

**\$295,245,000**

**PUERTO RICO AQUEDUCT AND SEWER AUTHORITY**  
**Revenue Bonds, Series 2012B (Senior Lien)**

The Revenue Bonds, Series 2012B (Senior Lien) (the “Series B Bonds”) of Puerto Rico Aqueduct and Sewer Authority (the “Authority”), the sole provider of public water and wastewater service in Puerto Rico, are being issued pursuant to a Master Agreement of Trust, dated as of March 1, 2008, as amended and restated as of February 15, 2012 (the “Trust Agreement”), with Banco Popular de Puerto Rico, trustee (the “Trustee”). The Series B Bonds will be issued to provide funds to be used by the Authority principally to repay or refinance certain outstanding indebtedness of the Authority. Concurrently with the issuance of the Series B Bonds, the Authority is issuing its \$1,800,450,000 Revenue Bonds, Series 2012A Bonds (Senior Lien) (the “Series A Bonds” and, together with the Series B Bonds, the “2012 Senior Bonds”) to provide funds to be used by the Authority principally to (i) repay or refinance certain outstanding indebtedness of the Authority, (ii) finance a portion of the Authority’s capital improvement program for the five fiscal year period ending June 30, 2016, and (iii) fund the newly created Budgetary Reserve Fund. The Series A Bonds are being offered for sale in the United States tax-exempt markets pursuant to a separate Official Statement. The issuance of the Series B Bonds is not contingent upon the issuance of the Series A Bonds. Capitalized terms not otherwise defined in this Official Statement are defined in “Definition of Certain Terms” in the *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement* included as *Appendix III*.

The 2012 Senior Bonds and any additional Senior Indebtedness (as defined herein on page 2) that the Authority has incurred or may incur from time to time under the Trust Agreement are payable solely from Authority Revenues as more fully described herein. The Trust Agreement generally establishes a gross lien on Authority Revenues as security for payment of debt service on Senior Indebtedness (including Senior Bonds) and Bonds (as defined herein on page III-3). The 2012 Senior Bonds will be secured on a parity in payment priority with the Authority’s outstanding Senior Indebtedness (including Senior Bonds) and any additional Senior Indebtedness (including Senior Bonds) that may be incurred. The Trust Agreement also allows the Authority to issue Bonds and incur other obligations payable from such Authority Revenues but with a claim thereon subordinate to the claim of the Senior Indebtedness.

The Series B Bonds will be issued as fully registered bonds without coupons in denominations of \$5,000 principal amount and integral multiples thereof. The Series B Bonds will be issued by means of a book-entry only system evidencing ownership and transfer of the Series B Bonds on the records of The Depository Trust Company (“DTC”) and its participants. Interest on the Series B Bonds will be payable on a monthly basis commencing on April 1, 2012. The Series B Bonds are subject to redemption at the option of the Authority, the earliest redemption date being July 1, 2015, as described herein. The inside cover page of this Official Statement contains information concerning the maturity schedules, interest payment dates, interest rates, prices and approximate yields of the Series B Bonds. Prospective investors should consider the information set forth in RISK FACTORS AND INVESTMENT CONSIDERATIONS before investing.

In the opinion of Pietrantoni Méndez & Alvarez LLC, Special Puerto Rico Tax Counsel, as described herein, under existing statutes, the Series B Bonds, and the interest thereon, are exempt from Commonwealth income, municipal license and property taxes. Under most circumstances, interest on the Series B Bonds will be exempt from United States federal income taxation to (i) individuals who are bona fide residents of Puerto Rico during the entire taxable year in which such interest is received and (ii) Puerto Rico corporations. The Series B Bonds are not otherwise exempt from United States federal income taxation. See TAX MATTERS herein regarding certain other tax considerations.

**The Series B Bonds are not a debt of the Commonwealth of Puerto Rico or any of its municipalities or other political subdivisions, other than the Authority, and neither the Commonwealth of Puerto Rico nor any such municipalities or other political subdivisions, other than the Authority, shall be liable for the payment of the principal of or interest on said Bonds.**

The issuance of the Series B Bonds and their purchase by the Underwriters are subject to the approval of legality by Nixon Peabody LLP, New York, New York, Bond Counsel, and certain other conditions. Pietrantoni Mendez & Alvarez LLC, San Juan, Puerto Rico will pass upon certain legal matters for the Underwriters and will act as Special Puerto Rico Tax Counsel, and Cancio Covas & Santiago, LLP, San Juan, Puerto Rico, will pass upon certain legal matters for the Authority. The Series B Bonds will be dated their date of delivery and are expected to be available for delivery through DTC on or about February 29, 2012.

BofA Merrill Lynch

Popular Securities

Santander Securities

UBS FS Puerto Rico

Barclays Capital

BBVAPR MSD

Citigroup

FirstBank PR Securities

Oriental Financial Services

Ramirez & Co. Inc.

Raymond James

Scotia MSD

**\$295,245,000**  
**PUERTO RICO AQUEDUCT AND SEWER AUTHORITY**  
**Revenue Bonds, Series 2012B (Senior Lien)**

| <b>Maturity Date</b><br><b>July 1</b> | <b>Principal</b><br><b>Amount</b> | <b>Interest Rate</b> | <b>Price</b> | <b>CUSIP*</b> |
|---------------------------------------|-----------------------------------|----------------------|--------------|---------------|
| 2014                                  | \$31,035,000                      | 3.35%                | 100.00       | 745160RT0     |
| 2016                                  | 33,665,000                        | 3.92                 | 100.00       | 745160RU7     |
| 2018                                  | 36,705,000                        | 4.45                 | 100.00       | 745160RV5     |
| 2020                                  | 40,255,000                        | 4.90                 | 100.00       | 745160RW3     |
| 2023                                  | 46,470,000                        | 5.00                 | 100.00       | 745160RY9     |

\$107,115,000 5.35% Term Bonds due July 1, 2027 - Price 100.00 CUSIP\* 745160RX1

\* Copyright, American Bankers Association. CUSIP data herein is provided by Standard & Poor's, CUSIP Service Bureau, a division of the McGraw-Hill Companies, Inc. This data is not intended to create a database and does not serve in any way as a substitute for the CUSIP Services. CUSIP numbers are provided for convenience of reference only. Neither the Authority nor the Underwriters take any responsibility for the accuracy of such numbers.

**In connection with this offering, the Underwriters may over-allot or effect transactions that stabilize or maintain the market price of the Series B Bonds at a level above that which might otherwise prevail in the open market. Such stabilizing, if commenced, may be discontinued at any time. The Underwriters may offer and sell the Series B Bonds to certain dealers and dealer banks and others at prices lower than the public offering prices stated on the inside cover page and said offering prices may be changed from time to time by the Underwriters.**

The information set forth herein has been obtained from sources which are believed to be reliable but, as to information from other than Puerto Rico Aqueduct and Sewer Authority (the "Authority"), is not guaranteed as to accuracy or completeness, and is not to be construed as a representation, by the Authority or the Underwriters. The information and expressions of opinion herein are subject to change without notice, and neither the delivery of the Official Statement nor any sale made hereunder shall under any circumstances create any implication that there has been no change in the affairs of the Authority since the date hereof. The various tables may not add due to rounding of figures.

The Underwriters have reviewed the information in this Official Statement in accordance with, and as part of, their respective responsibilities to investors under the federal and Commonwealth securities laws as applied to the facts and circumstances of this transaction, but the Underwriters do not guarantee the accuracy or completeness of such information.

No dealer, broker, sales representative or other person has been authorized by the Authority or the Underwriters to give any information or to make any representations, other than those contained in this Official Statement in connection with the offering described herein, and if given or made, such other information or representations must not be relied upon as having been authorized by any of the foregoing. This Official Statement does not constitute an offer to sell or the solicitation of an offer to buy, nor shall there be any sale of the Series A Bonds, by any person in any jurisdiction in which it is unlawful for such person to make such offer, solicitation or sale.

All quotations from and summaries and explanations of provisions of laws, the Trust Agreement, the Series A Bonds and other documents herein do not purport to be complete. Reference is made to said laws, Trust Agreement, the Series B Bonds and other documents for full and complete statement of their provisions. Copies of the above are available for inspection at the offices of the Authority or the Trustee.

**The Series B Bonds have not been registered under the Securities Act of 1933, as amended, in reliance upon exemptions contained in such act. The registration or qualification of the Series B Bonds in accordance with applicable provisions of laws of the states in which Series B Bonds have been registered or qualified and the exemption from registration or qualification in other states cannot be regarded as a recommendation thereof. Neither these states nor any of their agencies have passed upon the merits of the Series B Bonds or the accuracy or completeness of this Official Statement. Any representation to the contrary may be a criminal offense.**

#### **CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS IN THIS OFFICIAL STATEMENT**

Certain statements included or incorporated by reference in this Official Statement constitute projections or estimates of future events, generally known as forward-looking statements. These statements are generally identifiable by the words "estimates," "projects," "anticipates," "expects," "intends," "believes" and similar expressions. The achievement of certain results or other expectations contained in such forward-looking statements involves known and unknown risks, uncertainties and other factors which may cause actual results, performance or achievements described to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. The Authority does not plan to issue any updates or revisions to those forward-looking statements if or when changes in their expectations, or event, conditions or circumstances on which such statements are based, occur.

The projections set forth in this Official Statement, if any, and in the Commonwealth Financial Information and Operating Data Report, dated December 6, 2011, which is incorporated by reference to this Official Statement, were not prepared with a view toward complying with the guidelines established by the American Institute of Certified Public Accountants with respect to prospective financial information, but, in the view of the Commonwealth's and the Authority's responsible officers, were prepared on a reasonable basis, reflect the best currently available estimates and judgments, and present, to the best of such officers' knowledge and belief, the expected course of action and the expected future financial performance of the Commonwealth and the Authority. However, this information is not fact and should not be relied upon as being necessarily indicative of future results, and readers of this Official Statement are cautioned not to place undue reliance on the prospective financial information. Neither the Commonwealth's independent auditors, nor any other independent auditors, have compiled, examined, or performed any procedures with respect to the prospective financial information contained herein or in any document incorporated by reference, nor have they expressed any opinion or any other form of assurance on such information or its achievability and disclaim any association with the prospective financial information. Neither the Commonwealth's independent auditors, nor any other independent auditors, have been consulted in connection with the preparation of the prospective financial information set forth in this Official Statement and in the Commonwealth Financial Information and Operating Data Report, dated December 6, 2011, which is incorporated by reference to this Official Statement, which is solely the product of the Commonwealth and the Authority, and the independent auditors assume no responsibility for its content.

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**SUMMARY STATEMENT**

*The following summary statement is subject in all respects to the additional information contained in this Official Statement, including the appendices attached hereto. Capitalized terms not otherwise defined in this Official Statement are defined in “Definition of Certain Terms” in the Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement included as Appendix III.*

**2012 Senior Bonds .....** The Puerto Rico Aqueduct and Sewer Authority (the “Authority”) is issuing \$295,245,000 principal amount of its Revenue Bonds, Series 2012B (Senior Lien) (the “Series B Bonds”). Concurrently with the issuance of the Series B Bonds, the Authority is issuing \$1,800,450,000 principal amount of its Revenue Bonds, Series 2012A (Senior Lien) (the “Series A Bonds” and, together with the Series B Bonds, the “2012 Senior Bonds”). The Series A Bonds are being offered for sale in the United States tax-exempt markets pursuant to a separate Official Statement. The issuance of the Series B Bonds is not contingent upon the issuance of the Series A Bonds.

**Risk Factors .....** An investment in the 2012 Senior Bonds involves a degree of risk. A purchaser of such Bonds is advised to read RISK FACTORS AND INVESTMENT CONSIDERATIONS herein for a discussion of certain risk factors which should be considered in connection with an investment in the 2012 Senior Bonds.

**Plan of Financing .....** The Series B Bonds are being issued principally to repay or refinance certain outstanding indebtedness of the Authority. See PLAN OF FINANCING. The Authority may determine, in its sole discretion, to obtain credit enhancement with respect to some or all of the Series B Bonds. The Underwriters will provide notice on or before the date of pricing if the Authority determines to provide such credit enhancement for all or any part of the Series B Bonds.

The following table shows the Authority’s debt as of December 31, 2011, and as adjusted as of February 15, 2012 and to give effect to the issuance of the 2012 Senior Bonds. The Operating Reserve Fund Line of Credit (discussed herein) allows the Authority to draw up to \$150 million for working capital and other purposes, as set forth in the Trust Agreement.

|   | <u>12/31/2011</u>  | <u>As Adjusted</u> |
|---|--------------------|--------------------|
|   | (in thousands)     |                    |
| Revenue Bonds:  |                    |                    |
| 2008 Series A Bonds (Senior) *                                    | \$1,344,255        | \$1,344,255        |
| 2008 Series B Bonds (Senior)                                      | 22,445             | 22,445             |
| 2012 Senior Bonds   | -                  | 2,095,695          |
| Commonwealth Guaranteed Indebtedness:                             |                    |                    |
| 2008 Commonwealth Guaranteed Bonds                                | 284,755            | 284,755            |
| Guaranteed RUS Bonds  | 376,086            | 372,968            |
| Revolving Funds Loans   | 416,178            | 435,727            |
| Commonwealth Supported Obligations (PFC<br>Superaqueduct Bonds) † |                    |                    |
|   | 162,700            | 162,700            |
| Notes:  |                    |                    |
| Term Loan (Senior Subordinate lien) ‡                             | 240,272            | -                  |
| Lines of Credit   | 1,139,356          | 37,614             |
| Operating Reserve Fund Line of Credit                             | -                  | -                  |
| Transition Line of Credit   | -                  | -                  |
| Total bonds and notes payable                                     | <u>\$3,986,047</u> | <u>\$4,756,159</u> |

\* Includes accreted value of approximately \$28 million related to Convertible Capital Appreciation Bonds issued as part of the 2008 Senior Bonds.

† Represents Commonwealth Appropriation Debt that the Authority has agreed to pay as long as its Operating Revenues are sufficient for such purposes. See "Commonwealth Supported Obligations" under DEBT for a description of other Commonwealth Appropriations Debt related to the Authority.

‡ Repaid on January 17, 2012 with the proceeds of a bond anticipation note to be repaid with the proceeds of the Series B Bonds.

For more information regarding the Authority's outstanding debt, see DEBT and ANNUAL DEBT SERVICE.

### Security for 2012 Senior Bonds

Revenue Pledge .....

The 2012 Senior Bonds are payable solely from and secured by a gross lien on Authority Revenues other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which moneys are not subject to the lien of the Trust Agreement and can only be used to make such payments. As Senior Bonds, the 2012 Senior Bonds, together with the Authority's Senior Indebtedness outstanding from time to time, have a first claim on such Authority Revenues under the Trust Agreement. The 2012 Senior Bonds, however, will not be secured by a Senior Debt Service Reserve Account. For a more detailed description of what constitutes Authority Revenues, please see "Source of Payment" under SECURITY FOR THE BONDS and "Definition of Certain Terms" in the *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement* included in this Official Statement as *Appendix III*. Upon the occurrence and continuation of an Event of Default and an acceleration of the Bonds, however, the Trustee shall pay Current Expenses prior to the payment of debt service on any Bonds. See "Acceleration" under SECURITY FOR THE BONDS.



Amendment to Master Agreement of Trust .....

The Trust Agreement, as amended and restated as of February 15, 2012, provides for, among other things, (i) a gross lien on available Authority Revenues to secure the payment of debt service on Bonds and Other System Indebtedness and (ii) a revised rate covenant and revised additional bonds tests. Debt service on Senior Indebtedness, Senior Subordinate Indebtedness and Subordinate Indebtedness, together with required deposits, if any, to the related debt service reserve funds under the Trust Agreement (all as described in greater detail below), will be made from available Authority Revenues prior to payment of the Authority's Current Expenses. The change to a gross lien necessitated increases to the coverage levels required by the rate covenant and additional bonds tests. The rating agencies have confirmed the ratings on the Authority's outstanding Bonds. See "Amendment to the Master Agreement of Trust" under SECURITY FOR THE BONDS.

The Authority is also proposing an amendment to the Trust Agreement that would increase from 25% to a majority, the percentage of the aggregate principal amount of Senior Indebtedness (or if no Senior Indebtedness is then Outstanding, of Senior Subordinate Indebtedness) required to declare the entire unpaid principal of the Bonds due and payable. The amendment is expected to become effective on February 29, 2012 upon receiving the consent of Merrill Lynch, Pierce, Fenner & Smith Incorporated, as representative of and on behalf of the Underwriters. See "Proposed Amendment to Trust Agreement" under SECURITY FOR THE BONDS.

Rate Setting Powers.....

Rates, fees and charges are set and imposed solely by the Authority, pursuant to a public hearing procedure required by law, and are not subject to regulatory approval by the Commonwealth of Puerto Rico (the "Commonwealth") or any of its agencies. For a description of the Authority's rate setting powers, including its right to adjust rates upwards, see "Rate Setting Powers" under RATES, BILLINGS AND COLLECTIONS.

Rate Covenant .....

Under the Trust Agreement, as amended and restated, the Authority has covenanted to establish and collect rates, fees and charges so that it meets the following four independent requirements (which will be calculated annually no later than six months after the end of each Fiscal Year based upon the Operating Revenues and Authority Revenues set forth in the Authority's most recent audited financial statements): (i) Operating Revenues shall be sufficient to be at least equal to 250% of Annual Debt Service with respect to the Senior Indebtedness for the current Fiscal Year; (ii) Operating Revenues shall be sufficient to be at least equal to 200% of Annual Debt Service with respect to the Senior Indebtedness and the Senior Subordinate Indebtedness for the current Fiscal Year; (iii) Operating Revenues shall be sufficient to be at least equal to 150% of Annual Debt Service with respect to all Bonds and Other System Indebtedness for the current Fiscal Year; and (iv) Authority Revenues shall be sufficient to be at least equal to 100% of (A) Annual Debt Service on Indebtedness for the current Fiscal Year, (B) Current Expenses for the current Fiscal Year, (C) the amounts, if any, in the current Fiscal Year necessary to be deposited in any Senior Debt Service Reserve Account, Senior Subordinate Debt Service Reserve Account or Subordinate Debt Service Reserve Account to restore the amount on deposit therein to the amount of the applicable Debt Service Reserve Requirement (provided that such Accounts will be deemed to be funded at the applicable Debt Service Reserve Requirement for so

long as the monthly deposits to such Accounts from Authority Revenues as required by the Trust Agreement are being made), (D) the amount, if any, necessary to be deposited in the Operating Reserve Fund for the current Fiscal Year to maintain the balance therein at the Operating Reserve Fund Requirement and, (E) the amount, if any, necessary to be deposited in the Capital Improvement Fund and the Rate Stabilization Account of the Surplus Fund in accordance with the Annual Budget for the current Fiscal Year.

**Additional Senior Indebtedness**

Additional Senior Indebtedness, secured on a parity with the outstanding Senior Bonds, may be issued or incurred for any lawful purpose, including capital improvements to the Systems, and to refund or otherwise refinance any Outstanding Indebtedness and other Authority obligations, subject to compliance with certain financial tests provided in the Trust Agreement. For example, the Authority may issue Senior Bonds to finance capital improvements if, among other things, the amount of Operating Revenues for any twelve consecutive calendar months out of the eighteen calendar months immediately preceding the date of issuance of such Senior Bonds (adjusted to give effect for such twelve month period to any increase or decrease in rates, fees, rentals or other charges for which all legal conditions to effectiveness have been met as of the date of issuance of such additional Senior Bonds), shall be not less than (A) 250% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Outstanding Senior Indebtedness and the Senior Bonds then to be issued (and other Senior Indebtedness incurred together with said Senior Bonds), and (B) 150% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on all Bonds and Other System Indebtedness then Outstanding, the Additional Senior Bonds to be issued and any other Bonds and Other System Indebtedness to be issued or incurred simultaneously therewith, plus the amounts required to be deposited in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund from Authority Revenues pursuant to the Trust Agreement. See “Additional Bonds” under SECURITY FOR THE BONDS.

**Additional Indebtedness .....**

Additional Senior Subordinate and Subordinate Indebtedness may also be issued or incurred for any lawful purpose, subject to compliance with certain other financial tests provided in the Trust Agreement. See “Additional Bonds” under SECURITY FOR THE BONDS.

**The Authority.....**

The Authority, a governmental instrumentality of the Commonwealth, was established in 1945 for the purpose of owning and operating the public water supply system (the “Water System”) and wastewater system (the “Wastewater System”) and, together with the Water System, the “Systems”) and is the sole provider of public water and wastewater services in Puerto Rico. The Authority has organized its service area into five regions in order to decentralize the management and administration of many operational matters. The Authority has taken and is continuing to take steps designed to strengthen and improve the operation and financial condition of the Systems. See THE AUTHORITY.

**The Systems.....**

The Systems provide water and wastewater service in Puerto Rico to 98% and 59% of Puerto Rico’s population, respectively. The Water System provides an estimated average of 646 million gallons per day (“mgd”) of water to 1,290,800 accounts, of which 1,215,896 are residential accounts, representing 94% of the Water System customers. The Wastewater System

consists of several collection systems that discharge into 54 wastewater treatment plants. The Wastewater System serves 759,167 accounts, of which 708,800 are residential accounts, representing 93% of the Authority's Wastewater System customers. The Wastewater System treats on average 228 mgd of wastewater. All information in this paragraph is as of June 30, 2011. See THE WATER AND WASTEWATER SYSTEMS.

**Capital Improvement Program ...**

The Authority's capital improvement program for the five fiscal year period ending on June 30, 2016 (as the same may be amended and updated from time to time, the "Five-Year CIP") is designed to modernize the Systems, protect public health, safeguard environmental quality, permit continued economic development and meet the requirements of various consent decrees negotiated with, and administrative orders issued by, the United States Environmental Protection Agency ("EPA") and a settlement agreement negotiated with the Puerto Rico Department of Health ("DOH") (as discussed below). Approximately \$1.389 billion of the proceeds of the Series A Bonds will be applied to (i) refinance indebtedness incurred by the Authority to pay costs related to capital improvements undertaken from 2008 through 2011 and (ii) pay or finance costs related to its Five-Year CIP. Additional funding for the Five-Year CIP is expected to be provided chiefly through the issuance of additional Senior Indebtedness, federal and other grants, internally generated funds, and other financing sources. See ENVIRONMENTAL MATTERS and CAPITAL IMPROVEMENT PROGRAM.

**2006 EPA Consent Decree.....**

In June 2006, the EPA and the Authority entered into a consent decree resolving alleged violations under the Clean Water Act at the Authority's wastewater treatment plants (the "2006 EPA Consent Decree") after a federal grand jury indicted and charged the Authority with violations of the Clean Water Act for illegally discharging pollutants from nine sanitary wastewater treatment plants and from sludge treatment systems at five drinking water treatment plants. Under the 2006 EPA Consent Decree, the Authority paid \$1 million to the United States as a civil penalty and is required to implement system-wide remedial measures at all wastewater treatment plants owned and operated by the Authority over a 15-year period, among other things. The Authority has budgeted approximately \$377 million in the Five-Year CIP for 2006 EPA Consent Decree projects. As a penalty stemming from the Authority's criminal indictment and guilty plea agreement, the Authority was placed on probation for five years (through June 2012) and paid \$9 million to the United States Treasury. See "Regulatory Compliance" under ENVIRONMENTAL MATTERS.

**2006 Drinking Water  
Settlement Agreement .....**

In December 2006, the Authority settled litigation brought by the DOH seeking enforcement of multiple administrative orders issued by the DOH for alleged violations of various requirements under the Safe Drinking Water Act, enacted in 1974 and significantly amended in 1986 and 1996 (the "Safe Drinking Water Act"), and violations by the Authority of previous settlement agreements with the DOH addressing violations of monitoring and turbidity regulatory requirements (the "2006 Drinking Water Settlement Agreement"). The 2006 Drinking Water Settlement Agreement superseded all previous administrative enforcement actions and settlement agreements with the DOH on the subject and was approved by the Court of First Instance, Superior Court of San Juan on June 16, 2008. Under the 2006 Drinking Water Settlement Agreement, the Authority paid a \$1 million civil penalty to the Department of the Treasury of the

Commonwealth and is required to implement system-wide remedial measures in the Authority's potable water systems over a 15-year period to ensure compliance with Safe Drinking Water Act requirements, among other things. The Authority is also subject to the payment of stipulated penalties for failure to meet certain requirements of the 2006 Drinking Water Settlement Agreement, some of which are to be deposited into an escrow account to be established by the Authority. Subject to certain conditions, certain stipulated penalties deposited in the escrow account may be used by the Authority to finance compliance projects arising under the 2006 Drinking Water Settlement Agreement and under local and federal laws applicable to the Water System. The Authority has budgeted approximately \$166 million in the Five-Year CIP for 2006 Drinking Water Settlement Agreement projects. See "Regulatory Compliance" under ENVIRONMENTAL MATTERS.

**2010 EPA Consent Decree.....**

On May 3, 2010, the United States of America, at the request of the EPA, filed with the United States District Court for the District of Puerto Rico a new consent decree (the "2010 EPA Consent Decree") to resolve (i) alleged Clean Water Act violations at the Authority's water treatment plants, (ii) Safe Drinking Water Act violations at three unfiltered surface water treatment plants of the Authority, and (iii) certain unresolved administrative enforcement actions and existing water treatment plant sludge treatment systems (the "STS") consent decrees. The 2010 EPA Consent Decree superseded these prior enforcement actions and consent decrees and was approved by the United States District Court for the District of Puerto Rico on August 24, 2010. Under the 2010 EPA Consent Decree, the Authority is required to implement at its water treatment plants a compliance plan to meet National Pollutant Discharge Elimination System permit requirements, measures to properly handle sludge disposals, and system-wide remedial measures and long-term capital improvements to address washwater discharges, among other things. Under the 2010 EPA Consent Decree, the Authority paid a \$1.02 million civil penalty and is required to commit at least \$2.5 million towards a supplemental environmental project. The Authority has budgeted approximately \$92 million in the Five-Year CIP for 2010 EPA Consent Decree projects. See "Regulatory Compliance" under ENVIRONMENTAL MATTERS.

**Consulting Engineer  
and Reports .....**

MP Engineers of Puerto Rico, PSC ("MPPR") and its subcontractor, Malcolm Pirnie, Inc., have prepared a Consulting Engineer's Report, which includes the Consulting Engineer's Report dated February 2011 (covering the period from July 1, 2009 through June 30, 2010) (the "2010 CE Report"), as supplemented by the Consulting Engineer's Supplemental Report dated January 2012 (the "Supplemental CE Report" and, together with the 2010 CE Report, the "Consulting Engineer's Report"), on the condition of the Authority's Systems, its capital improvement program, its financial condition and its financial projections. The Consulting Engineer's Report is attached hereto as *Appendix II*.

**Litigation .....**

There is currently no litigation pending or threatened that will affect the issuance or validity of the 2012 Senior Bonds or any other outstanding Indebtedness of the Authority. The Authority is a defendant in various lawsuits. See LITIGATION.

**\$295,245,000**  
**PUERTO RICO AQUEDUCT AND SEWER AUTHORITY**  
**Revenue Bonds, Series 2012B (Senior Lien)**

**INTRODUCTORY STATEMENT**

The purpose of this Official Statement, which includes the cover page, the inside cover page, the summary statement, the appendices and the information incorporated by reference below, is to provide certain information in connection with the issuance and sale by Puerto Rico Aqueduct and Sewer Authority (the “Authority”) of \$295,245,000 principal amount of its Revenue Bonds, Series 2012B (Senior Lien) (the “Series B Bonds”). Concurrently with the issuance of the Series B Bonds, the Authority is issuing its \$1,800,450,000 Revenue Bonds, Series 2012A (Senior Lien) (the “Series A Bonds” and together with the Series B Bonds, the “2012 Senior Bonds”). The Series A Bonds are being offered for sale in the United States tax-exempt markets pursuant to a separate Official Statement. The issuance of the Series B Bonds is not contingent upon the issuance of the Series A Bonds. Certain capitalized terms used in this Official Statement are defined in “Definitions of Certain Terms” in the *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement* included as *Appendix III*.

*The Authority.* The Authority is a governmental instrumentality of the Commonwealth of Puerto Rico (the “Commonwealth” or “Puerto Rico”) created by Act No. 40 of the Legislative Assembly of Puerto Rico, approved May 1, 1945, as amended and reenacted (the “Act”), for the purpose of owning and operating the public water supply and wastewater systems in the Commonwealth and is the sole provider of public water and wastewater services in Puerto Rico.

The Authority’s water supply system (the “Water System”) serves most (approximately 98%) of Puerto Rico’s population. The Authority’s wastewater system (the “Wastewater System” and, together with the Water System, the “Systems”) serves more than half (approximately 59%) of Puerto Rico’s population. According to the United States Census Bureau, the population of Puerto Rico was 3,725,789 in 2010. Detailed demographic and economic information concerning Puerto Rico is incorporated by reference as set forth below.

The Authority contracted MP Engineers of Puerto Rico, PSC (“MPPR”) and its subcontractor, Malcolm Pirnie, Inc. (together, the “Consulting Engineer”), to (i) prepare a Consulting Engineer’s Report, which consists of the Consulting Engineer’s Report dated February 2011 (covering the period from July 1, 2009 through June 30, 2010) (the “2010 CE Report”), as supplemented by the Consulting Engineer’s Supplemental Report dated January 2012 (the “Supplemental CE Report” and, together with the 2010 CE Report, the “Consulting Engineer’s Report”), on the condition of the Systems and the Authority’s five-year capital improvement program for the five fiscal year period ending June 30, 2016 (as the same may be amended and updated from time to time, the “Five-Year CIP”), its financial condition and its financial projections and (ii) provide the services of the Consulting Engineer under the Trust Agreement (hereinafter described). The Consulting Engineer’s Report is attached hereto as *Appendix II*. As set forth in the Consulting Engineer’s Report and in “Summary of Certain Conclusions of the Consulting Engineer” under THE WATER AND WASTEWATER SYSTEMS below, the Consulting Engineer has concluded that, with the possible exception of buried infrastructure improvements, the Five-Year CIP and the Authority’s operational initiatives are generally in alignment with the operational and regulatory needs of the Systems. See page 8-3 of the 2010 CE Report.

The Five-Year CIP is estimated to cost, in current dollars, \$1.56 billion. Approximately \$635 million of the Five-Year CIP is budgeted for projects covering portions of the Systems specifically required to comply with (i) a court order approving a comprehensive and all inclusive consent decree resulting from negotiations between the Authority and the United States Environmental Protection Agency (“EPA”) to resolve criminal sanctions and certain claims under prior administrative enforcement actions and consent decrees based on federal effluent violations, operation and maintenance violations, and unlawful discharge violations (the “2006 EPA Consent Decree”), (ii) a new consent decree addressing unresolved administrative enforcement actions and existing water treatment plant sludge treatment systems (the “STS”) consent decrees (the “2010 EPA Consent Decree”), and (iii) a comprehensive settlement agreement with Puerto Rico Department of Health (“DOH”) entered into in 2006 to resolve alleged violations by the Authority of the federal Safe Drinking Water Act, enacted in 1974 and significantly amended in

1986 and 1996 (the “Safe Drinking Water Act”) and two prior settlement agreements (the “2006 Drinking Water Settlement Agreement”). The Five-Year CIP also includes the investment of \$266 million for additional non-mandatory compliance projects. The remainder of the Five-Year CIP is devoted to Systems’ improvements and modernization. See ENVIRONMENTAL MATTERS.

As set forth in more detail in this Official Statement, the Authority faces significant operating, regulatory compliance, rate setting and financial challenges. Current management, which has been running the Authority since early 2004 upon its transition from private sector management, has demonstrated the willingness to confront these challenges and has achieved certain success in the years in which it has been in control. There remain, however, many hurdles to overcoming these challenges, some of which are described herein, and it may not be possible for the Authority to accomplish its goals of regulatory compliance, completion of major Systems’ improvements and achieving its financial independence. See RISK FACTORS AND INVESTMENT CONSIDERATIONS.

*Purpose of the Series B Bonds.* The Series B Bonds are being issued to provide funds to (i) repay a bond anticipation note issued by the Authority in the aggregate principal amount of \$241 million the proceeds of were used to repay certain of the Authority outstanding indebtedness, (ii) provide funds to repay certain lines of credit provided by Government Development Bank for Puerto Rico (“Government Development Bank” or “GDB”) to the Authority to finance operating expenses and as interim financing for a portion of its capital improvement plan, (iii) pay capitalized interest on the Series B Bonds through July 1, 2013, and (iv) pay the costs of issuance of the Series B Bonds.

*Security for the Bonds, including the 2012 Senior Bonds.* The 2012 Senior Bonds will be issued under and secured by a Master Agreement of Trust, dated as of March 1, 2008, as amended and restated as of February 15, 2012 (the “Trust Agreement”), between the Authority and Banco Popular de Puerto Rico, trustee (the “Trustee”), one or more series supplements thereto fixing their details (the “2012 Series Supplement”) and a resolution of the Governing Board of the Authority (the “Bond Resolution”). The 2012 Senior Bonds, the Authority’s \$1,316,204,456 Revenue Bonds, Series A (Senior Lien) and \$22,445,000 Revenue Bonds, Series B (Senior Lien) issued on March 18, 2008 (collectively, the “2008 Senior Bonds”) currently outstanding and any Additional Bonds issued on a parity therewith under the Trust Agreement are collectively referred to in this Official Statement as the “Senior Bonds.” Under the Trust Agreement, the Authority is also permitted to incur other Indebtedness on a parity with the Senior Bonds (upon compliance with certain financial tests), and such Indebtedness together with the Senior Bonds are referred to as “Senior Indebtedness.” The Senior Indebtedness has a first claim on Authority Revenues other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which moneys are not subject to the lien of the Trust Agreement and can only be used to make such payments.

The Authority is permitted under the Trust Agreement to issue two additional types of Bonds with a claim on Authority Revenues subordinate to the claim on Authority Revenues of the Senior Indebtedness. “Senior Subordinate Bonds” are issuable for any lawful purpose of the Authority upon the Authority’s satisfying the applicable financial tests for their issuance (see SECURITY FOR THE BONDS) and together with other Indebtedness permitted to be incurred by the Authority on a parity with the Senior Subordinate Bonds in satisfaction of the same tests (collectively, “Senior Subordinate Indebtedness”) will have a first claim on Authority Revenues, after the claim of the Senior Indebtedness has been satisfied. “Subordinate Bonds” are issuable also for any lawful purpose of the Authority upon the Authority’s satisfying the applicable financial tests for their issuance (see SECURITY FOR THE BONDS) and together with other Indebtedness permitted to be incurred by the Authority on a parity with the Subordinate Bonds in satisfaction of the same tests (collectively, “Subordinate Indebtedness”) will have a claim on Authority Revenues subordinate to the claim of the Senior Indebtedness and the Senior Subordinate Indebtedness. Collectively, the Senior Bonds, Senior Subordinate Bonds and Subordinate Bonds are referred to herein as the “Bonds.”

Under the Trust Agreement, Authority Revenues are pledged in the priority set forth therein to the payment of the principal of and premium, if any, and interest on the Bonds and other Indebtedness on a parity therewith and maintaining reserves therefor. Operating Revenues remaining after the payment of the Bonds and such parity Indebtedness (and maintaining such reserves) will be used to pay the Authority’s Current Expenses, maintain the required balance in the Operating Reserve Fund and in the Capital Improvement Fund and thereafter will be used to

pay debt service on the Authority's outstanding Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations. See SECURITY FOR THE BONDS. Upon the occurrence and continuation of an Event of Default and an acceleration of the Bonds, however, the Trustee shall pay Current Expenses prior to the payment of debt service on any Bonds. See "Acceleration" under SECURITY FOR THE BONDS. The Authority is also proposing an amendment to the Trust Agreement that would increase from 25% to a majority, the percentage of the aggregate principal amount of Senior Indebtedness (or if no Senior Indebtedness is then Outstanding, of Senior Subordinate Indebtedness) required to declare the entire unpaid principal of the Bonds due and payable. The amendment is expected to become effective on February 29, 2012 upon receiving the consent of Merrill Lynch, Pierce, Fenner & Smith Incorporated, as representative of and on behalf of the Underwriters. See "Proposed Amendment to Trust Agreement" under SECURITY FOR THE BONDS.

*Amendment to Master Agreement of Trust.* The Trust Agreement, as amended and restated as of February 15, 2012, provides for, among other things, (i) a gross lien on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which moneys are not subject to the lien of the Trust Agreement and can only be used to make such payments) to secure the payment of debt service on Bonds and Other System Indebtedness and (ii) a revised rate covenant and revised additional bonds tests. Debt service on Senior Indebtedness, Senior Subordinate Indebtedness and Subordinate Indebtedness, together with required deposits, if any, to the related debt service reserve funds under the Trust Agreement (all as described in greater detail below), will be made from Operating Revenues prior to payment of the Authority's Current Expenses. Prior to the amendment, Operating Revenues were applied to cover Current Expenses prior to their application to cover debt service. The change to a gross lien necessitated increases to the coverage levels required by the rate covenant and additional bonds tests. See "Amendment to Master Agreement of Trust" under SECURITY FOR THE BONDS.

*Fiscal Oversight Agreement.* The Authority and Government Development Bank, as fiscal agent for the Authority, entered into a fiscal oversight agreement, dated July 9, 2009, as amended on October 20, 2010 (the "Existing FOA"), pursuant to which the Authority agreed to implement a comprehensive expense reduction program, including certain fiscal oversight controls, subject to laws and existing agreements of the Authority, and provide Government Development Bank with certain financial information and operating data, as well as other financial information reasonably requested by Government Development Bank. In connection with the issuance of the 2012 Senior Bonds, the Authority, Government Development Bank, and the Commonwealth will enter into a Fiscal Oversight and Support Agreement (the "Fiscal Oversight Agreement") that will amend and restate the Existing FOA and establish a new Budgetary Reserve Fund, held by Government Development Bank in trust for the Authority, which will be funded initially with a portion of the proceeds of the Series A Bonds. See "Budgetary Reserve Fund" under SECURITY FOR THE BONDS. The Fiscal Oversight Agreement is intended to allow the Authority to become self sufficient and to protect and improve the credit rating of the Authority, so that the Authority may obtain adequate financing to fund its capital expenditure requirements and operate the Systems in an efficient and reliable manner and in compliance with applicable laws and regulations and other regulatory requirements. For more information regarding the Fiscal Oversight Agreement, see "Fiscal Oversight Agreement" under THE AUTHORITY.

*Commonwealth Guaranteed Indebtedness.* As of December 31, 2011, the Authority had outstanding \$284.8 million principal amount of Revenue Refunding Bonds, 2008 Series A and 2008 Series B, each guaranteed by the Commonwealth (collectively, the "2008 Commonwealth Guaranteed Bonds"), that were issued under Resolution No. 1583, as amended and restated as of March 7, 2008 (as so amended and restated, "Resolution 1583"). As of December 31, 2011, the Authority also had outstanding \$376.1 million total principal amount of multiple series of Revenue Bonds, guaranteed by the Commonwealth, issued to Rural Utilities Service of the United States Department of Agriculture (the "Guaranteed RUS Bonds" and, together with the 2008 Commonwealth Guaranteed Bonds and any other bonds issued before July 1, 2015 under Resolution 1583 or Resolution 1224, hereinafter mentioned, the "Guaranteed Bonds") that were issued under Resolution No. 1224, adopted by the Authority on August 12, 1986, as amended ("Resolution 1224" and, together with Resolution 1583, the "Guaranteed Bond Resolution"). Under the Guaranteed Bond Resolution, after being released from the lien of the Trust Agreement, all Authority Revenues are deposited into a revenue fund held by the fiscal agent thereunder (also Banco Popular de Puerto Rico) to be used to pay debt service on the Guaranteed Bonds. The Guaranteed Bonds are considered Commonwealth Guaranteed Indebtedness under the Trust Agreement.

As of December 31, 2011, the Authority also had outstanding \$416.2 million total principal amount of revolving loans from the Puerto Rico Water Pollution Control Revolving Fund (the "Pollution Control Revolving Fund") and the Puerto Rico Safe Drinking Water Revolving Fund (the "Drinking Water Revolving Fund," and together with the Pollution Control Revolving Fund, the "Revolving Funds"), which are subordinate to the Senior, Senior Subordinate, and Subordinate Indebtedness, are payable from the Commonwealth Payments Fund, and most of which are guaranteed by the Commonwealth (the "Guaranteed State Revolving Loans" and, together with the Guaranteed Bonds, the "Commonwealth Guaranteed Indebtedness").

*Commonwealth Supported Obligations.* In addition to the Commonwealth Guaranteed Indebtedness, the Authority currently has notes outstanding held by Puerto Rico Public Finance Corporation ("PFC") securing \$386.8 million of outstanding PFC bonds the proceeds of which were used to finance projects related to the Authority and the Systems and to cover certain operating expenses of the Authority (collectively, the "PFC Bonds"). The PFC Bonds are contractually payable "solely" from Commonwealth budgetary appropriations. The Authority, however, has agreed to pay debt service on the PFC Bonds the proceeds of which were used to finance the construction of the North Coast Superaqueduct System (the "PFC Superaqueduct Bonds"). As of December 31, 2011, the Authority had outstanding \$162.7 million in notes securing the PFC Superaqueduct Bonds. The PFC Bonds are considered Commonwealth Supported Obligations under the Trust Agreement, subordinate to the payment of Senior, Senior Subordinate and Subordinate Indebtedness.

Until 2006, the Commonwealth (directly or indirectly through budgetary appropriations) had made all of the debt service payments on the Commonwealth Guaranteed Indebtedness and the PFC Bonds. In 2006, in order to help alleviate its budget constraints, the Commonwealth requested that the Authority, as part of its actions to restore its operations to financial self-sufficiency, recommence, in respect of the Commonwealth Guaranteed Indebtedness and begin, in respect of the PFC Superaqueduct Bonds, to make debt service payments on said obligations, and the Authority agreed. The projections included in this Official Statement of the Authority's revenues and expenses include line items (subordinate to the payment of Current Expenses of the Authority) for this debt service. The payment of this debt service is included in the calculations the Authority must undertake to show compliance with its Rate Covenant under the Trust Agreement.

The Authority currently has a \$150 million line of credit from Government Development Bank which is used to satisfy the requirements of the Operating Reserve Fund (discussed in "Reserve Funds" under SECURITY FOR THE BONDS) under the Trust Agreement. Under this line, the Authority is authorized to draw funds in situations described in the Trust Agreement. See DEBT and *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement in Appendix III.*

*Audited Financial Statements.* This Official Statement includes as *Appendix I* the Authority's audited financial statements as of and for the fiscal years ended June 30, 2010 and 2011.

*Incorporation of Certain Information by Reference.* This Official Statement also includes the following documents, which have been filed with the Municipal Securities Rulemaking Board ("MSRB") through the Electronic Municipal Market Access system ("EMMA") and are incorporated herein by reference:

- (i) the Comprehensive Annual Financial Report of the Commonwealth for the fiscal year ended June 30, 2010, prepared by the Department of the Treasury of the Commonwealth ("Treasury Department") (the "Commonwealth's Annual Financial Report"), which was filed with the MSRB through EMMA on April 29, 2011. The Commonwealth's Annual Financial Report includes the basic financial statements of the Commonwealth as of and for the fiscal year ended June 30, 2010, together with the independent auditors' report thereon (which report expresses an unqualified opinion and includes emphasis of matter paragraphs regarding investments held by the Employees Retirement System, Teachers Retirement System and Judiciary Retirement System (the "Retirement Systems") whose fair values have been estimated in the absence of readily determinable fair values and the Retirement Systems' unfunded actuarial accrued liabilities and funded ratios as of June 30, 2010), dated April 27, 2011, of Deloitte & Touche LLP, certified public accountants. Deloitte & Touche LLP did not audit the financial statements of certain activities, funds, and component units separately identified in its report. Those financial statements were audited by other auditors whose reports have been furnished to Deloitte & Touche LLP, and its opinion as to the basic financial statements, insofar as it relates to the



amounts included in the basic financial statements pertaining to such activities, funds and component units, is based solely on the reports of the other auditors; and

- (ii) the Commonwealth Financial Information and Operating Data Report, dated December 6, 2011, which is attached as Appendix I to the Official Statement relating to the Puerto Rico Public Finance Corporation's \$437,645,000 2012 Series B Bonds, which was filed with the MSRB through EMMA on December 6, 2011. The Commonwealth Report includes important operating and financial information about the Commonwealth, including information about its economy, historical revenues and expenditures of its General Fund, the year end results for fiscal year 2011, the budget for fiscal year 2012, the debt of the Commonwealth's public sector, the financial situation of the Government's retirement systems and certain litigation involving the Commonwealth (the "Commonwealth Report").

Any Appendix of an Official Statement of the Commonwealth or any instrumentality of the Commonwealth containing the same information as the Commonwealth Annual Financial Report, filed with the MSRB through EMMA or any new or revised Commonwealth Report or Commonwealth Annual Financial Report or other document containing information that modifies or supersedes the information contained in the Commonwealth Report or in the Commonwealth Annual Financial Report that is filed with the MSRB through EMMA, in each case after the date hereof and prior to the termination of the offering of the 2012 Senior Bonds, shall be deemed to be incorporated by reference into this Official Statement and to be part of this Official Statement from the date of filing of such document. Any statement contained in such Commonwealth Annual Financial Report or Commonwealth Report or contained elsewhere herein shall be deemed to be modified or superseded for purposes of this Official Statement to the extent that a statement contained herein or in any other subsequently filed document modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Official Statement.

In addition, any information regarding the Authority that modifies or supersedes the information contained in this Official Statement that is filed with the MSRB through EMMA after the date hereof and prior to the termination of the offering of the Series B Bonds shall be deemed to be incorporated by reference into this Official Statement and to be part of this Official Statement from the date of filing of such information. Any information contained herein regarding the Authority shall be deemed to be modified or superseded for purposes of this Official Statement to the extent that information contained in any other subsequently filed document modifies or supersedes such information. Any information so modified or superseded shall be deemed to constitute part of this Official Statement only as so modified or superseded.

A copy of the Commonwealth Report and the Commonwealth's Annual Financial Report may be obtained by accessing <http://emma.msrb.org> or by visiting the website of Government Development Bank at [www.gdbpr.com](http://www.gdbpr.com). No additional information on the Government Development Bank's website is deemed to be part of or incorporated by reference in this Official Statement.

This Official Statement includes brief descriptions of the Act, the Series B Bonds, and the Trust Agreement. Such descriptions do not purport to be complete and are qualified in their entirety by reference to such documents. All references to the Series B Bonds are qualified in their entirety by reference to the definitive form thereof contained in the 2012 Series Supplement. Copies of all such documents and agreements, including the documents incorporated herein by reference, are available for inspection during regular business hours at the offices of Government Development Bank for Puerto Rico, Roberto Sánchez Vilella Government Center, Avenida de Diego, Parada 22, San Juan, Puerto Rico 00940, telephone number (787) 722-2525, or at the principal corporate trust office of the Trustee, San Juan, Puerto Rico.

## **RISK FACTORS AND INVESTMENT CONSIDERATIONS**

AN INVESTMENT IN THE SERIES B BONDS INVOLVES A DEGREE OF RISK. SET FORTH BELOW IS A SUMMARY OF CERTAIN OF THE RISKS ASSOCIATED WITH THE SERIES B BONDS. EACH PROSPECTIVE INVESTOR SHOULD CAREFULLY CONSIDER THE RISK FACTORS SET FORTH BELOW IN ORDER TO MAKE A DECISION AS TO THE CREDIT-WORTHINESS OF THE AUTHORITY AND MUST EXAMINE ITS FINANCIAL CONDITION IN ORDER TO MAKE A JUDGMENT AS TO ITS ABILITY TO BEAR THE RISK OF AN INVESTMENT IN THE SERIES B BONDS.

THE FOLLOWING DISCUSSION OF RISK FACTORS IS INTENDED ONLY AS A SUMMARY AND DOES NOT PURPORT TO IDENTIFY ALL THE RISK FACTORS THAT MAY AFFECT THE AUTHORITY'S ABILITY TO PAY DEBT SERVICE ON THE AUTHORITY'S BONDS. PROSPECTIVE INVESTORS ARE ADVISED TO REVIEW ALL THE INFORMATION IN THIS OFFICIAL STATEMENT, INCLUDING THE CONSULTING ENGINEER'S REPORT INCLUDED AS APPENDIX II, IN EVALUATING AN INVESTMENT IN THE SERIES B BONDS. ANY ONE OR MORE OF THE FACTORS DISCUSSED AND OTHERS COULD ADVERSELY AFFECT THE AUTHORITY'S OPERATIONS AND REVENUES AND EXPENSES TO AN EXTENT THAT CANNOT BE DETERMINED AT THIS TIME, AND COULD LEAD TO A DECREASE IN THE MARKET VALUE AND/OR THE LIQUIDITY OF THE SERIES B BONDS. THERE IS NO ASSURANCE THAT OTHER FACTORS WILL NOT BE MATERIAL IN THE FUTURE.

### **The Authority's ability to charge and collect rates sufficient to provide for debt service on the Bonds and other Indebtedness and meet its operating expenses**

The imposition and collection by the Authority of rates, fees and charges for services of the Systems provide the only security for payment of the Series B Bonds. Although the Authority will set aside moneys in certain reserve and other funds, these funds will not be sufficient to provide long-term coverage should the Authority encounter prolonged financial difficulty.

The Operating Revenues of the Authority are dependent on the rates which it charges and the revenues it collects from its customers. The inability of or failure by the Authority to charge rates that produce, and to collect, sufficient Operating Revenues could result in the Authority being unable to meet coverage requirements or debt service payments on its Bonds, or to cover its operating expenses. The risk of insufficient revenues to meet debt service payments, however, has been ameliorated with the adoption of the amendments to the Trust Agreement whereby a gross lien is created on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which moneys are not subject to the lien of the Trust Agreement and can only be used to make such payments) as security for payment of debt service on the Bonds. See SECURITY FOR THE BONDS.

The revenue and expense projections prepared by the Authority for the five fiscal year period from 2012-2016 (see "Management's Discussion of Projected Operating Results" under OPERATING RESULTS), which show that the Authority is able to meet the coverage requirements of the Trust Agreement, are premised to a significant extent on the Authority's ability to adjust its rates upward, secure annual budgetary appropriations or other sources of funding from the Commonwealth or Government Development Bank and/or implement further revenue raising or expense reduction measures in order to produce an average of \$292 million per year of additional net revenues during the period, which represents approximately 41.4% of the Authority's projected average annual Operating Revenues for this period, as well as upon maintaining or increasing its total annual billings and maintaining a collection rate that is at or above 90%. The Authority's collection rate during fiscal year 2011 was 97% (this percentage takes into account a 95% collection rate for industrial, commercial and residential accounts resulting from, among other things, a new revenue optimization initiative implemented by the Authority that collected \$74.6 million, and certain one-time, extraordinary collections from government agencies of amounts due from prior fiscal years). The Authority's collection rate for the first six months of fiscal year 2012 was 88%. During January 2012, the Authority experienced an increase in collections that improved the collection rate for the first seven months of fiscal year 2012 to 90%.

Under the Authority's current rate resolution, the Authority may adjust rates by 4.5% annually and 25% in the aggregate without complying with certain public hearing and review procedures required by applicable law (see RATES, BILLINGS AND COLLECTIONS). The Authority has a history of making infrequent changes in rates. Prior to 2003, the Authority had not implemented a rate increase since 1986. After the two-stage rate increase implemented in October 2005 and July 2006, the Authority has not altered its rate structure.

As mentioned above, the Authority must increase rates, receive additional budgetary appropriations or other sources of funding or implement further revenue raising and/or expense reduction measures in order to meet its financial obligations and cover its operating expenses for all periods after fiscal year 2013. See "Management's Discussion of Projected Operating Results" under OPERATING RESULTS. The Authority's ability to increase its rates and/or collect additional revenues from its customers is affected by economic conditions, water consumption trends and population trends in the Commonwealth. The Commonwealth has been in a recession since the fourth quarter of fiscal year 2006. In its most recent projections, the Puerto Rico Planning Board (the "Planning Board") projects a decrease in real gross national product of 1.0% for fiscal year 2011 and an increase of 0.7% for fiscal year 2012. Water consumption has also been declining since 2004 due to the greater use of bottled water, increasing usage of water saving devices, and the two-stage rate increase implemented in fiscal years 2006 and 2007. In addition, the population of the Commonwealth decreased from 2000 to 2010 and decreased further from 2010 to 2011. If this trend continues, the Authority's ability to increase its revenues may be adversely affected.

Notwithstanding the Authority's ability to increase its rates, the Authority may still need to receive additional budgetary appropriations or other sources of funding or implement further revenue raising and/or expense reduction measures in order to meet its financial obligations and cover its operating expenses for all periods after fiscal year 2013. In fiscal year 2011, the Authority received Commonwealth budgetary appropriations in the amount of \$85 million and \$20 million of other Commonwealth contributions. For the six-month period ended December 31, 2011, the Authority received Commonwealth budgetary appropriations in the amount of \$70.2 million. These appropriations and contributions were made in order to permit the Authority to meet its debt service and operating expense requirements without having to increase its rates. The Commonwealth's ability to continue making budgetary appropriations and/or contributions in the necessary amounts will be affected by the Commonwealth's current difficult budgetary situation. While the Commonwealth has improved its financial condition considerably, there is no assurance that the Commonwealth will achieve a balanced budget in the near term or that it will be able to continue making budgetary appropriations and/or contributions. Under the Fiscal Oversight Agreement, the Commonwealth has agreed to notify the Authority at least five months prior to the beginning of each fiscal year if it is not going to request a budgetary appropriation or provide a commitment for another funding source in an amount sufficient to fund the Budgetary Reserve Fund at the Budgetary Reserve Requirement. This should provide the Authority sufficient time to proceed with a rate increase should such an increase be necessary or to identify additional sources of revenue or operating cost reductions.

If the Authority's financial results do not meet the above assumptions regarding the availability of budgetary appropriations or other funding sources, or increased rates and collections, its ability to generate sufficient Authority Revenues to pay debt service on the Bonds and meet its operating expense requirements may be adversely affected. In addition, its ability to continue funding its capital improvement program to improve the Systems and comply with its regulatory requirements may also be adversely affected. The inability to comply with its regulatory obligations may result in additional monetary penalties.

### **The Authority's financial condition**

#### *Operating Losses*

For the three fiscal years ended June 30, 2011, 2010 and 2009, the Authority incurred operating losses of \$39.6 million, \$58.3 million and \$63.7 million, respectively, before taking into account non-operating revenue and interest expense. The operating loss incurred in fiscal year 2011 took into account an \$85 million budgetary appropriation received by the Authority from the Commonwealth, which increased the Authority's total operating revenues from \$724.1 million to \$809.1 million. Interest expense for fiscal years 2011, 2010 and 2009 was \$153.1 million, \$137.1 million, and \$127.0 million, respectively. During fiscal years 2011, 2010 and 2009, the Authority received other Commonwealth contributions for principal and interest payments on indebtedness of \$38.6 million, \$45.5 million, and \$18.2 million, respectively, and had non-operating income of \$7.6 million, \$11.4 million, and

\$10.3 million, respectively. Notwithstanding the foregoing, during fiscal years 2011, 2010 and 2009, the Authority recognized a loss before capital contributions of \$146.5 million, \$138.6 million and \$162.2 million, respectively, in accordance with United States generally accepted accounting principles. Capital contributions for fiscal years 2011, 2010 and 2009 consisted of federal and Commonwealth grants and other contributions of \$34.3 million, \$969.4 million and \$22.1 million, respectively. The capital contributions received by the Authority in fiscal year 2010 included a \$933.4 million capital contribution involving capital improvement projects previously undertaken by Puerto Rico Infrastructure Financing Authority (“PRIFA”). During this same period, the Authority’s net assets fluctuated, from \$2.356 billion as of June 30, 2008, to \$2.216 billion as of June 30, 2009, to \$3.047 billion as of June 30, 2010, to \$2.934 billion as of June 30, 2011.

The Authority’s net losses during these three fiscal years are mainly due to (i) payroll and payroll related expenses of \$251.0 million, \$266.1 million and \$279.6 million during fiscal years 2011, 2010 and 2009, (ii) electricity expenses of \$156.6 million, \$140.1 million and \$136.5 million during fiscal year 2011, 2010 and 2009, and (iii) depreciation and amortization of \$201.0 million, \$151.8 million and \$143.7 million during fiscal years 2011, 2010 and 2009.

#### *Funding of Pension Liabilities*

Substantially all of the employees of the Authority are covered by the Employees Retirement System of the Government of the Commonwealth of Puerto Rico (the “Employees Retirement System”), a multi-employer hybrid defined benefit plan consisting of different benefit structures. The Employees Retirement System faces a number of financial difficulties, as reflected in its large and growing unfunded actuarial accrued liability (“UAAL”) and historical funding shortfalls, which are expected to continue. As of June 30, 2010, the date of the latest actuarial valuation of the Employees Retirement System, the UAAL of the Employees Retirement System was \$17.8 billion and the funded ratio was 8.5%. For more information regarding the Employees Retirement System, see the Commonwealth Report.

As a participating employer in the Employees Retirement System, the Authority has been making employer contributions based on the minimum statutory rate (currently 10.275% of covered payroll). These contribution rates are statutorily established rates that do not reflect actuarially recommended contribution rates or rates that are intended to fully pre-fund the present value of future benefits.

The Authority’s total employer contributions for the fiscal years ended June 30, 2011, 2010 and 2009 amounted to approximately \$12.4 million, \$14.0 million and \$14.7 million, respectively. As a result of recent legislation, the Authority’s contributions are projected to increase annually by an average of \$2.4 million per fiscal year, to a total of approximately \$37.7 million by fiscal year 2021. For fiscal year 2012, the Authority’s estimated employer contribution is \$15.4 million. As stated above, these contributions do not reflect actuarially recommended contribution rates and contributions by all employers at the current statutory rates are expected to result in a depletion of the gross assets of the Employees Retirement System.

Because the current funding requirements will not be sufficient to make future benefit payments when due and the Authority is ultimately responsible for any funding deficiency with respect the Authority’s members participating in the Employees Retirement System, additional funding from the Authority and other sponsoring employers will ultimately be necessary to make benefit payments to the Employee Retirement System’s participants. Under current law, once the Employee Retirement System’s assets are depleted, the Authority will be obligated to make contributions to the Employees Retirement System in an amount sufficient to cover the deficiency between the Authority’s employee contributions and all benefit payments relating to its retirees, as well as a portion of the administrative costs of the Employee Retirement System. This additional funding obligation may adversely affect the Authority’s ability to generate sufficient Authority Revenues to meet its operating expense requirements after the payment of debt service on the Bonds. In addition, its ability to continue funding its capital improvement program to improve the Systems and comply with its regulatory requirements may also be adversely affected.

For more information regarding pension liabilities affecting the Authority, see “Pension Plan” under THE AUTHORITY.

### **The Authority's ability to manage and improve operating practices**

The Trust Agreement, as amended and restated as of February 15, 2012, provides for a gross lien on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which moneys are not subject to the lien of the Trust Agreement and can only be used to make such payments) to secure the payment of debt service on Bonds and Other System Indebtedness, which means that debt service on the Bonds, together with required deposits, if any, to the related debt service reserve funds under the Trust Agreement, will be made from Authority Revenues prior to payment of Current Expenses. Notwithstanding this additional protection, if Current Expenses of the Authority should experience a significant increase without a corresponding increase in rates and charges or Commonwealth support, the Authority's ability to operate the Systems could be negatively affected. These expenses will be significantly influenced by the performance of management and by external circumstances, such as the existence of litigation, changes in regulatory policy or legislation, changes in uncontrollable costs such as electricity, chemicals or insurance, or the necessity to carry out unexpected repairs or replacements, any of which could have a material adverse financial effect on the Authority. The Authority's current management has been in place since early 2004. As set forth in the *Consulting Engineer's Report in Appendix II*, Management has undertaken certain operational initiatives, including better management of operating expenses in the area of payroll costs, as well as revenue enhancing measures related to reducing unaccounted-for water that, in the opinion of the Consulting Engineer, should result in improving the performance of the Authority's Systems and its fiscal condition. There can be no assurances, however, that the Authority will continue to successfully implement revenue enhancing measures or that Authority's estimate of Current Expenses will not be substantially exceeded. See "Operation and Maintenance" under THE WATER AND WASTEWATER SYSTEMS.

### **The Authority's ability to comply with environmental and public health standards, maintain self-sufficiency in a highly regulated industry and fund the Five-Year CIP required to comply with regulatory requirements**

The environmental aspects of the Authority's operations are regulated primarily by (a) EPA, (b) DOH and (c) Puerto Rico Environmental Quality Board ("EQB") under federal and Commonwealth statutes and associated rules and regulations. There are no assurances that these agencies will not tighten their environmental standards, or bring additional enforcement actions under existing statutes, which could require additional, unexpected capital and/or operating expenditures. While the Authority would seek to increase its rates and charges to support such additional costs, there can be no assurance that such rate increases could be implemented successfully. For more information regarding the Authority's and the Systems' compliance with environmental laws and regulations, please see ENVIRONMENTAL MATTERS.

Recent EPA actions in the areas of wastewater collection systems and combined sewer systems have the potential to require additional significant expenses in capital improvements and maintenance that cannot be determined at this time. While the Authority intends to negotiate with the applicable regulatory agencies over the incorporation of any additional expenses to the Five-Year CIP in connection with these actions to the current expense levels contained in the 2006 EPA Consent Decree, no assurance can be given that the Authority's actual cost of complying with any additional EPA requirements will not exceed the expense levels included in the Five-Year CIP. To date, the Authority has invested over \$5 million in its capital improvement plan in studies to achieve compliance with the 2006 EPA Consent Decree. However, the economic impact of developing and implementing EPA's repair plans in the remaining wastewater collection systems is uncertain at this time. As such, the Authority is presently unable to determine the total cost of the current capital improvement projects to be required to bring the wastewater collection systems into regulatory compliance.

In addition, future regulatory requirements provide for a period of time to achieve compliance with, or provide a plan to comply with, such regulatory requirements and may require additional capital improvements. It is not possible for the Authority to determine at this point the magnitude of such expenditures, but it is possible that the Authority may not be in a position to fund such additional expenditures.

Additionally, the Authority is bound by the terms of comprehensive consent decrees and settlement agreements that collectively require the Authority to implement remedial plans to eliminate treatment plant non-compliance and unpermitted discharges of untreated sewage, and sanitary sewer system overflows and to improve

the quality of potable water and sludge treatment and disposal by the Water System. See “Regulatory Compliance” under ENVIRONMENTAL MATTERS. The economic impact of these decrees and agreements on the Authority and the Systems will be significant.

The Five-Year CIP, including the items required by the various consent decrees and settlement agreements, is estimated to total approximately \$1.56 billion, of which approximately \$635 million are for projects required by the 2006 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement, and the 2010 EPA Consent Decree. Additional capital expenditures may be required for this five-year period and will be required beyond it in order to comply with regulatory requirements, agreements and decrees as described herein and in the Consulting Engineer’s Report.

The Authority currently estimates that the total cost (incurred and projected) of compliance with the various decrees will be approximately \$2.7 billion through fiscal year 2025. The actual cost of compliance and the Authority’s total capital expenditures may vary substantially depending on, among other things, (i) the availability of an adequate pool of qualified contractors to carry out needed projects, (ii) the inflationary environment with respect to the costs of labor and supplies needed to implement the compliance program, (iii) weather conditions that could adversely affect construction schedules and consumption patterns, (iv) population trends and political and economic developments in Puerto Rico that could adversely impact the collection of Operating Revenues, (v) the willingness of the United States Justice Department, EPA, EQB and DOH to cooperate with respect to various issues that may arise as the Authority implements its remedial plan, (vi) the possibility of new environmental legislation or regulations affecting the Systems, (vii) unanticipated costs or potential modifications to projects resulting from requirements and limitations imposed by environmental laws and regulations and (viii) the inherent uncertainty involved in capital improvement projects of the magnitude undertaken by the Authority.

There can be no assurance that the actual cost of compliance will not be significantly higher than the Authority’s current estimate, nor can any assurances be given that the Authority will be able to comply fully with the terms of the various consent decrees and settlement agreements and avoid the imposition of additional monetary penalties. In addition, in order to comply with the various decrees and agreements and to implement the Five-Year CIP, the Authority may need to issue additional Senior Indebtedness and Senior Subordinate Indebtedness beyond the amounts currently projected to be issued. The burden of such additional debt and other obligations may require increases in the rates currently being charged to Authority customers and/or the implementation of further revenue raising and/or expense reduction measures. See RATES, BILLINGS AND COLLECTIONS. No assurances can be given that the Authority will be able to finance, through the issuance of bonds or otherwise, the estimated cost of the Five-Year CIP or of any additional capital improvement requirements that may be imposed on the Authority, or that rate increases will be implemented on a timely basis to support any such additional obligations.

Although the Authority is committed to bringing the Systems into compliance with applicable law, it is expected that the Authority will continue to pay stipulated penalties and to make additional capital expenditures (some not included in the Five-Year CIP) in the future under its existing consent decrees, administrative orders and settlement agreements. To prepare for this potential liability, the Authority makes a risk assessment of the average exposure for payment of stipulated penalties and non-compliance with its consent decrees, administrative orders and settlement agreements and creates a reserve for the amounts it believes should be sufficient to pay the stipulated penalties at current levels of non-compliance. In addition, the Five-Year CIP is structured to modernize and help bring the Systems into compliance with applicable environmental laws. See CAPITAL IMPROVEMENT PROGRAM. No assurance can be given, however, that the amounts budgeted for payment of stipulated penalties will be in all cases sufficient to cover potential civil, administrative or criminal liabilities or that the Five-Year CIP will result in regulatory compliance. However, the Authority expects to comply with its regulatory obligations in the near future.

In addition to the aforementioned possibility of additional environmental legislation or regulation, the Authority is also subject to any other legislation or regulatory action passed or promulgated from time to time with respect to its operations. Although the Constitution of Puerto Rico provides protection against enactment of post-bond issuance legislation that would have the effect of substantially impairing the Authority’s obligations under the Trust Agreement and the Bonds, no assurance can be given that future legislative or regulatory actions will not occur, which actions may adversely affect the ability of the Authority to establish the rates and charges it believes are necessary to generate sufficient Authority Revenues to pay debt service on Senior Indebtedness and the Bonds.

## **The Authority's ability to manage substantial construction efforts related to its Five-Year CIP**

The Five-Year CIP is significantly larger than the Authority's historical experience prior to fiscal year 2005. Since 2005, the Authority has embarked on an aggressive capital improvement program to improve the condition of the Systems and to meet regulatory requirements. There are 647 projects currently included in the Five-Year CIP, which cover major capital improvements identified throughout all of the Authority's operational regions, as well as island-wide initiatives such as technological advancements, telemetry implementations, preventive maintenance, meter replacement, and renewal and replacement to the Systems. To facilitate the implementation, development and evolution of a capital improvement program of this magnitude, the Authority has engaged world renowned engineering and consulting companies ("Program Management Consultants"). For the past six years, the Program Management Consultants have provided support to the Authority in the project development process. Program Management Consultants actively participate in the planning, design and construction phases, and they also manage key tasks that drive capital improvement project budgets, such as defining project scopes, negotiating consultant contracts for studies and design services, and preparation of project construction cost estimates. Since 2005, the Authority has invested over \$2 billion in capital improvements. Projects completed during this period show the Authority's significant improvement in metrics such as completion of construction projects in a timely fashion and within budget. These efforts represent significant management and construction cost savings to the Authority and demonstrate the Authority's ability to manage its Five-Year CIP. There can be no assurances, however, that the Authority will continue to successfully implement a capital improvement program of this magnitude.

## **The Consulting Engineer's Report on the Condition of the Authority and the Systems**

In January 2012, the Consulting Engineer supplemented the 2010 CE Report and reached the following principal conclusions regarding the Authority and the Systems: (i) although a number of treatment facilities are operating out of compliance with discharge permit limits and drinking water standards, the condition of most facilities with implemented capital improvement projects improved from fiscal year 2009 to fiscal year 2010 and, despite compliance problems, the facilities are generally producing and delivering water and conveying and treating wastewater to a level of competency; (ii) although the Authority's operations and management practices are adequate, there is a need for (a) standardization across regions, (b) facility-specific operations and management plans or manuals, and (c) standardized process for prioritizing and scheduling preventative, corrective and routine maintenance; and (iii) although the Authority's projections for fiscal years 2012 through 2016 are reasonable based on recent historical performance, the probability of achieving such projections is conditioned on the Authority's ability to: (a) maintain its service revenues in a very challenging economic environment, (b) continue to successfully implement all of its operational initiatives, and (c) secure other sources of revenue beyond fiscal year 2013 (after the initial funding of the Budgetary Reserve Fund has been depleted). See *Consulting Engineer's Report* attached hereto as *Appendix II*.

## **The Authority's ability to withstand weather or other uncontrollable events**

Puerto Rico is an island located in an area subject to tropical storms and hurricanes. If a major storm were to strike Puerto Rico, the Systems and customers' homes may experience substantial damage and a resulting interruption in service. Such events may materially adversely affect the Authority's ability to provide service and collect Operating Revenues. Repair and maintenance of the Systems are also subject to availability of key raw materials and on the continued operations of other ports, including ports in the Gulf Coast of the United States. Storms and hurricanes in the Gulf have affected the price and availability of materials such as chemicals and oil increasing the Authority's costs of operations in the past. In addition, although rare, the island is not immune from droughts that have caused the Authority to consider rationing and other measures to conserve its water sources.

The Authority has taken steps to mitigate the impact of tropical storms, including implementation of a hurricane preparedness plan and securing insurance coverage where available and contracts with suppliers of chemicals providing for emergency inventories of key raw materials, and to mitigate the effect of such drought conditions, including the construction of the NCS (as defined in "The Water System" under THE WATER AND WASTEWATER SYSTEMS).

If all, substantially all or any portion of the Systems are damaged or destroyed by any casualty or condemned by a governmental authority, there is no assurance that casualty insurance proceeds or pollution liability insurance proceeds (if available) will be sufficient to repair or replace such property. Even if applicable insurance coverages are adequate, there is no assurance that such damage or destruction would not have a material adverse effect on the ability of the Authority to provide water and wastewater service to its customers or on the Operating Revenues of the Authority.

### **Labor and Management Factors**

The Authority recently entered into a new collective bargaining agreement with its largest union, the Independent Authentic Union. This new collective bargaining agreement is in effect from January 1, 2012 to December 31, 2015. See “Employees and Labor Relations” under THE AUTHORITY. While the Authority’s relations with its chief labor unions are considered satisfactory at this time, these may be adversely affected by issues arising as a result of the bargaining process or other labor disputes. The Authority has experienced prior episodes of labor unrest that included work stoppages and occasional incidents of sabotage to its facilities. The ability of the Authority and its labor unions to continue the current spirit of cooperation and consultation will facilitate the Authority’s meeting its financial and operating objectives and projections. Should these relations deteriorate, however, and recurrent work stoppages occur, it is possible that this may have an adverse effect on the ability of the Authority to provide water and wastewater services to its customers or on the Operating Revenues of the Authority.

There can be no assurance given as to how long senior management personnel will remain in their current positions nor whether the current policies and programs being implemented by this management team in response to various regulatory and other imperatives will continue should management positions change. Any such changes may have an adverse effect on the ability of the Authority to provide water and wastewater services to its customers or on the Operating Revenues of the Authority.

### **Limited Nature of Ratings; Reductions, Suspension or Withdrawal of a Rating**

Any rating assigned to the Series B Bonds by a rating agency will reflect such rating agency’s assessment of the likelihood of the payment of interest when due and principal of the Series B Bonds on their respective maturity or mandatory redemption dates. Any rating of the Series B Bonds is not a recommendation to purchase, hold or sell such Series B Bonds and such rating will not address the marketability of such Series B Bonds, their market price or suitability for a particular investor. There is no assurance that any rating will remain for any given period of time or that any rating will not be lowered, suspended or withdrawn entirely by a rating agency if, in such rating agency’s judgment, circumstances so warrant based on factors prevailing at the time, including, but not limited to, the evaluation by such rating agency of the financial outlook for the Authority. Any such reduction, suspension or withdrawal of a rating, if it were to occur, could adversely affect the availability of a market for the market prices for the Series B Bonds. Finally, the Trust Agreement does not include a covenant by the Authority to maintain a specific rating with respect to outstanding Series B Bonds.

### **Limited Rights of Bondholders; Disposition of Operating Revenues Upon Acceleration**

The holders of the Series B Bonds will have no mortgage or other lien on the physical assets of the Authority and will have no rights to direct management changes, continuity or decisions except in the case of bringing suit to compel compliance with the Rate Covenant as described under “Rate Covenant” in SECURITY FOR THE BONDS.

In the event of a default by the Authority, the ability of the Trustee to raise sufficient funds to pay the principal of and interest on the Series B Bonds will depend upon the exercise of various remedies specified by the Trust Agreement. Under existing law, those remedies are often subject to discretion and delay and may not be readily available or may be limited. Equitable principles may also delay or otherwise adversely affect the enforcement of Bondholders’ rights.



Upon the occurrence and continuation of an Event of Default and an acceleration of the Bonds, however, the Trustee shall pay Current Expenses prior to the payment of debt service on any Bonds. See “Acceleration” under SECURITY FOR THE BONDS. The Authority is proposing an amendment to the Trust Agreement that would increase the threshold for holders of the Bonds to accelerate the Bonds in the event of an occurrence and continuance of certain Events of Default. The amendment is expected to become effective on February 29, 2012 upon receiving the consent of Merrill Lynch, Pierce, Fenner & Smith Incorporated, as representative of and on behalf of the Underwriters. As a result, this amendment will make it more difficult for holders of the Bonds exercise this remedy. See “Proposed Amendment to Trust Agreement” under SECURITY FOR THE BONDS.

**General Risk Factors**

There can be no assurance that there will be a secondary market for the 2012 Senior Bonds, which market is dependent upon prevailing market conditions, the financial condition or market position of firms who may make a secondary market and the financial condition and results of operations of the Authority.

**PLAN OF FINANCING**

**General**

The Authority has developed a comprehensive plan to finance the Five-Year CIP through the issuance of Indebtedness (chiefly Senior Bonds), federal, Commonwealth and other grants and contributions and internally generated funds. The Series B Bonds are being issued to (i) provide funds to repay a bond anticipation note issued by the Authority in the aggregate principal amount of \$241 million, the proceeds of were used to repay certain of the Authority outstanding indebtedness, (ii) provide funds to repay certain lines of credit provided by Government Development Bank to the Authority to finance operating expenses and as interim financing for a portion of its capital improvement plan, (iii) pay capitalized interest on the Series B Bonds through July 1, 2013, and (iv) pay the costs of issuance of the Series B Bonds.

**Estimated Sources and Uses of Funds**

The proceeds of the Series B Bonds will be used as follows:

**Sources**

|  |                         |
|--|-------------------------|
| Principal Amount of the Series B Bonds ..... | \$295,245,000.00        |
| <b>Total Sources</b> .....                   | <u>\$295,245,000.00</u> |

**Uses**

|  |                         |
|--|-------------------------|
| Deposit in Construction Fund (including \$18,770,365.98 for capitalized interest)* | \$ 18,770,365.98        |
| Payment of lines of credit with Government Development Bank .....                  | 30,984,475.34           |
| Payment of Bond Anticipation Note .....  | 241,562,333.33          |
| Underwriting discount and estimated legal, printing and financing expenses.....    | <u>3,927,825.35</u>     |
| <b>Total Uses</b> .....  | <u>\$295,245,000.00</u> |

## SECURITY FOR THE BONDS

### Amendment to Master Agreement of Trust

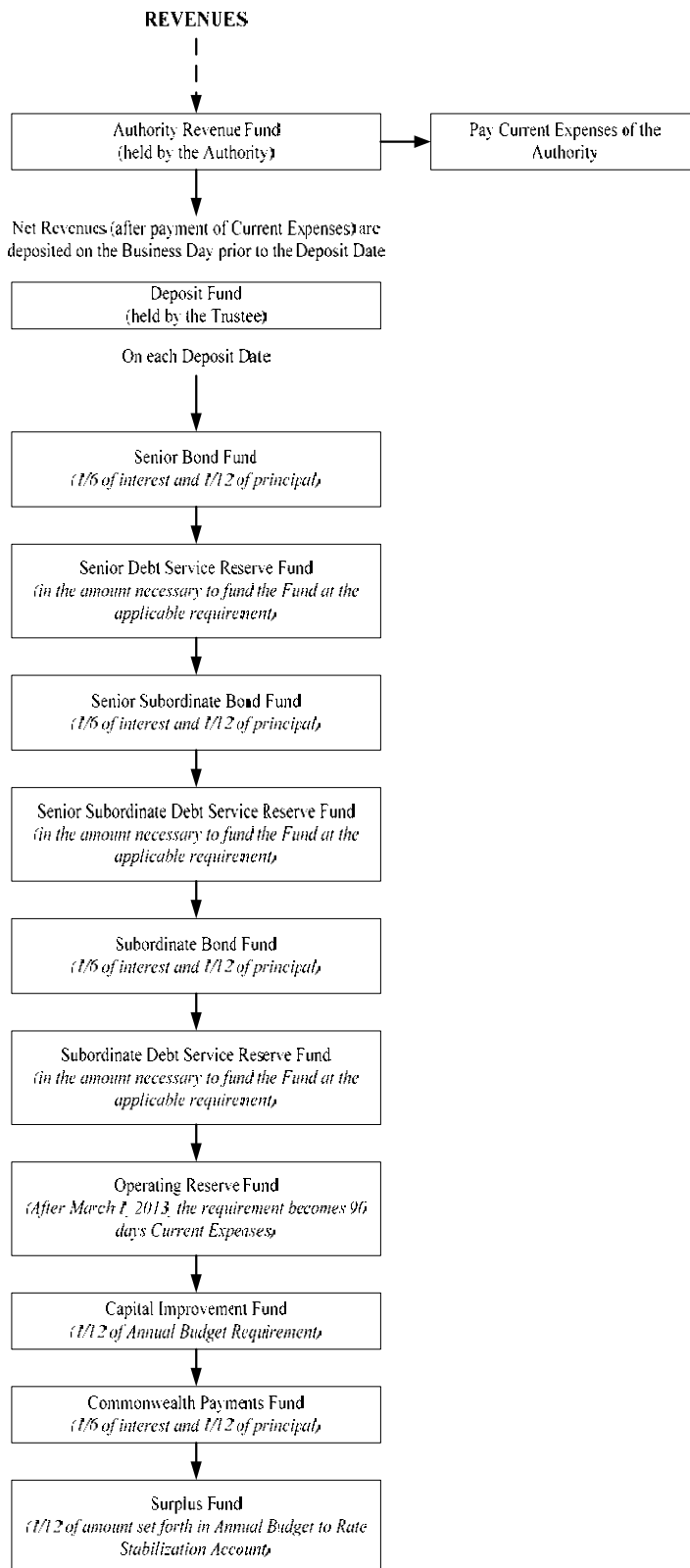
The Authority adopted a Supplemental Resolution on January 24, 2012, authorizing the amendment of certain provisions of the Trust Agreement. The Trust Agreement, as amended and restated as of February 15, 2012. The rating agencies have confirmed the ratings on the Outstanding Bonds of the Authority and such ratings have not changed as a result of the adoption of these amendments.

The Authority amended the Trust Agreement to:

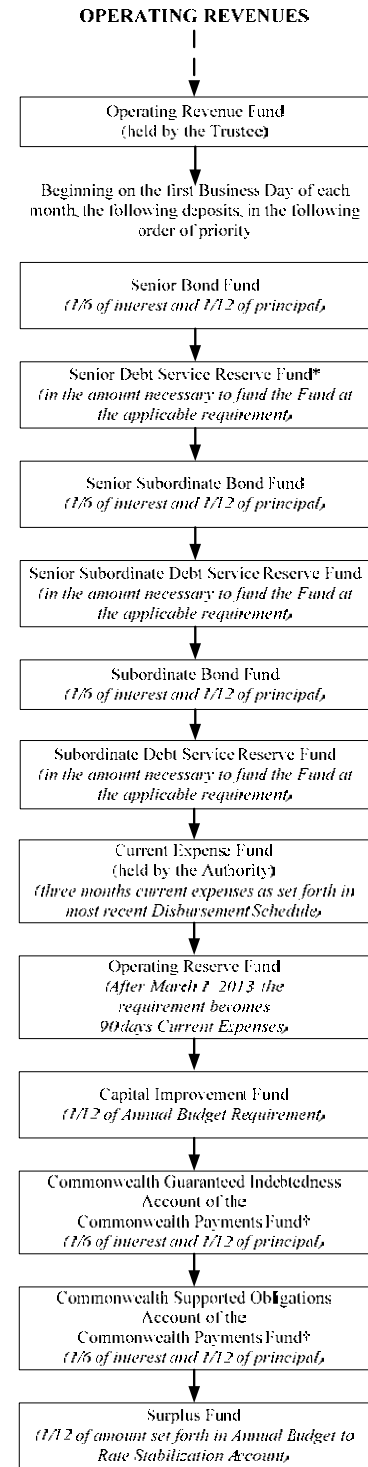
- (1) provide that the pledge of revenues to Bondholders thereunder is a gross revenue pledge instead of a net revenue pledge;
- (2) revise the flow funds to provide for the payment of debt service and the funding of debt service reserve funds prior to the payment of Current Expenses and to create a Current Expense Fund;
- (3) change the defined term “Revenues” to “Operating Revenues”;
- (4) add a definition of “Authority Revenues” which means Operating Revenues plus (i) any governmental grants or appropriations available to pay Current Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (ii) any amounts received from the Commonwealth on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited directly in the Commonwealth Payments Fund) and (iii) any amounts transferred from the Budgetary Reserve Fund to the Trustee.
- (5) amend the Rate Covenant to require that Operating Revenues and Authority Revenues provide the coverage levels set forth below under the caption “Rate Covenant”;
- (6) amend the additional bonds tests to require that Operating Revenues provide the coverage levels set forth below under the caption “Additional Bonds”;
- (7) amend the definition of Current Expenses to provide that such expenses are calculated on an accrual basis for purposes of the Rate Covenant and the additional bonds tests and on a cash basis for all other purposes of the Trust Agreement;
- (8) provide for the funding of the Current Expense Fund from moneys transferred from the Budgetary Reserve Fund held by Government Development Bank for the benefit of the Authority.

The diagrams below illustrate the flow of funds under the Trust Agreement prior to its amendment and restatement and the flow of Operating Revenues under the Trust Agreement after its amendment and restatement as of February 15, 2012:

**Flow of Funds under the Trust Agreement  
(prior to its amendment and restatement)**



**Flow of Funds under the Trust Agreement  
(after its amendment and restatement)**



\* The 2012 Senior Bonds are not secured by the Senior Debt Service Reserve Fund.  
 † Operating Revenues are deposited only to the extent Authority Revenues deposited directly into this fund are not sufficient to pay debt service.

*Application of Authority Revenues.* Authority Revenues consisting of governmental grants or appropriations available to pay the Authority's Current Expenses, shall be deposited directly in the Current Expense Fund. Authority Revenues consisting of grants or appropriations received by the Authority for the purpose of paying principal of and interest on Bonds or Other System Indebtedness shall be deposited directly in the applicable debt service fund. Authority Revenues consisting of amounts transferred from the Budgetary Reserve Fund to the Trustee shall be deposited directly in the fund designated in the applicable Disbursement Schedule. Authority Revenues constituting amounts received from the Commonwealth on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations shall be deposited directly in the Commonwealth Payments Fund, are not subject to the lien of the Trust Agreement and shall only be applied to the payment of principal and interest on Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations, as applicable.

### **Source of Payment**

The principal of and premium, if any, and interest on Bonds and Other System Indebtedness that the Authority is required, or has elected, to treat as payable on a parity with Bonds (including the 2012 Senior Bonds), are secured by and payable solely from a gross lien on Authority Revenues; provided, however, that the portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations are not subject to the lien of the Trust Agreement and can only be used to make such payments.

The Trust Agreement provides that the Authority may incur debt to finance its capital expenditures and for any other lawful purpose of the Authority, which debt may be secured with different liens on Authority Revenues. The 2012 Senior Bonds will be issued as Senior Indebtedness under the Trust Agreement, which Indebtedness includes Senior Bonds and other Indebtedness incurred on a parity with Senior Bonds. Senior Indebtedness has a first claim on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which are not subject to the lien of the Trust Agreement and can only be used to make such payments). The Authority contemplates that most of its Indebtedness to finance the Five-Year CIP will be incurred as Senior Indebtedness.

The Authority is also able to incur "Senior Subordinate Indebtedness," which has a claim on Authority Revenues subordinate to the claim of Senior Indebtedness, and "Subordinate Indebtedness," which has a claim on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which are not subject to the lien of the Trust Agreement and can only be used to make such payments) subordinate to the claim of Senior Subordinate Indebtedness. There is no Senior Subordinate Indebtedness or Subordinate Indebtedness currently Outstanding under the Trust Agreement. The Authority contemplates that a portion of the Indebtedness used to finance the Five-Year CIP will be incurred as Senior Subordinate Indebtedness.

In addition, the Authority is able to incur Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which in each case has a lien on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which are not subject to the lien of the Trust Agreement and can only be used to make such payments) subordinate to the claim of Subordinate Indebtedness. Failure to pay principal of or interest on such Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations is not an Event of Default under the Trust Agreement.

The Authority has an agreement with Government Development Bank under which Government Development Bank provides a revolving line of credit to the Authority in the amount of \$150 million that currently satisfies the balance that the Authority is required to maintain in the Operating Reserve Fund under the Trust Agreement. This line of credit is payable from moneys on deposit in the Operating Reserve Fund (after making deposits to the Current Expenses Fund). See DEBT.

## Flow of Funds

The Trust Agreement was amended to provide for a gross lien on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which are not subject to the lien of the Trust Agreement and can only be used to make such payments) to secure the payment of debt service on Bonds and Other System Indebtedness payable on a parity with Bonds. Debt service on Senior Indebtedness, Senior Subordinate Indebtedness and Subordinate Indebtedness, together with required deposits, if any, to the related debt service reserve funds under the Trust Agreement (all as described in greater detail below), will be made from Authority Revenues prior to payment of the Authority's Current Expenses, except upon the occurrence and continuation of an Event of Default and an acceleration of the Bonds, however, in which case the Trustee shall pay Current Expenses prior to the payment of debt service on any Bonds. See "Acceleration" under SECURITY FOR THE BONDS.

Under the Trust Agreement all Operating Revenues are deposited into the Operating Revenue Fund upon receipt. Authority Revenues are required to be deposited as described in "Amendment to Master Agreement of Trust – Application of Authority Revenues" above. Beginning on the first business day of each month, the Trustee is required to transfer the Operating Revenues on deposit in the Operating Revenue Fund in the following order of priority:

*First*, to the credit of the various accounts in the Senior Bond Fund, an amount equal to one-sixth of the interest due on all Outstanding Senior Indebtedness on the next interest payment date and one-twelfth of the principal (or sinking fund) installments due on all Outstanding Senior Indebtedness on the next principal payment (or mandatory sinking fund redemption) date (with appropriate adjustment to the amount so deposited if the period between interest payment dates is less than six months and the period between principal payment (or mandatory sinking fund redemption) dates is less than 12 months);

*Second*, to the credit of the various accounts in the Senior Debt Service Reserve Fund, one-twelfth of the respective amounts necessary in order to cause the amounts then on deposit in said accounts to equal the corresponding Senior Reserve Requirements (provided, that if a deposit is made to one of said accounts because the required balance therein has increased on account of the issuance of additional Senior Bonds, the required monthly deposit amount will equal one-sixtieth of the increase in the applicable Senior Reserve Requirement on account of said issuance);

*Third*, to the credit of the various accounts in the Senior Subordinate Bond Fund, an amount equal to one-sixth of the interest due on all Outstanding Senior Subordinate Indebtedness on the next interest payment date and one-twelfth of the principal (or sinking fund) installments due on all Outstanding Senior Subordinate Indebtedness on the next principal payment (or mandatory sinking fund redemption) date (with appropriate adjustment to the amount so deposited if the period between interest payment dates is less than six months and the period between principal payment (or mandatory sinking fund redemption) dates is less than 12 months);

*Fourth*, to the credit of the various accounts in the Senior Subordinate Debt Service Reserve Fund, one-twelfth of the respective amounts necessary in order to cause the amounts then on deposit in said accounts to equal the corresponding Senior Subordinate Reserve Requirements (provided, that if a deposit is made to one of said accounts because the required balance therein has increased on account of the issuance of additional Senior Subordinate Bonds, the required monthly deposit amount will equal one-sixtieth of the increase in the applicable Senior Subordinate Reserve Requirement on account of said issuance);

*Fifth*, to the credit of the various accounts in the Subordinate Bond Fund, an amount equal to one-sixth of the interest due on all Outstanding Subordinate Indebtedness on the next interest payment date and one-twelfth of the principal (or sinking fund) installments due on all Outstanding Subordinate Indebtedness on the next principal payment (or mandatory sinking fund redemption) date (with appropriate adjustment to the amount so deposited if the period between interest payment dates is less than six months and the period between principal payment (or mandatory sinking fund redemption) dates is less than 12 months);

*Sixth*, to the credit of the various accounts in the Subordinate Debt Service Reserve Fund, one-twelfth of the respective amounts necessary in order to cause the amounts then on deposit in said accounts to equal the corresponding Subordinate Reserve Requirements (provided, that if a deposit is made to one of said accounts because the required balance therein has increased on account of the issuance of additional Subordinate Bonds, the required monthly deposit amount will equal one-sixtieth of the increase in the applicable Subordinate Reserve Requirement on account of said issuance);

*Seventh*, to the credit of the Current Expenses Fund, after taking into account any funds transferred from the Budgetary Reserve Fund, an amount equal to the amount set forth in the most recently delivered Disbursement Schedule to pay Current Expenses of the Systems for the current and each of the next two succeeding months.

*Eighth*, to the credit of the Operating Reserve Fund, an amount necessary in order to cause the amount on deposit in said Fund to equal the Operating Reserve Fund Requirement (including any amounts owed by the Authority under the \$150 million Government Development Bank line of credit referred to under *Plan of Financing* or under any other Operating Reserve Facility held for the benefit of the Operating Reserve Fund);

*Ninth*, to the credit of the Capital Improvement Fund, an amount necessary in order to cause the amount then on deposit in said Fund to equal within the next twelve months (in equal monthly installments) the Capital Improvement Fund Requirement;

*Tenth*, to the credit of the Commonwealth Payments Fund, to the extent the payment of debt service described in this paragraph has not been satisfied from Authority Revenues deposited directly into this fund, first, an amount equal to one-sixth of the interest due on all Outstanding Commonwealth Guaranteed Indebtedness on the next interest payment date and one-twelfth of the principal (or sinking fund) installment due on all Outstanding Commonwealth Guaranteed Indebtedness on the next principal payment (or mandatory sinking fund redemption) date and second, an amount equal to one-sixth of the interest due on all Outstanding Commonwealth Supported Obligations on the next interest payment date and one-twelfth of the principal (or sinking fund) installment due on all Outstanding Commonwealth Supported Obligations on the next principal payment (or mandatory sinking fund redemption) date (with, in each case, appropriate adjustment to the amount so deposited if the period between interest payment dates is less than six months and the period between principal payment (or mandatory sinking fund redemption) dates is less than 12 months); and

*Eleventh*, all remaining Authority Revenues, to the credit of the Rate Stabilization Account of the Surplus Fund in equal monthly deposits until the balance therein equals the balance set forth in the then current Annual Budget and thereafter, any such remaining amount will be deposited in the Surplus Fund.

## **Reserve Funds**

Under the Trust Agreement, separate debt service reserve funds are established for each lien created thereunder (and within such funds separate debt service reserve accounts are allowed to be set up for individual Series of Bonds). The Authority is not obligated, however, to establish a debt service reserve account for a Series of Bonds and may elect that multiple Series of Bonds have the benefit of the same debt service reserve account. If not otherwise specified in a Supplemental Agreement authorizing the issuance of a particular Series of Bonds, the Debt Service Reserve Requirement applicable to its corresponding Debt Service Reserve Account shall be the lesser of (x) maximum Annual Debt Service on the Outstanding Bonds secured by such Account, (y) 10% of the proceeds, calculated in accordance with the Code, of the Outstanding Bonds secured by such Account and (z) 125% of average Annual Debt Service for the payment of the principal of and interest on the Outstanding Bonds secured by such Account. A Senior Debt Service Reserve Account will not be established for the 2012 Senior Bonds and the Senior Debt Service Reserve Account established and funded in connection with the issuance of the 2008 Senior Bonds will not secure the 2012 Senior Bonds.

*Senior Debt Service Reserve Accounts.* Upon the issuance of Senior Bonds, the Authority may establish one or more Senior Debt Service Reserve Accounts related thereto. Each Senior Debt Service Reserve Account will be established under the Trust Agreement as security for the Outstanding Senior Bonds to which such Account relates. Upon the occurrence of any deficiency in any Senior Debt Service Reserve Account, the Authority must cure the deficiency within 12 months. In addition, from the date of issuance of Additional Senior Bonds, the

Authority has 60 months to fund the increase, if any, in the Senior Reserve Requirement from Authority Revenues as described in “Flow of Funds” above. Subject to certain conditions in the Trust Agreement, in lieu of the required deposits, the Authority may cause a Debt Service Reserve Facility to be deposited into any Senior Debt Service Reserve Account. Moneys in a Senior Debt Service Reserve Account, including moneys drawn under any such Debt Service Reserve Facility, are available to pay principal of and interest on the Series of Senior Bonds to which it relates on any interest payment date whenever moneys in the Senior Bond Fund, the Surplus Fund, the Commonwealth Payments Fund, the Capital Improvement Fund, the Current Expense Fund and the Operating Reserve Fund are insufficient for such purpose. Upon the issuance of the 2008 Senior Bonds, the Authority deposited approximately \$90.6 million to the credit of the Senior Debt Service Reserve Account established under the Trust Agreement as security for the 2008 Senior Bonds.

*Senior Subordinate Debt Service Reserve Accounts.* Upon the issuance of Senior Subordinate Bonds, the Authority may establish one or more Senior Subordinate Debt Service Reserve Accounts related thereto. Each Senior Subordinate Debt Service Reserve Account will be established under the Trust Agreement as security for the Outstanding Senior Subordinate Bonds to which such Account relates. Upon the occurrence of any deficiency in any Senior Subordinate Debt Service Reserve Account, the Authority must cure the deficiency within 12 months. In addition, from the date of issuance of Additional Senior Subordinate Bonds, the Authority has 60 months to fund the increase, if any, in the Senior Subordinate Reserve Requirement as described in “Flow of Funds” above. Subject to certain conditions in the Trust Agreement, in lieu of the required deposits, the Authority may cause a Debt Service Reserve Facility to be deposited into any Senior Subordinate Debt Service Reserve Account. Moneys in the Senior Subordinate Debt Service Reserve Account, including moneys drawn under any such Debt Service Reserve Facility, are available to pay principal of and interest on the Series of Senior Subordinate Bonds to which it relates on any interest payment date whenever moneys in the Senior Subordinate Bond Fund, the Surplus Fund, the Commonwealth Payments Fund, the Capital Improvement Fund, the Current Expense Fund and the Operating Reserve Fund are insufficient for such purpose.

*Subordinate Debt Service Reserve Accounts.* Upon the issuance of Subordinate Bonds, the Authority may establish one or more Subordinate Debt Service Reserve Accounts related thereto. Each Subordinate Debt Service Reserve Account will be established under the Trust Agreement as security for the Outstanding Subordinate Bonds to which such Account relates. Upon the occurrence of any deficiency in any Subordinate Debt Service Reserve Account, the Authority must cure the deficiency within 12 months. In addition, from the date of issuance of Additional Subordinate Bonds, the Authority has 60 months to fund the increase, if any, in the Subordinate Reserve Requirement as described in “Flow of Funds” above. Subject to certain conditions in the Trust Agreement, in lieu of the required deposits, the Authority may cause a Debt Service Reserve Facility to be deposited into any Subordinate Debt Service Reserve Account. Moneys in the Subordinate Debt Service Reserve Account, including moneys drawn under any such Debt Service Reserve Facility, are available to pay principal of and interest on the Series of Subordinate Bonds to which it relates on any interest payment date whenever moneys in the Subordinate Bond Fund, the Surplus Fund, the Commonwealth Payments Fund, the Capital Improvement Fund, the Current Expense Fund and the Operating Reserve Fund are insufficient for such purpose.

*Other Reserves.* As the above discussion of the flow of funds shows, immediately after monthly deposits are made for debt service, associated reserves on the Authority’s Bonds (other than Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations) and Current Expenses, the Authority makes deposits into an Operating Reserve Fund and a Capital Improvement Fund. The moneys in these funds will be used by the Authority to provide reserves for covering normal operating expenses of the Systems as well as for providing “internally generated funds” for a portion of its Five-Year CIP. Moneys in these two funds are also available, prior to the use of any moneys in the various debt service reserve funds (see “Reserve Funds” above), to cover debt service shortfalls relating to the Senior, Senior Subordinate and Subordinate Bonds, and serve as additional reserves for those purposes.

### **Budgetary Reserve Fund**

The Fiscal Oversight Agreement establishes a new Budgetary Reserve Fund, held by Government Development Bank in trust for the Authority, which will be funded initially with a portion of the proceeds of the Series A Bonds equal to the Budgetary Reserve Requirement (as defined below) for fiscal years 2012 and 2013. On the first Business Day of each month, Government Development Bank shall transfer from the Budgetary Reserve

Fund to the Trustee, the amount, which together with amounts previously transferred from the Budgetary Reserve Fund and remaining on deposit in the applicable Fund, will be sufficient to fund the various Funds at the respective amounts estimated in the most recent Disbursement Schedule for the current month and each of the next two subsequent months.

The Fiscal Oversight Agreement requires that the Authority deliver an annual Disbursement Schedule to Government Development Bank no later than June 30 of each year, certified by the chief financial officer, which sets forth the Current Expenses and other deposits expected to be paid from the Budgetary Reserve Fund during the next Fiscal Year. On or before the last Business Day of each month, the Authority is required to update the Disbursement Schedule for the subsequent three month period.

The Commonwealth agrees that no later than February 1, 2013 and by each February 1 thereafter it shall either (i) obtain an appropriation or a commitment for another funding source for the projected Budgetary Reserve Requirement applicable to the fiscal year beginning on the next July 1 or (ii) advise the Authority that it does not intend to request an appropriation or a commitment for another funding source to cover all or a portion of the projected Budgetary Reserve Requirement for that fiscal year.

The “Budgetary Reserve Requirement” for each fiscal year is the amount projected by the Authority in the Fiscal Improvement Plan to be required in such fiscal year as financial support from the Commonwealth; provided, however, in the event the Authority anticipates a rate increase in any fiscal year, the Authority shall include such rate increase in its Fiscal Improvement Plan for such fiscal year if all approvals, public hearings and action by the Board necessary pursuant to the Act, the Trust Agreement and required by law have occurred. The Budgetary Reserve Requirement will be recalculated annually each February 1.

To the extent the Budgetary Reserve Requirement is reduced on a subsequent calculation date, any amounts on deposit in the Budgetary Reserve Fund in excess of the Budgetary Reserve Requirement shall be transferred from the Budgetary Reserve Fund to, or at the direction of, Government Development Bank.

To the extent that the Commonwealth determines not to request an appropriation or otherwise fails to provide an additional funding source in an amount equal to at least the Budgetary Reserve Requirement for a fiscal year, the Authority shall be obligated to either promptly revise its rates, fees and charges or to otherwise increase Operating Revenues or decrease expenses to ensure that it will be in compliance with the Rate Covenant under the Trust Agreement.

For more information regarding the Fiscal Oversight Agreement, see “Fiscal Oversight Agreement” under THE AUTHORITY.

### **Rate Covenant**

The Authority covenants that it will fix, charge and collect rates, fees and other charges for the use of and the services furnished by the Systems and shall, from time to time and as often as necessary, revise such rates, fees and other charges so as to meet the following four independent requirements (which will be calculated annually no later than six months after the beginning of each Fiscal Year based upon the Operating Revenues and Authority Revenues set forth in the Authority’s audited financial statements for the preceding Fiscal Year):

- (1) Operating Revenues shall be at least equal to 250% of Annual Debt Service with respect to Senior Indebtedness for the current Fiscal Year;
- (2) Operating Revenues shall be at least equal to 200% of Annual Debt Service with respect to Senior Indebtedness and Senior Subordinate Indebtedness for the current Fiscal Year;
- (3) Operating Revenues shall be at least equal to 150% of Annual Debt Service with respect to all Bonds and Other System Indebtedness for the current Fiscal Year; and



(4) Authority Revenues shall be sufficient to be equal at least 100% of (A) Annual Debt Service on Indebtedness, (B) Current Expenses, (C) the amounts, if any, necessary to be deposited in any Debt Service Reserve Account to restore the amount on deposit therein to the amount of the applicable Debt Service Reserve Requirement (provided that each such Account will be deemed to be funded at its applicable Debt Service Reserve Requirement for so long as the deposits required by the Trust Agreement are being made), (D) the amount, if any, necessary to be deposited in the Operating Reserve Fund to maintain the balance therein at the Operating Reserve Requirement and (E) the amount, if any, necessary to be deposited in the Capital Improvement Fund and the Rate Stabilization Account of the Surplus Fund in accordance with the Annual Budget for the current Fiscal Year.

Operating Revenues include, among other things, all moneys received by or on behalf of the Authority, including (i) the moneys derived by or on behalf of the Authority from the sale of water produced, treated or distributed by, or the collection, transmission, treatment or disposal of sewage by the Systems, (ii) any proceeds of use and occupancy insurance on the Systems or any part thereof, (iii) any income from the investments made under the Trust Agreement (with certain exceptions), (iv) any special assessments, including assessments in the nature of impact fees, (v) amounts, if any, paid from the Rate Stabilization Account into the Operating Revenue Fund in any Fiscal Year minus the amounts, if any, paid from the Operating Revenue Fund into the Rate Stabilization Account during the same Fiscal Year; and (vi) regularly scheduled payments received under any Qualified Swap or Hedge Agreement during such period.

Operating Revenues do not include (i) income from the investment of moneys on deposit to the credit of the Construction Fund, proceeds of insurance (except use and occupancy insurance) or condemnation awards (which are required to be deposited directly to the credit of the Capital Improvement Fund), (ii) proceeds of sales of property constituting a part of the Systems (which are required to be deposited directly to the credit of the Capital Improvement Fund), (iii) the proceeds of Bonds or other Indebtedness, (iv) any governmental grants or appropriations available to pay Current Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (v) any amounts received from the Commonwealth on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited in the Commonwealth Payments Fund), (vi) any amounts transferred from the Budgetary Reserve Fund to the Trustee, and (vii) termination or similar payment under any interest rate swap or similar hedge agreement received by the Authority (which are required to be deposited directly to the credit of the Capital Improvement Fund).

The Authority shall immediately retain a Consultant to submit a written report and recommendations with respect to increases in the Authority's rates, fees and other charges and improvements in the operations of and the services rendered by the Systems and the Authority's accounting and billing procedures necessary to bring the Authority into compliance with the Rate Covenant if (i) at the end of any Fiscal Year the Authority is not in compliance with the Rate Covenant for such Fiscal Year, (ii) the Authority fails for three consecutive months to make the required deposits to any Bond Fund, (iii) there is a deficiency in any Debt Service Reserve Account for longer than three consecutive months (provided no such deficiency shall be deemed to exist so long as the deposits required by the Trust Agreement are being made), or (iv) there is a deficiency in the Operating Reserve Fund for longer than six consecutive months. The report and recommendations shall be filed with the Trustee and the Authority within 120 days from the date the Consultant is retained, and the Authority shall promptly revise its rates, fees and charges, and alter its operations and services to conform with the report and recommendations of the Consultant to the extent permitted by law.

If the Authority promptly revises its rates, fees, charges, operations, services and procedures in conformity with the report and recommendations of the Consultant and otherwise follows such recommendations to the extent permitted by law so that the Authority is expected to be, when its actions become fully effective, in compliance with the Rate Covenant, then any failure to meet the Rate Covenant will not constitute an Event of Default under the Trust Agreement.

In the event that the Authority shall fail to pursue diligently an adjustment of the schedule of rates, fees and charges in accordance with the provisions of the preceding paragraph, the Trustee shall, upon the request of the Holders of not less than 10% in principal amount of all Senior Bonds then Outstanding and upon being indemnified to its satisfaction, institute and prosecute an appropriate suit, action or proceeding to compel the Authority to adjust

such schedule in accordance with the requirements of the Trust Agreement, and the Authority has covenanted in the Trust Agreement that it will adopt and charge rates and charges in compliance with any judgment, order or decree entered in any such suit, action or proceeding.

### **Additional Bonds**

*General.* The Authority may issue Bonds in addition to the 2012 Senior Bonds and the 2008 Senior Bonds under the Trust Agreement for any lawful purpose, such as to finance Improvements to the Systems or to refinance other Authority Indebtedness and for making deposits to the corresponding Debt Service Reserve Fund, and paying any costs of issuance so long as the Authority satisfies the following tests:

*Senior Bonds.* Additional Senior Bonds may be issued under the Trust Agreement, provided that, among other conditions, the amount of the Operating Revenues for any twelve consecutive calendar months out of the eighteen calendar months immediately preceding the date of issuance of such Senior Bonds, adjusted to give effect for such twelve month period to any increase or decrease in rates, fees, rentals or other charges for which all legal conditions to effectiveness have been met as of the date of issuance of such additional Senior Bonds, shall be not less than (A) 250% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Outstanding Senior Indebtedness and the Senior Bonds then to be issued (and other Senior Indebtedness incurred together with said Senior Bonds), and (B) 150% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on all Bonds and Other System Indebtedness then Outstanding, the Additional Senior Bonds to be issued and any other Bonds and Other System Indebtedness to be issued or incurred simultaneously therewith, plus the amounts required to be deposited in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund from Authority Revenues pursuant to the Trust Agreement.

*Senior Subordinate Bonds.* Senior Subordinate Bonds may also be issued under the Trust Agreement, provided that, among other conditions, the amount of the Operating Revenues for any twelve consecutive calendar months out of the eighteen calendar months immediately preceding the date of issuance of such Senior Subordinate Bonds, adjusted to give effect for such twelve month period to any increase or decrease in rates, fees, rentals or other charges for which all legal conditions to effectiveness have been met as of the date of issuance of such additional Senior Subordinate Bonds, shall be not less than (A) 200% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Outstanding Senior and Senior Subordinate Indebtedness and the Senior Subordinate Bonds then to be issued (and other Senior or Senior Subordinate Indebtedness incurred together with said Senior Subordinate Bonds), and (B) 150% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Bonds and Other System Indebtedness then Outstanding, the Additional Senior Subordinate Bonds to be issued and any other Bonds and Other System Indebtedness to be issued or incurred simultaneously therewith, plus amounts required to be deposited in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund from Authority Revenues pursuant to the Trust Agreement.

*Subordinate Bonds.* Subordinate Bonds may be issued under and secured by the Trust Agreement provided that, among other conditions (i) the amount of the Operating Revenues for any twelve consecutive calendar months out of the eighteen calendar months immediately preceding the date of issuance of such Subordinate Bonds, adjusted to give effect for such twelve month period to any increase or decrease in rates, fees, rentals or other charges for which all legal conditions to effectiveness have been met as of the date of issuance of such additional Subordinate Bonds, shall be not less than 150% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Bonds and Other System Indebtedness then Outstanding, the additional Subordinate Bonds to be issued and any other Bonds and Other System Indebtedness to be issued or incurred simultaneously therewith plus amounts required to be deposited in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund, and the Subordinate Debt Service Reserve Fund from Authority Revenues pursuant to the Trust Agreement and (ii) the projected Operating Revenues for each of the three Fiscal Years after the issuance of such Subordinate Bonds shall be not less than 150% of the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Bonds and Other System Indebtedness then Outstanding, the Additional Subordinate Bonds to be issued and Other System Indebtedness to be issued or incurred simultaneously therewith, plus amounts required to be deposited in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund, and the Subordinate Debt Service Reserve Fund from Authority Revenues pursuant to the Trust Agreement.

*Refunding Bonds.* In addition to issuing Bonds, as aforesaid, for financing Improvements to the Systems and related purposes, the Authority is also permitted under the Trust Agreement to issue Bonds to refinance all or any part of its then outstanding obligations. If, after the issuance of such refunding Bonds and the provision for the refunding of the obligations in question, (A) Annual Debt Service on such refunding Bonds for each applicable Fiscal Year following the issuance thereof is not greater than the Annual Debt Service for such Fiscal Year on the obligations to be refunded or (B) maximum aggregate Annual Debt Service for any Fiscal Year thereafter on Indebtedness Outstanding after the issuance of such refunding Bonds is not greater than the maximum aggregate Annual Debt Service for any Fiscal Year thereafter on the Indebtedness Outstanding prior to the issuance of such refunding Bonds, then the Authority need not establish compliance with the financial tests that it must otherwise meet in order to issue a particular class of Bonds under the Trust Agreement as described under “Additional Bonds” above. If, however, such is not the case, then the Authority – prior to issuing any such refunding Bonds – must demonstrate to the Trustee written compliance with the applicable financial tests outlined above under “Additional Bonds” (treating, for purposes of demonstrating such compliance, the obligations being refunded as not Outstanding under the Trust Agreement). For purposes of this paragraph, applicable Fiscal Year means any Fiscal Year in which such refunding Bonds are outstanding.

*Other.* The Authority may enter into agreements with issuers of any credit facility or liquidity facility securing any Series of Bonds which involve parity liens on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which are not subject to the lien of the Trust Agreement and can only be used to make such payments) to the extent that the Series of Bonds or portion thereof which is supported by such credit facility or liquidity facility is issued under the conditions described above. The Authority may also incur Other System Indebtedness secured on a parity with the claim of Bonds (Senior, Senior Subordinate or Subordinate, as the case may be) on Authority Revenues (other than that portion of Authority Revenues consisting of moneys received from the Commonwealth for the payment of principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations, which are not subject to the lien of the Trust Agreement and can only be used to make such payments), provided the applicable conditions above for the issuance of Additional Bonds are met, including obligations to counterparties under interest rate exchange agreements and similar derivative instruments.

## **Events of Default**

Under the Trust Agreement, certain actions or inactions of the Authority, such as not paying its Bonds and Other System Indebtedness when due (including Other System Indebtedness incurred under contracts other than the Trust Agreement), not meeting covenants and instituting bankruptcy or insolvency proceedings, are Events of Default that will subject the Authority to breach of contract and similar lawsuits and, in certain cases (involving non-payment of debt or its initiation of insolvency proceedings) to having the principal of its Bonds being declared due and payable immediately upon the happening of such default. The failure, however, by the Authority to make payments in respect of any Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations will not be considered Events of Default under the Trust Agreement, and the above remedies, absent such failure also being such an event of default (as would be the case if such failure also caused a violation of a Trust Agreement covenant), would not be available to the Trustee or Bondholders upon any such nonpayment. See *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement in Appendix III.*

## **Acceleration**

Upon the occurrence and continuation of an Event of Default, except for certain specified Events of Default, the Trustee may (and if requested by the Holders of not less than 25% in aggregate principal amount of Senior Indebtedness (or if no Senior Indebtedness are then Outstanding, of Senior Subordinate Indebtedness) then Outstanding shall) by written notice to the Authority, declare the entire unpaid principal of the Bonds due and payable and, thereupon, the entire unpaid principal of the Bonds shall forthwith become due and payable. Upon any such declaration, on the first Business Day of each month, the Trustee shall pay to (i) the Authority, an amount of Authority Revenues equal to the amount set forth in the applicable Annual Budget to pay Current Expenses of the Systems for such month and (ii) the Holders of the Bonds and Other System Indebtedness, but only from the remaining Authority Revenues and other moneys in the Trust Agreement specifically pledged for payments of Bondholders, the entire unpaid principal of and premium, if any, and accrued interest on the Bonds and Other

System Indebtedness. If at any time after such a declaration and before the entry of a final judgment or decree in any suit, action or proceeding instituted on account of such default or before the completion of the enforcement of any other remedy under the Trust Agreement, the principal of all Bonds and Other System Indebtedness that have matured or been called for redemption pursuant to any sinking fund provision and all arrears of interest have been paid and any other Events of Default which may have occurred have been remedied, then the Trustee may, by written notice to the Authority, rescind or annul such declaration and its consequences. No such rescission or annulment shall extend to or affect any subsequent default or impair any right consequent thereon. Senior Subordinate Indebtedness may not be accelerated if any Senior Indebtedness is Outstanding. Subordinate Indebtedness may not be accelerated if any Senior Indebtedness or Senior Subordinate Indebtedness are Outstanding. See *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement in Appendix III.*

### **Proposed Amendment to Trust Agreement**

In addition to the amendments approved by the Authority and incorporated into the Trust Agreement, the Authority is proposing an additional amendment to the Trust Agreement.

The amendment to the Trust Agreement would increase from 25% to a majority, the percentage of the aggregate principal amount of Senior Indebtedness (or if no Senior Indebtedness is then Outstanding, of Senior Subordinate Indebtedness) required to declare the entire unpaid principal of the Bonds due and payable upon the written notice to the Authority and, thereupon, the entire unpaid principal of the Bonds shall forthwith become due and payable. As a result, the threshold for holders of the Bonds to exercise this remedy in the event of an occurrence and continuance of certain Events of Default will be higher and will be more difficult to satisfy.

Section 9.02(e) of the Trust Agreement specifically authorizes the purchasers of Bonds, whether purchasing as underwriters or otherwise, upon such purchase, to consent to amendments to the Trust Agreement with the same effect as a consent given by the Holder of such Bonds. The amendment is expected to become effective upon the issuance of the 2012 Senior Bonds on February 29, 2012, upon receiving the consent of Merrill Lynch, Pierce, Fenner & Smith Incorporated, as representative of and on behalf of the Underwriters and holder of a majority of the aggregate principal amount of the Bonds Outstanding. See *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement in Appendix III.*

## **THE SERIES B BONDS**

### **General**

The Series B Bonds will be dated, bear interest at such rates, be payable at such times, and mature on the dates and in the principal amounts set forth on the cover and inside cover page of this Official Statement. Certain of the Bonds are subject to redemption at the times and at the prices set forth below in "Redemption."

### **Book-Entry Only System**

The Depository Trust Company ("DTC"), New York, NY, will act as securities depository for the Series B Bonds. The Series B Bonds will be issued as fully-registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered Series B Bond certificate will be issued for each stated maturity of the Series B Bonds, each in the aggregate principal amount of such maturity, and will be deposited with DTC. SO LONG AS CEDE & CO. IS THE REGISTERED OWNER OF THE SERIES B BONDS, AS NOMINEE FOR DTC, REFERENCES HEREIN TO BONDHOLDERS OR OWNERS OF THE SERIES B BONDS (OTHER THAN UNDER THE CAPTION TAX MATTERS) SHALL MEAN CEDE & CO. AND SHALL NOT MEAN THE BENEFICIAL OWNERS OF THE SERIES B BONDS. If, however, the aggregate principal amount of any issue exceeds \$500 million, one certificate will be issued with respect to each \$500 million of principal amount, and an additional certificate will be issued with respect to any remaining principal amount of such issue.

DTC, the world's largest securities depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934, as amended. DTC holds and provides asset servicing for over 3.5 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments (from over 100 countries) that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). DTC has a Standard & Poor's rating of AA+. The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at [www.dtcc.com](http://www.dtcc.com).

Purchases of Series B Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Series B Bonds on DTC's records. The ownership interest of each actual purchaser of each Series B Bond ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Series B Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in the Series B Bonds, except in the event that use of the book-entry system for the Series B Bonds is discontinued.

To facilitate subsequent transfers, the Series B Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of the Series B Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the Series B Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such Series B Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of Series B Bonds may wish to take certain steps to augment the transmission to them of notices of significant events with respect to the Series B Bonds, such as redemptions, tenders, defaults, and proposed amendments to the Series B Bonds documents. For example, Beneficial Owners of Series B Bonds may wish to ascertain that the nominee holding the Series B Bonds for their benefit has agreed to obtain and transmit notices to Beneficial Owners. In the alternative, Beneficial Owners may wish to provide their names and addresses to the registrar and request that copies of notices be provided directly to them.

Redemption notices shall be sent to DTC. If less than all of the Series B Bonds within an issue are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to Series B Bonds unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to the Authority as soon as possible after the record date. The Omnibus

Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Series B Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal, redemption premium, if any, and interest payments on the Series B Bonds will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from the Authority or the Trustee, on payable dates in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participant and not of DTC, the Trustee or the Authority, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal, redemption premium, if any, and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the Authority or the Trustee, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

The information in this section concerning DTC and DTC's book-entry system has been obtained from sources that the Authority believes to be reliable, but the Authority takes no responsibility for the accuracy thereof.

NONE OF THE AUTHORITY, THE TRUSTEE OR THE UNDERWRITERS WILL HAVE ANY RESPONSIBILITY OR OBLIGATION TO DIRECT PARTICIPANTS, INDIRECT PARTICIPANTS OR ANY BENEFICIAL OWNER WITH RESPECT TO (I) THE ACCURACY OF ANY RECORDS MAINTAINED BY DTC, ANY DIRECT PARTICIPANT OR INDIRECT PARTICIPANT; (II) THE PAYMENT BY DTC OR ANY DIRECT PARTICIPANT OR INDIRECT PARTICIPANT OF ANY AMOUNT WITH RESPECT TO THE PRINCIPAL OF, OR PREMIUM, IF ANY, OR INTEREST ON, THE SERIES B BONDS; (III) ANY NOTICE WHICH IS PERMITTED OR REQUIRED TO BE GIVEN TO BONDHOLDERS; (IV) ANY CONSENT GIVEN BY DTC OR OTHER ACTION TAKEN BY DTC AS A BONDHOLDER; OR (V) THE SELECTION BY DTC OR ANY DIRECT PARTICIPANT OR INDIRECT PARTICIPANT OF ANY BENEFICIAL OWNERS TO RECEIVE PAYMENT IN THE EVENT OF ANY PARTIAL REDEMPTION OF THE SERIES B BONDS.

#### **Discontinuance of the Book-Entry Only System**

DTC may discontinue providing its services as depository with respect to the Series B Bonds at any time by giving reasonable notice to the Authority or the Trustee. Under such circumstances, in the event that a successor depository is not obtained, Series B Bond certificates are required to be printed and delivered.

The Authority may decide to discontinue use of the system of book-entry only transfers through DTC (or a successor securities depository). In that event, Series B Bond certificates will be printed and delivered to DTC.

In the event that such book-entry only system is discontinued or terminated, the following provisions will apply: (i) payment of the principal of and the interest on the Series B Bonds will be made in lawful money of the United States of America; (ii) payment of the principal will be made at the corporate office of the Trustee in San Juan, Puerto Rico; (iii) interest on the Series B Bonds will be paid by check mailed to the respective addresses of the registered owners thereof as of the fifteen day of the month immediately preceding the interest payment date as shown on the registration books of the Authority maintained by the Trustee; (iv) the Series B Bonds will be issued only as registered bonds without coupons in authorized denominations; and (v) the transfer of the Series B Bonds will be registrable and the Series B Bonds may be exchanged at the corporate office of the Trustee in San Juan, Puerto Rico upon the payment of any taxes or other governmental charges required to be paid with respect to such transfer or exchange.

## Redemption

### *Optional Redemption*

The Series B Bonds maturing after July 1, 2015 may be redeemed at the option of the Authority prior to maturity, upon not less than 30 days prior notice, either in whole, or in part, in such order of maturity as directed by the Authority, from any available moneys, but not from moneys held by the Trustee in respect of a Sinking Fund Requirement, on any date not earlier than July 1, 2015, at the principal amount of the Series B Bonds to be redeemed, plus accrued interest to the redemption date, without premium.

### *Sinking Fund Requirements*

The Series B Term Bonds maturing July 1, 2027 shall be redeemed in part on July 1, 2026, and each July 1 thereafter in the principal amounts equal to the respective Sinking Fund Requirements (less the principal amount of any Series B Term Bonds retired by purchase) from moneys in the Senior Sinking Fund Account at par plus accrued interest in the years and amounts set forth below:

| <b>Year</b> | <b><u>Annual Sinking Fund Requirements<br/>for Series B Bonds due July 1, 2027</u></b> |
|-------------|--|
| 2026        | \$53,535,000   |
| 2027        | 53,580,000*  |

\* Final maturity.

If the amount of the Series B Bonds purchased or redeemed in any fiscal year exceeds the amount of the amortization requirement due on such Series B Bonds for such fiscal year, the amortization requirement for such Series B Bonds may be decreased for such subsequent fiscal years and in such amounts aggregating the amount of such excess as the Authority shall determine.

## Notice of Redemption

At least thirty (30) days prior to any redemption, notice thereof will be sent by registered or certified mail or overnight express delivery to the Holder of each Series B Bond to be redeemed at the address as it appears on the registration books kept by the Trustee and all organizations registered with the Securities and Exchange Commission (the "SEC") as securities depositories and to the MSRB. If less than all of the Series B Bonds of any one maturity are called for redemption, the particular Series B Bonds or portions thereof to be redeemed will be selected by the Trustee by such method as it deems fair, except that so long as the book-entry only system shall remain in effect, in the event of any such partial redemption, DTC shall reduce the credit balances of the applicable DTC Participants in respect of such Series B Bonds, and such DTC Participants shall in turn select those Beneficial Owners whose ownership interests are to be extinguished by such partial redemption, each by such method as DTC or such DTC Participants, as the case may be, in its sole discretion deems fair and appropriate. Each notice of redemption shall contain, among other things, the CUSIP identification number and the number of the Series B Bonds (or portion thereof) being called for redemption, the redemption date and price and the address at which Series B Bonds are to be surrendered for payment of the redemption price. Any defect in such notice or the failure so to mail any such notice to registered owner of any Series B Bond will not affect the validity of the proceedings for the redemption of any other Series B Bond. Any defect in such notice or the failure so to mail any such notice to any such national information service will not affect the effectiveness of a call for redemption. Notices of optional redemption are permitted under the Trust Agreement to be given with the condition that the effectiveness of such optional redemption is dependent upon the Trustee having in its possession on the date of redemption moneys sufficient to enable it to pay the applicable redemption price on the corresponding Series B Bonds and in the absence of such possession by the Trustee, such redemption will not take place.

**Purchase of Bonds**

The Authority may purchase or cause to be purchased any Bonds of any particular Series or maturity in lieu of redemption of such Bonds (in which event any Bonds so purchased shall be cancelled and shall cease to bear interest pursuant to the provisions of the Trust Agreement) or for any other purpose pursuant to written instructions given by the Authority to the Trustee. Such purchases shall be made in such manner as directed by the Authority. The Authority or the Trustee shall pay the purchase price of such Bonds together with accrued interest thereon from such funds as may be available therefor pursuant to the Trust Agreement, any Supplemental Agreement, or as otherwise may be made available by the Authority.



## THE AUTHORITY

The Authority is a body corporate and politic constituting a public corporation and governmental instrumentality of the Commonwealth. The Authority owns and operates the public water supply and wastewater systems of the Commonwealth. The executive offices of the Authority are located at 604 Barbosa Avenue, Hato Rey, Puerto Rico 00916. The telephone number is (787) 620-2277.

### Powers

The Authority has broad powers under the Act, including the power to make contracts, to acquire properties by any lawful means, to exercise eminent domain, to hold, operate and administer its properties, to borrow money and issue bonds for any of its corporate purposes, to secure the payment of its bonds and all other obligations by pledge of its revenues, to determine, revise, charge and collect rates, fees, rentals and other charges for the use of its facilities and to have complete control and supervision of its properties and activities.

### Management

The Governing Board of the Authority (the “Board”) is composed of nine members, five of whom are private citizens (the “Independent Directors”) appointed by the Governor of Puerto Rico and confirmed by the Senate; two of whom are ex-officio members in their capacity as Executive Director of the Electric Power Authority and President of the Planning Board; and two of whom are ex-officio members in their capacity as Executive Directors of the organizations representing Mayors of the Municipalities of the Commonwealth. Members of the Board who are not ex-officio members serve staggered, five-year terms. The members of the Board are:

| Members                         | Occupation                                      | Term Ends     |
|---------------------------------|---|---------------|
| Mr. Edgardo Fábregas Castro     | Independent Director; Interim Board Chairman    | June 30, 2014 |
| Mr. Otoniel Cruz Carrillo       | Executive Director, Electric Power Authority    | Ex-Officio    |
| Eng. Bernardino Feliciano Ruiz  | Independent Director                            | June 30, 2014 |
| Ms. Carmen Ana Culpeper Ramírez | Independent Director                            | June 30, 2015 |
| Mr. Reinaldo Paniagua Látimer   | Executive Director of the Federation of Mayors  | Ex-Officio    |
| Mr. Jaime García García         | Executive Director of the Association of Mayors | Ex-Officio    |
| Mr. Rubén Flores Marzán         | President of Planning Board                     | Ex-Officio    |
| Aura González Ríos, Esq.        | Independent Director                            | June 30, 2013 |
| Carlos Dávila Torres, CPA       | Independent Director                            | June 30, 2013 |

The Board is responsible for making or approving all major decisions taken by the Authority, including overall institutional policies, the Authority’s strategies and programs, executive and key management manpower recruitments and removals, approval of union contracts, professional services contracts beyond the limits accorded to the Executive President, and all contract changes that are beyond the limits accorded to the Executive President.

The Board is assisted by an Internal Audit Unit which is responsible for conducting internal audits for the Board, and by a Board Secretary, who maintains Board records, among other responsibilities.

The Board appoints the Executive President, who is the chief executive officer of the Authority responsible for its day-to-day operations. The appointment is for a six-year term. In addition, under the Act, the operations of the Authority are divided into five geographical regions and are run by regional executive directors who report to the Executive President and are also subject to six-year terms. Set forth below are brief biographical descriptions of the Executive President and certain members of the Authority’s senior management staff.

**Eng. José Ortiz Vázquez**, Executive President, was appointed to that position in January 2007. Prior to his appointment, he was the Authority’s Executive Director for Infrastructure since 2004. Before that he worked in the manufacturing industry, having served as Engineering Director for multinational firms including Colgate-

Palmolive and Unilever. In November 2011, Mr. Ortiz was appointed Chairman of the Governing Board of Puerto Rico Electric Power Authority. He holds a Bachelor's Degree in Electrical Engineering from the Mayagüez Campus of the University of Puerto Rico and a Master's Degree in Business Administration from the University of Turabo.

**Eng. Eufemio Toucet**, Executive Vice President and Interim Executive Director for the Metro Region, assumed such positions in February 2009 and January 2012, respectively. Prior to his appointment as Executive Vice President, he was the Authority's Executive Director for the East Region since 2005. Before joining the Authority, Mr. Toucet worked for Cemex de Puerto Rico, Inc. as Executive Director of Ready Mix, for four years. Prior to that, he was President and General Manager of Storage Technology, Ponce, Puerto Rico, and Plant Manager of Digital Equipment Corporation, San Germán, Puerto Rico. Mr. Toucet obtained a Bachelor's Degree in Industrial Engineering from the University of Puerto Rico, Mayagüez Campus.

**Eng. Alberto Lázaro**, Executive Director for Infrastructure, assumed such position in January 2007 after having served as the Authority's Director of Engineering for two years. Prior to that, he served as Deputy Secretary for Puerto Rico Department of Natural and Environmental Resources for two years and as an environmental engineer consultant in the private sector for seven years, involved with planning, design, construction, management, and operation of water and sewer facilities. He holds a Bachelor's Degree in Civil Engineering from Cornell University and a Master's Degree in Environmental Engineering from the Massachusetts Institute of Technology.

**Efraín Acosta Reboyras**, Executive Director of Administration and Finance, was appointed to such position in April 2004, after working for two years with Ondeo de Puerto Rico (a subsidiary of Suez Environment). Prior to that, he served as Deputy Executive Director of Finance for Puerto Rico Industrial Development Company. Before joining the government, Mr. Acosta worked in various senior financial and accounting positions in the private sector for companies such as 3M, Bacardi Corporation, Haskins & Sells and ITT Corporation. Mr. Acosta holds a Bachelor's Degree in Business Administration from the University of Puerto Rico and has pursued his Masters of Business Administration degree from Interamerican University of Puerto Rico.

**Raquel Matos, Esq.**, General Legal Counsel, assumed such position in November 2006 after having served as the Authority's Internal Auditor for almost two years. Prior to that, she served as Legal Counsel to the Office of the Comptroller of the Commonwealth for two years. Ms. Matos holds a Juris Doctor from the University of Puerto Rico School of Law and a Bachelor's Degree in Business Administration, with a major in accounting, from the University of Puerto Rico, Río Piedras Campus. She is also a CPA.

**José E. Nieves Maldonado**, Human Resources and Labor Relations Director, was appointed to such position in November 2009. Mr. Nieves joined the Authority in August 1980 and has occupied different management positions within the Human Resources and Labor Relations Department. He holds a Bachelor's Degree in Labor Relations from University of Puerto Rico, Río Piedras Campus.

**Eng. José Capeles**, Executive Director of Environmental Compliance and Quality Control, was appointed to such position in February 2007, after having served as the Authority's Deputy Executive Director for Infrastructure since 2004. Prior to that, he served as Vice President of Compliance and Planning for the Authority, directing and administering the private operator's service contract related obligations. Mr. Capeles joined the public sector in 2001 after 25 years of service in various technical and executive management positions for multinational manufacturing and marketing firms, including Sunoco and Enron. He holds a Bachelor's Degree in Chemical Engineering from the University of Puerto Rico, Mayagüez Campus, and has taken several post-graduate courses, including an Executive Business Program from Dartmouth College, New Hampshire.

**Eng. Doriel I. Pagán Crespo**, Executive Director for the North Region, was appointed to that position in May 2011. Prior to her appointment, she served as Regional Executive Sub-Director for the North Region for a year and a half. Ms. Pagán joined the Authority in 1992, and has occupied different positions within the Compliance and Quality Control Department. Prior to joining the Authority, she worked for Johnson & Johnson Company in San Germán, Puerto Rico, for two years. Ms. Pagán was recognized by the College of Engineers and Surveyors of Puerto Rico as "Woman of Avant-garde." She obtained her Bachelor's Degree in Chemical Engineering from the University of Puerto Rico, Mayagüez Campus in 1991.

**Eng. Francisco Martínez Castello**, Executive Director for the East Region, was appointed to such position in November 2011, after having served as the Authority's Executive Director for the West Region for two years. Prior to that, he served as the Guayama Operational Area Director and as Director of the Infrastructure Department for the West and East Region. Mr. Martínez worked with Ondeo de Puerto Rico and Compañía de Aguas de Puerto Rico. He holds a Bachelor's Degree in Mechanical Engineer from the University of Puerto Rico, and a Master's Degree in Business Administration, with a major in management, from the Pontifical Catholic University of Puerto Rico.

**Eng. Julio Víctor Pérez**, Executive Director for the South Region, was appointed to that position in January 2009. He has over twenty nine years of experience in the management, operation, maintenance, and construction of water and wastewater systems. Mr. Pérez received his Bachelor's Degree in Electrical Engineering from the University of Puerto Rico, Mayagüez Campus.

**Eng. Joel Lugo Rosa**, Interim Executive Director for the West Region, was appointed to such position in December 2011, after having served as Executive Sub-Director for West Region since January 2009. Prior to that, he served as Auxiliary Infrastructure Director for West Region from 2006. Mr. Lugo joined the Authority in 1998 as field engineer for the Infrastructure Department. He holds a Bachelor's Degree in Civil Engineering from the University of Puerto Rico, and is currently pursuing a Master's Degree in Civil Engineering with a concentration in Water Resources and Environmental Engineering from the University of Puerto Rico.

As stated in the Consulting Engineer's Report, the Consulting Engineer believes that the Authority's current management structure is adequately developed and consistent with those found at similar United States utilities of equivalent size.

The Authority has organized its service area into five regions to decentralize the management and administration of many operational matters. Regional executive directors, serving terms of six years and reporting to the Executive President, are responsible for administration and operation of water and wastewater facilities within each region. The Authority's management has taken and is continuing to take steps to strengthen the operation and management of the Authority. These steps include improved billing and collection procedures (including mobile and remote meter readings to reduce the number of estimated bills being produced), consolidation and computerization of the planning process for capital improvement projects, upgrading of laboratory personnel and facilities, organization of the Pretreatment Area to manage the Authority's pretreatment program, and improved handling of personnel grievances within the Human Resources Area.

## **Employees and Labor Relations**

The Authority had 4,919 regular and temporary employees as of June 30, 2011, as compared with 5,001 as of June 30, 2010 and 5,575 as of June 30, 2009. At June 30, 2011, 3,657 employees were represented by two unions, the Independent Authentic Union (the "UIA" by its Spanish acronym) and the Hermandad de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados (the "HIEPAAA"), the largest of which is the UIA with 3,490 members.

The Authority's relations with its unionized employees have at times been contentious. For example, a prolonged work stoppage occurred in 2004, and lasted 84 days. Since that time, multi-day labor stoppages have occurred periodically. Recently, the Authority and the UIA entered into a new collective bargaining agreement that will be in effect from January 1, 2012 through December 31, 2015. The new collective bargaining agreement contains, among other things, certain retroactive and future economic agreements in the areas of payroll and benefit expenses that are included in the Authority's budget projections.

In 2009, the Puerto Rico Labor Relations Board made a final determination regarding the scope of the UIA's collective bargaining agreement that expired in 2003 and found that the collective bargaining agreement was in existence and reinstated its effects through December 2008. As a result of this decision, the Authority was required to retroactively recognize the existence of certain employment terms that the Authority had ceased to apply from 2003 through 2008. As a result of the retroactive application of these employment terms, the Authority negotiated the payment of approximately \$34.2 million to UIA members to be paid in three installments during fiscal years 2012 and 2013.

With respect to the HIEPAAA, their collective bargaining agreement expired in 2009, however, it is automatically renewed for one-year periods. A new collective bargaining agreement is currently being negotiated between the Authority and the HIEPAAA.

Pending negotiation and execution a new collective bargaining agreement with the HIEPAAA, the management of the Authority believes that current labor relations are satisfactory.

## **Pension Benefits**

*The information set forth below with respect to the Employees Retirement System of the Government of the Commonwealth of Puerto Rico (the “Employees Retirement System”), and other information referenced as being provided by the Employees Retirement System, has been obtained from the Employees Retirement System. The Employees Retirement System is responsible for conducting actuarial valuations of the benefit plan. The Authority has not reviewed the actuarial valuation or verified the accuracy of the data used by the Employees Retirement System for the actuarial valuations. The Authority and the Employees Retirement System intend to review the actuarial valuation and the Authority’s census data.*

Substantially all of the employees of the Authority are covered by the Employees Retirement System, a multi-employer hybrid defined benefit plan consisting of different benefit structures. The Employees Retirement System covers substantially all employees of the departments and agencies of the Commonwealth, all members and regular employees of the Legislative Branch, and all employees of the public corporations (other than the University of Puerto Rico and the Puerto Rico Electric Power Authority) and municipalities, except for those employees that are covered by two other retirement systems of the Commonwealth.

The Employees Retirement System faces a number of financial difficulties, as reflected in its large and growing unfunded actuarial accrued liability (“UAAL”) and historical funding shortfalls, which are expected to continue. As of June 30, 2010, the date of the latest actuarial valuation of the Employees Retirement System, the UAAL of the Employees Retirement System was \$17.8 billion and the funded ratio was 8.5%. Based on the current statutory employer and member funding requirements and disbursement projections (which reflect continued funding shortfalls), the UAAL of the Employees Retirement System is expected to continue growing instead of being amortized. The Employees Retirement System is in the process of preparing the actuarial valuation as of June 30, 2011. The Employees Retirement System expects that, mainly as a result of a decrease in the assumed investment return to be used in the actuarial valuation as of June 30, 2011, the UAAL of the Employees Retirement System will increase to approximately \$21.5 billion and the funded ratio will decrease to approximately 7.4%. These estimates, however, are preliminary and could change as part of the Employees Retirement System’s review of the actuarial valuation as of June 30, 2011.

Because the statutory employer and member contributions are not adequate to fund the System’s benefits, the System’s assets are being rapidly depleted and, as a result, the currently scheduled future contributions will not be adequate to accumulate sufficient assets to make future benefit payments when due. Based on the assumptions used in the actuarial valuation as of June 30, 2010, the Employees Retirement System would deplete its net assets (total assets less liabilities, including the principal amount of certain pension obligation bonds issued by the Employees Retirement System) by fiscal year 2014 and its gross assets by fiscal year 2019. This means that during the period from fiscal year 2014 through fiscal year 2019, benefits are expected to be paid from the proceeds of the pension obligation bonds, and that after depletion of the gross assets, there would be no funds remaining to pay pension benefits to members, to refund member balances or to pay debt service on the pension obligation bonds. As a result of the gradual increases in employer contributions provided for by Act 116 of July 6, 2011 (“Act 116”), as described below, and other matters considered in the actuarial valuation report being prepared as of June 30, 2011, the Employees Retirement System expects that the new actuarial valuation will project that the Employees Retirement System will deplete its net assets by fiscal year 2015 and its gross assets by fiscal year 2022.

The Employees Retirement System is funded from contributions by the employers (the Commonwealth, public corporations, including the Authority, and municipalities), contributions by the employees and investment income. Act 116 provided for an increase in employer contributions of 1% of payroll in each of the next five fiscal years and by 1.25% of payroll in each of the following five fiscal years. As of July 1, 2011, after the adoption of Act 116, the statutory employer contribution for the employers (including the Authority) increased from a minimum

of 9.275% to a minimum of 10.275% of payroll. By fiscal year 2021, the total employer contribution rate will be 20.525% of payroll. The employer contribution rate of 9.275% had been in effect since February 1990. These contribution rates are statutorily established rates that do not reflect actuarially recommended contribution rates or rates that are intended to fully pre-fund the present value of future benefits.

For a detailed discussion of the funding requirements and benefit structure of the Employees Retirement System, as well as its financial and actuarial situation, funding shortfalls, and efforts to address its financial solvency, see RETIREMENT SYSTEMS in the Commonwealth Report.

The enabling act of the Employees Retirement System requires that the contributions of each employer cover the difference between (i) the benefits provided by the Employees Retirement System to its employees who are members of the System, plus administrative costs, and (ii) the contributions that its employees are required to make to the Employees Retirement System. This requirement, however, has not been adhered to and the level of employer contributions has historically been limited to the minimum statutory rate. The enabling act further provides that any resulting deficiency in the employer contribution is an obligation of the employer.

As a participating employer in the Employees Retirement System, the Authority has been making employer contributions based on the minimum statutory rate (currently 10.275% of covered payroll). The Authority's total employer contributions for the fiscal years ended June 30, 2011, 2010 and 2009 amounted to approximately \$12.4 million, \$14.0 million and \$14.7 million, respectively. As a result of Act 116, the Authority's contributions are projected to increase annually by an average of \$2.4 million per fiscal year, to a total of approximately \$37.7 million by fiscal year 2021. For fiscal year 2012, the Authority's estimated employer contribution is \$15.4 million. As stated above, these contributions do not reflect actuarially recommended contribution rates and, as described above, contributions at this level are expected to result in a depletion of the gross assets of the Employees Retirement System.

Because the current funding requirements will not be sufficient to make future benefit payments when due and the Authority is ultimately responsible for any funding deficiency with respect to the Authority's members participating in the Employees Retirement System, additional funding from the Authority and other sponsoring employers will ultimately be necessary to make benefit payments to the Employees Retirement System's participants. Under current law, once the System's assets are depleted, the Authority will be obligated to make contributions to the Employees Retirement System in an amount sufficient to cover the deficiency between the Authority's employee contributions and all benefit payments relating to its retirees, as well as a portion of the administrative costs of the System. This additional funding obligation may adversely affect the Authority's ability to generate sufficient Authority Revenues to meet its operating expense requirements after the payment of debt service on the Bonds. In addition, its ability to continue funding its capital improvement program to improve the Systems and comply with its regulatory requirements may also be adversely affected. The Employees Retirement System estimates that, for fiscal year 2011, benefit payments to the Authority's members in the Employees Retirement System were approximately \$81.5 million, and the Authority's employees contributed approximately \$9.5 million.

The actuarial valuation report as of June 30, 2010 allocates to the participating public corporations \$5.1 billion of the total actuarial accrued liability of \$19.5 billion. The Employees Retirement System estimates that as of June 30, 2011, in connection with the new actuarial valuation being performed, the actuarial accrued liability of the participating public corporations will be approximately \$6.1 billion of an estimated total actuarial accrued liability of \$23.3 billion. The Employees Retirement System estimates that, as of June 30, 2011, approximately \$1.2 billion of the actuarial accrued liability allocated to the public corporations corresponds to the Authority's participants in the System and that, if the Authority were required to make contributions at the actuarially recommended rates, the contributions for fiscal year 2011 would have been approximately \$88.4 million. As stated above, however, the Authority has not reviewed or verified the actuarial valuation or the accuracy of the data used for these actuarial estimates. The Authority and the Employees Retirement System intend to review the Authority's census data and, because actuarial valuations are dependent, among other things, on the data supplied, it is possible that as a result of such review the estimate of the Authority's actuarial liabilities and actuarially recommended contributions could vary.

The Employees Retirement System has been evaluating measures to improve its financial solvency. Ultimately, the Commonwealth, which as the principal participating employer is required to cover a significant

amount of the funding deficiency of the Employees Retirement System, will have to implement significant reforms in order to maintain the long-term fiscal integrity of the Employees Retirement Systems and its ability to pay required benefits to members. Given the funding status of the Employees Retirement System, these reforms may have to include, among other things, further increases to the employer contributions over the next several years by all participating employers, including the Authority, and changes in the allocations of those contributions among the employers. See “Efforts to Address Cash Flow Shortfall and Improve Funding Ratio” under RETIREMENT SYSTEMS in the Commonwealth Report.

### **Other Post-Employment Benefits**

In addition to the pension benefits, the Authority provides non-pension post-employment benefits under a Healthcare Benefits Plan to Retirees that consist of a fixed maximum monthly payment to cover medical expenses for retired employees meeting the service eligibility requirements. Based on this Plan’s features, it is treated as a single-employer defined benefit healthcare plan. These benefits are funded by the Authority on a “pay-as-you-go basis,” which means that there is no reserve or pool of assets against the benefit expenses that the Authority may incur in future years. For fiscal year 2011, the Authority paid \$2.5 million for these non-pension post-employment benefits for its eligible retirees. For fiscal year 2012, these benefits are also expected to amount to \$2.5 million.

In accordance with the provisions of GASB Statement No. 45, the Authority is required to quantify and disclose its obligations to pay non-pension post employment benefits to current and future retirees. The most recent actuarial valuation report for these benefits, as of June 30, 2009, reflects a UAAL of \$56.4 million with respect to these benefits, and the funding ratio is 0% since, as mentioned previously, these benefits are funded on a “pay-as-you-go basis.”

### **Fiscal Oversight Agreement**

Under the Existing FOA, the Authority agreed to implement a comprehensive expense reduction program, including certain fiscal oversight controls, subject to laws and existing agreements of the Authority, and provide Government Development Bank with certain financial information and operating data, as well as other financial information reasonably requested by Government Development Bank. In connection with the issuance of the 2012 Senior Bonds, the Authority, Government Development Bank, and the Commonwealth will enter into the Fiscal Oversight Agreement, which will amend and restate the Existing FOA and establish a new Budgetary Reserve Fund. The Fiscal Oversight Agreement is intended to allow the Authority to become self sufficient and to protect and improve the credit rating of the Authority, so that the Authority may obtain adequate financing to fund its capital expenditure requirements and operate the Systems in an efficient and reliable manner and in compliance with applicable laws and regulations and other regulatory requirements.

The Fiscal Oversight Agreement, among other things, requires the Authority to provide certain financial and operational information to Government Development Bank on a regular basis. Additionally, the Fiscal Oversight Agreement requires that the Authority provide Government Development Bank a draft of its Annual Budget, capital expenditure budget and Disbursement Schedule no later than April 15 of each year and final copies of these budgets and schedule be delivered to Government Development Bank no later than June 30 of each year. The Fiscal Oversight Agreement provides that an independent third-party consulting engineering firm may assist Government Development Bank in reviewing and analyzing the Authority’s reports and budgets and enforcing the Fiscal Oversight Agreement.

The Fiscal Oversight Agreement also establishes a new Budgetary Reserve Fund, held by Government Development Bank in trust for the Authority, which will be funded initially with a portion of the proceeds of the Series A Bonds. For more information regarding the Budgetary Reserve Fund created by the Fiscal Oversight Agreement, see “Budgetary Reserve Fund” under SECURITY FOR THE BONDS.

## AUTHORITY CONSULTANTS

The Authority has contracted the Consulting Engineer to prepare the Consulting Engineer’s Report on the state of the Authority’s Systems, its Five-Year CIP and its financial condition/projections, and to provide the services of the Consulting Engineer under the Trust Agreement. The Consulting Engineer’s Report is attached to this Official Statement as *Appendix II* and should be read in its entirety for a more complete description of the Authority’s operations and facilities and for the conclusions reached by the Consulting Engineer about the state of the Authority’s Systems, its Five-Year CIP and its financial condition/projections. Certain of these conclusions are set forth in other sections of this Official Statement.

In addition, the Authority has obtained the services of recognized engineering firms and program management consultants (in some cases providing the requested services through financially guaranteed, local affiliates) to assist in the planning, design and management of its Five-Year CIP as follows:

| Region               | Consultant                   |
|----------------------|------------------------------|
| Metro and North      | CH Caribe Engineers          |
| East, West and South | CDM Caribbean Engineers, PSC |

As covered more fully in the Consulting Engineer’s Report in *Appendix II*, the Authority has embarked on programs to improve its operations and financial situation. To assist it in these endeavors, the Authority has engaged other recognized consulting firms, including Accenture, CDM Caribbean Engineers, PSC, CSA Architects and Engineers, Miya Luxemburg Holdings S.a.r.l., MP Engineers of Puerto Rico, PSC, and Truenorth Corporation, among others.

## THE WATER AND WASTEWATER SYSTEMS

### Introduction

The island of Puerto Rico is about 100 miles long and 35 miles wide. According to the United States Census Bureau, the population of Puerto Rico was 3,725,789 in 2010 (compared to 3,808,610 in 2000). The Municipality of San Juan, on the north coast, is Puerto Rico’s capital, and is the center of the metropolitan area with approximately 1.2 million residents. Most of the remaining population is located on the coastal plains. The island’s central land area is rugged and mountainous and less heavily populated. Smaller cities and towns in these areas are linked with each other and the larger population centers by an extensive highway system.

The Authority operates the public water supply and wastewater systems in the Commonwealth. The central government of the Commonwealth and island-wide public corporations such as the Authority are responsible for providing many services, such as police and fire services, education and public health services, as well as water and wastewater services, which, by contrast, are typically provided by local governments on the United States mainland. The Authority’s Systems are island-wide, with an estimated 98% of the population served by the Water System and about 59% of the population served by the Wastewater System.

The Authority’s facilities are diverse. Large facilities serve metropolitan San Juan. Major facilities also serve other urban centers, and some large regional facilities have also been constructed or planned to serve several communities in a single area. But in many areas, especially in small municipalities located in mountainous terrain, the Authority’s facilities are small and must be operated and maintained separately from the principal urban and regional components of the Systems. The differences in size of the communities the Authority serves, the fact that these communities are widely dispersed throughout the island, and the resulting diversity and disparity in the Authority’s facilities, make its Systems atypical when compared to water and wastewater utilities in the United States.

**Number of Customers by Type of Service as of June 30, 2011**

| <u>Type</u> | <u>Water Only</u> | <u>Water and Sewer</u> | <u>TOTAL</u> |
|-------------|-------------------|------------------------|--------------|
| Residential | 507,096           | 708,800                | 1,215,896    |
| Commercial  | 20,514            | 42,239                 | 62,753       |
| Government  | 3,791             | 7,141                  | 10,932       |
| Industrial  | 232               | 987                    | 1,219        |
| Total       | 531,633           | 759,167                | 1,290,800    |

From May 1995 until March 2004, the operation, management, repair and maintenance of the Systems were performed by private companies under operation and management contracts. The most recent agreement for the private management of the Systems was entered into in May 2002 with Ondeo de Puerto Rico, Inc. (“Ondeo”). In January 2004, Ondeo and the Authority agreed to terminate their agreement, and in April 2004, all operation, management, repairs and maintenance of the Systems was returned to the Authority.

As part of the return of operations to the Authority, the Authority’s management structure was changed by law and additional powers to improve its operational and financial management were enacted. The main areas of this restructuring included: (i) decentralizing the administration of the Authority into five regions to provide greater efficiency in, and financial control of, the day-to-day administration and operational decision-making process and execution; (ii) creating the positions of five Executive Regional Directors and an Executive Director for Infrastructure, who will, respectively, manage each region and be responsible for development, implementation and management of all capital improvement projects; and (iii) providing for six-year appointments for each of the Executive Regional Directors, Executive Director for Infrastructure and Executive President in order to provide longer-term continuity of top management.

As a result, the Systems’ operation has been divided into five regions (North, South, East, West and Metro). Set forth below is a map that illustrates the operational regions:



The Systems are highly complex and some of its facilities are in need of significant upgrades, replacement, additions or rehabilitation due to compliance issues, changes in the regulatory requirements or deterioration due to age or insufficient maintenance.



The Authority's goals are to (i) simplify the Systems and improve customer service, (ii) achieve and maintain regulatory compliance and financial self-sufficiency, (iii) prioritize and execute projects in deficient areas, (iv) foresee and manage toward future compliance requirements, (v) maximize financial resources, and (vi) implement corrective management initiatives.

## **The Water System**

The Water System provides drinking water to virtually all (98%) residences, businesses, government and industries throughout Puerto Rico. The Water System is made up of water supply facilities, including reservoirs, dams, wells and pump stations, 126 water treatment plants (of which two are currently not in operation) and an extensive drinking water distribution system, including over 14,000\* miles of pipe.

The Authority's raw water supply is drawn both from surface water sources and wells. Currently, there are adequate sources of raw water to meet Water System demand. Over the next 30 years, however, additional water sources may be needed to meet future demand. The need for additional water sources will depend on actual population growth rates, the Authority's actions for controlling and reducing its unaccounted-for-water (the difference between estimated total water produced and total water sales), and the condition and quality of water sources. Surface water sources—small dams, weirs, regulated dams, lakes, rivers and streams—account for approximately 85% of the Authority's raw water supply. While Puerto Rico's average rainfall of over 63 inches a year is not evenly distributed across the island, rainfall levels are adequate (together with the Authority's system of aqueducts) to maintain sufficient raw water resources for the surface water facilities. The balance of the System's raw water supply is drawn from several hundred groundwater wells. For the San Juan metropolitan area, water supply is provided by an interconnected system of reservoirs and rivers. The largest water supply facility is Lake Carraízo, providing approximately 100 million gallons per day ("mgd") of capacity. Although Lake Carraízo was dredged in 1997-1998 (a \$60 million investment), approximately 30% of the recovered capacity has again been lost due to high erosion at the watershed and sediments transported into the reservoir (although this erosion has not affected the ability of the Authority to extract its 100 mgd from this facility).

Supply for the San Juan area is augmented by water piped from the Dos Bocas reservoir through the 41.5 mile North Coast Superaqueduct System (the "NCS") completed in 2000. The NCS provides an additional 100 mgd on average from Arecibo to Bayamón, San Juan and other metropolitan area communities. Until May 2011, the NCS was operated and maintained by Thames-Dick Superaqueduct Partners ("Thames-Dick") under a master agreement that also covered its construction. The master agreement between Thames-Dick and the Authority was terminated by the parties pursuant to a Resolution Agreement dated May 18, 2011. The operation, maintenance and administration of the NCS were transferred back to Authority effective as of June 19, 2011. The decision was made based on business and policy reasons, mutually agreed to by the parties, and not based on their respective performance or existing claims. The NCS is currently being operated by a team that includes both the Authority and third-party personnel. All purchasing and logistics, as well as maintenance and repair scheduling, have been integrated with the Authority's systems. The operation and maintenance are being conducted by third party personnel under an operation and maintenance contract that expired in January 2012. After January 2012, the Authority expects to continue operating and maintaining the NCS with third party personnel under an operation and maintenance contract.

In contrast to the supply systems in the San Juan area and some of the other large population centers, many smaller systems rely entirely on local water supply sources and, because of distance and terrain, are not linked with any other supply system.

The Authority's drinking water production and treatment facilities treat and filter raw water before it flows into the distribution system. Island-wide, the Authority's treatment plant average water production is approximately 646 mgd, and the Authority has been operating many treatment plants in excess of rated design capacity as a result

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\* As a result of the Authority's Geographic Information System ("GIS") development efforts, the Authority has improved and expanded its buried infrastructure knowledge and database. Based on the latest GIS database information, the Authority owns over 14,000 miles of water pipelines (as opposed to the 7,500 miles of water pipelines previously reported). The Authority is in the process of reconciling this value in its fixed asset registry.

of an approximately 196 mgd maximum day demand deficit. The two large and five small treatment plants located in the San Juan metropolitan area and the transmission from the NCS and the related Santiago Vázquez Water Treatment Plant have a combined production capacity of approximately 293 mgd, about 45% of the Water System total. Altogether there are 126 treatment plants for surface water supplies (of which two are currently not in operation), all of which provide complete treatment consisting of coagulation, sedimentation and filtration. Well supplies are disinfected with chlorine but not otherwise treated before entering the distribution mains. The operation of the Authority's treatment plants has been affected by the increasing stringency of drinking water quality regulation.

The water supply distribution systems utilize approximately 14,000 miles of transmission and distribution mains to deliver water to customers from wells and treatment plants. Distribution is generally achieved by gravity. Since the implementation of the SAP-ISU database system in 2009, which is used by the Authority for operation, maintenance, and management activities, the tracking and reporting of water pipeline leaks has improved. However, the Authority's rate of leak occurrence continues to be very high compared to other utilities in the United States and Canada. This high rate of occurrence contributes to the Authority's non-revenue water ("NRW"), discussed below.

Water quality generally meets the National Primary Standards established by EPA under the federal Safe Drinking Water Act although, from time to time, certain facilities of the Water System have experienced parameter violations. For a description of the condition of the water treatment plants inspected by the Consulting Engineer and their compliance status, see page 3-8 of the 2010 CE Report attached hereto as *Appendix II*. The Authority has entered into the 2006 Drinking Water Settlement Agreement to address these and other violations. See "Regulatory Compliance" under ENVIRONMENTAL MATTERS. Based on the Consulting Engineer's most recent facility inspections and system condition assessment conducted from January 28, 2010 through March 16, 2010, and as reported in the Consulting Engineer's Report attached as *Appendix II*, the Consulting Engineer has concluded that (while aging) the Authority's treatment plants dams, pump stations, storage tanks and wells are generally in adequate condition. Well, pump station and storage tank deficiencies are mostly related to equipment shortcomings (i.e., stand-by pumps not working, inoperable valves, etc.), which are intended to be addressed through the Authority's renewal and replacement program, or, in some cases can be addressed by modification of operation and maintenance practices. The Authority expects to bring the performance of non-compliant plants up to regulatory requirements either through scheduled capital improvements, additional staff training and operating systems improvements or through decommissioning over the next 15 years.

Additionally, many of the water treatment plants have inadequate sludge treatment systems ("STS") and the discharges from these plants are out of compliance with their National Pollutant Discharge Elimination System ("NPDES") permit effluent limits issued pursuant to the Clean Water Act. These compliance issues are addressed in the 2010 EPA Consent Decree executed between the Authority and EPA to settle these alleged violations of the Clean Water Act which was approved by the United States District Court for the District of Puerto Rico on August 24, 2010. This consent decree also addresses alleged violations of the Safe Drinking Water Act at three unfiltered surface water treatment plants and requires the Authority to implement remedial measures (including the construction of a new water treatment plant) to ensure compliance with the Safe Drinking Water Act, See "Regulatory Compliance" under ENVIRONMENTAL MATTERS.

The foregoing notwithstanding, the condition of most facilities that have implemented capital improvement projects improved from fiscal year 2009 to fiscal year 2010. Although, certain facilities are operating out of compliance with discharge permit limits and drinking water standards, the facilities are generally producing and delivering potable water to an acceptable level. The Authority continues to work towards correcting system shortcomings. See the *Consulting Engineer's Report* attached as *Appendix II*.

The portion of the Five-Year CIP devoted to the Water System is principally directed at (i) compliance with the 2006 Drinking Water Settlement Agreement and the 2010 EPA Consent Decree (ii) expanding raw water supply and protecting the capacity of existing reservoirs against loss from silting, (iii) upgrading and expanding treatment plant capacity to increase water production and improve treated water quality, and (iv) improving transmission and distribution systems, especially to reduce unaccounted-for water. The Authority believes that the projects included in the Water System Five-Year CIP will enable it to meet its necessary goals and compliance requirements and meet its potable water supply demands over the next ten years. After completion of these projects, additional major improvements not included in the Five-Year CIP may be necessary to maintain and improve reliable operation of the

Water System and may be required to meet proposed water quality regulations developed by EPA under the federal Safe Drinking Water Act.

In order to review the Authority's buried infrastructure, the Consulting Engineer analyzed the data collected on water leaks and sewer overflows, but did not inspect such buried infrastructure. Reported active leaks and sewer overflows remain at very high levels when compared to other utilities in the United States and Canada. As stated in the Consulting Engineer's Report in connection with the Authority's buried infrastructure (for the Systems), an analysis of the Authority's renewal and replacement needs and budget is recommended in order to develop a sound renewal and replacement program that will allow the Authority to improve and extend the useful life of the Water System, and potentially reduce its high rate of water leaks and sewer overflows. See the *Consulting Engineer's Report* attached as *Appendix II*. See also the discussion under "Water Production and Consumption" below.

For information concerning the principal federal and Commonwealth regulations to which the Water System is subject, see "Water System Regulation" under ENVIRONMENTAL MATTERS.

*Customers of the Water System.* The following table sets forth the number and types of customers served by the Water System during the five fiscal years ended June 30, 2011:

**Number of Customers with Water Service**

| <u>Fiscal Year</u> | <u>Residential</u> | <u>Commercial</u> | <u>Industrial</u> | <u>Government</u> | <u>Total</u> |
|--------------------|--------------------|-------------------|-------------------|-------------------|--------------|
| 2007.....          | 1,178,677          | 67,560            | 1,472             | 11,706            | 1,259,415    |
| 2008.....          | 1,181,366          | 63,004            | 1,447             | 11,519            | 1,257,336    |
| 2009.....          | 1,184,661          | 61,657            | 1,280             | 11,290            | 1,258,888    |
| 2010.....          | 1,204,636          | 62,938            | 1,237             | 10,946            | 1,279,757    |
| 2011.....          | 1,215,896          | 62,753            | 1,219             | 10,932            | 1,290,800    |

*Water Production and Consumption.* The following table sets forth the consumption of water by categories of the Authority's customers during the five fiscal years ended June 30, 2011:

**Water Production and Sales  
(Cubic Meters)**

| <u>Fiscal Year</u> | <u>Water Sales</u> |                   |                   |                   |              | <u>Estimated Total Water Produced</u> | <u>Volume Unaccounted For</u> | <u>Volume Unaccounted For As Percentage of Total Water Production</u> |
|--------------------|--------------------|-------------------|-------------------|-------------------|--------------|---------------------------------------|-------------------------------|---|
|                    | <u>Residential</u> | <u>Commercial</u> | <u>Industrial</u> | <u>Government</u> | <u>Total</u> |                                       |                               |   |
| 2007               | 263,088,570        | 42,712,379        | 11,858,269        | 32,653,127        | 350,312,345  | 934,019,760                           | 583,707,415                   | 62%   |
| 2008               | 244,623,520        | 41,160,542        | 11,952,555        | 28,867,287        | 326,603,904  | 857,109,800                           | 530,505,896                   | 62%   |
| 2009               | 246,561,753        | 41,628,183        | 11,575,856        | 31,058,569        | 330,824,361  | 893,225,775                           | 562,401,414                   | 63%   |
| 2010               | 244,324,000        | 38,284,000        | 9,807,000         | 32,757,000        | 325,172,000  | 910,487,463                           | 585,315,463                   | 64%   |
| 2011               | 236,658,000        | 40,204,000        | 13,837,000        | 33,459,000        | 324,159,000  | 911,912,783                           | 587,753,783                   | 64%   |

The Authority attributes the decline in water sales (about a three-quarters of a percent compound annual decline since 2004, accompanied by a just under one percent compound annual increase in customers) to greater use of bottled water, increasing usage of water saving devices in showers, toilets and other places, and the two-stage rate increase implemented in fiscal years 2006 and 2007. Also, in fiscal year 2008, the Authority implemented a new billing methodology to eliminate estimated readings. Under the new methodology the Authority takes the actual consumption read for a two-month period and divides the total consumption by two before calculating the monthly bill. This new methodology has resulted in a net reduction of invoiced consumption in the higher-priced rate

brackets. In 2011, the Authority experienced an additional reduction in residential water sales that is attributable to a reduction in residential customer consumption. This is to be expected given that current economic conditions affecting the island are promoting water conservation among residential customers in order to reduce household expenses. See RATES, BILLINGS AND COLLECTIONS.

As shown in the above table, the Water System has a high percentage of unaccounted-for water, although, the information used to calculate unaccounted-for water is not entirely reliable given the estimation of wells production, lack of dependable meters at treatment facilities, and the age and condition of customer meters. During the seven fiscal years ended June 30, 2011, the estimated volume of unaccounted-for water has averaged over 570 million cubic meters per year, or approximately 64% of estimated annual water production, substantially higher than United States median unaccounted-for water for water utilities. Factors contributing to Water System losses include hydrant use, water loss during water main breaks and other leaks, water delivered but not billed, and theft. The Authority believes, however, that its volume of unaccounted-for water may be significantly overstated due to (i) metering deficiencies both at its production facilities and at the point of delivery, (ii) the high level of metering estimates at delivery points and (iii) meter mis-reads by its employees.

The Authority, as part of its program to reduce unaccounted-for water, embarked on a comprehensive, system-wide program to reduce its unaccounted-for water and to improve its ability to meter both production and consumption. This program includes (i) replacing meters at its 26 largest water treatment plants (completed in fiscal year 2008), (ii) replacing meters on additional production facilities (accounting for an additional 16% of metered output by the end of fiscal year 2012) and (iii) replacing aged or defective meters at all of its customer locations (based on age of meter). From January 2007 through June 2011, over 500,000 customer meters have been replaced. Close to 300,000 small customer meters (mostly for residential customers) have been replaced in the last four fiscal years.

The Authority reports that it completed the production meters project which consisted of the installation of water meters at points of distribution in water treatment plants. As of the date of the Consulting Engineer's Report, the Authority was successfully metering 80% of the total water produced in its water treatment plants. When compared to the Authority's production estimates prior to the completion of the meter installation project, the difference between estimated versus metered production for these facilities was approximately 5%. This finding shows there is a strong possibility that the amount of NRW due to metering deficiencies at water treatment plants may be actually lower than assumed. See the *Consulting Engineer's Report* attached as *Appendix II*.

The Authority continues with its efforts to reduce unaccounted-for water or NRW in order to optimize its operations, billings and collections. In 2009, it completed its water accountability pilot program which included extensive field research to further identify the sources of NRW as well as to understand its causes and estimated magnitudes. In summary, the main sources of NRW include: (i) theft and other unauthorized consumption; (ii) metering deficiencies at wells and at the point of delivery; (iii) use of meter reading estimates and misreads; (iv) customer database problems; (v) leakage and breaks in water mains; (vi) storage tank overflows and leaks; and (vii) hydrant use for firefighting and other authorized, but unmetered uses. It is estimated that 15% of produced water is NRW due to commercial losses (differences between consumption and invoiced amounts), whereas the other 49% is due to physical losses. In fiscal year 2009 the Authority launched its NRW Reduction Program which targets the identified NRW sources, previously listed. Also, the Authority recently retained the services of Miya Puerto Rico LLC, a local subsidiary of Miya Luxemburg Holdings, S.a.r.l., a world-renowned NRW consultant, in order to assist the Authority in developing a strategic NRW management and reduction plan. The development of this strategic plan will provide the Authority with the necessary information to implement a comprehensive and cost-effective long-term NRW management program.

Reducing unaccounted-for water will have both a revenue enhancing impact (as estimated below) and an expense reduction impact as illegal connections are eliminated along with the costs of supplying them. The rate of leak occurrence in the Authority's Water System continues to be much higher than for that of mainland United States and Canadian water systems and contributes to the volume of unaccounted-for water. With time, however, the Authority's steps in identifying and repairing leaks, replacing pipes and meters, and addressing commercial losses (e.g., unauthorized consumption, theft, database and billing errors, etc.) is expected to reduce the volume of unaccounted-for water. The Authority intends on continuing with its meter replacement program to reduce as much as possible meter miss-reads and other inaccurate water consumption data. The Authority expects to replace 90,000

small meters in fiscal year 2012. However, according to the Consulting Engineer's Report, as a result of recent staff reductions, as of the 2010 fiscal year, the Authority's performance regarding meter readings and effectiveness of repairing leaks, among other things, had fallen.

In fiscal years 2010 and 2011, the NRW Reduction Program initiative surpassed the Authority's budget projection by achieving \$67.3 million and \$74.6 million, respectively, in additional revenues. The Authority has retained several consultants to provide support in the execution and monitoring of the program. The Authority has estimated the NRW Reduction Program could bring in additional revenues of approximately \$60 million in fiscal year 2012.

## **The Wastewater System**

The Wastewater System is made up of sewage collection and conveyance systems (including trunk and lateral sewers) and treatment plants. The basic collection and conveyance system consists of approximately 5,325\* miles of lateral, trunk and interceptor sewers and transmission mains which carry wastewater to the 54 treatment plants from the points of connection with the Authority's customers. Over 600 manned or unmanned pumping stations aid these wastewater flows. The most significant collection systems serve the San Juan metropolitan area, with interceptor or trunk sewers as large as ten feet in diameter and an extensive network of large and small pumping stations. Elsewhere, the collection systems depend on the size and topography of the community served. As a result, in many localities the wastewater collection systems are less extensive than the Authority's water supply systems. About 59% of the population is connected to the Authority's Wastewater System, leaving many areas reliant on septic systems for wastewater disposal. As new Wastewater System trunk and lateral sewers capital improvements are built, the customer base for the Wastewater System will expand. As a result, the Authority expects increases in wastewater customers in coming years, and it projects a long-term increase to about 69% of the population being connected by 2030†.

The Authority's 54 wastewater treatment plants are located throughout the island. As with the Water System, some serve large municipalities, and some serve very small municipalities. Island-wide, the Authority's wastewater treatment plants average treatment is approximately 228 mgd. Total aggregate capacity of the treatment plants is approximately 350 mgd. The ten largest plants account for 80% of total Wastewater System capacity. By level of treatment, three plants are designed to provide tertiary treatment, 45 plants are designed to provide secondary treatment, and the remaining six facilities (aggregating 213 mgd of capacity) provide only primary treatment. The Authority intends to maintain operation of wastewater treatment plants providing primary treatment as long as it is allowed by the EPA. Should the EPA require installation of secondary treatment systems for any of these plants (primarily activated sludge processes and biofilters), additional, unbudgeted capital and operating expenses will be incurred by the Authority that are not included in its Five-Year CIP or operating projections.

There is great variation in the size, age and condition of the wastewater treatment plants. The largest plant, the Puerto Nuevo facility in the San Juan metropolitan area, is a 80 mgd primary treatment plant commissioned in 1957. This plant was substantially rehabilitated and upgraded in 1999 and is scheduled to undergo additional rehabilitation and capital improvements during the next five years. Other plants serve other portions of the San Juan metropolitan area, including the 45 mgd Carolina plant, commissioned in 1986, and the 52 mgd Bayamón plant, commissioned in 1983. Ponce is served by an 18 mgd plant commissioned in 1974 which was upgraded and expanded in 1990. The Mayagüez plant, a 22.5 mgd plant commissioned in 1987, serves the Mayagüez area. This plant was upgraded to 28 mgd in 2002. Major new regional plants have also been constructed to replace obsolete smaller facilities. Other regional plants, in addition to those mentioned above, with their capacity and year of original start-up (all of these facilities have been upgraded and renovated since), include Caguas (12 mgd, 1996), Guayama (10 mgd, 1939), Barceloneta (8.33 mgd, 1972), and Arecibo (10 mgd, 1976).

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\* As a result of the Authority's GIS development efforts, the Authority has improved and expanded its buried infrastructure knowledge and database. Based on the latest GIS database information, the Authority owns over 5,325 miles of wastewater pipelines. The Authority is in the process of reconciling this value in its fixed asset registry.

† As recommended in the 2011-2030 Master Plan (as defined under CAPITAL IMPROVEMENT PROGRAM).

Plants with small treatment capacity typically serve very small and sometimes remote communities. About 42 of the 54 plants now in operation have capacities of less than 8 mgd, and 22 of these smaller plants have capacities of less than 1 mgd. While some of these plants will eventually be replaced by regional facilities, connection to larger plants is not possible in many areas because of rugged terrain.

All plants have outfalls which discharge treated wastewater effluent to a nearby stream or pond or to the ocean. Sewage sludge extracted from wastewater in the treatment process is disposed of at sludge disposal facilities, usually a local landfill, except at Mayagüez, where a composting facility serves this plant as well as the Aguadilla wastewater treatment plant; Arecibo, where a composting facility serves this and several other plants, including Barceloneta; and at the Puerto Nuevo wastewater treatment plant, where a sludge incinerator serves this and several nearby plants.

Portions of the island are served by wastewater treatment plants now operating at or in excess of capacity. In localities served by such plants, the Authority approves sewer connections in accordance with the Authority's capacity management policy agreed to by the EPA under the 2006 EPA Consent Decree. As a result, in many instances, proposed connections for industries, businesses, and residential subdivisions and multi-family buildings have been denied when the Authority cannot divert or otherwise offset any excess flow. The Authority's current capacity management policy permits authorization of new connections to the extent existing flows are reduced by 110% of the flow to be produced by new connections. Sewer connection limitations imposed pursuant to the Authority's capacity management policy may be lifted once the Authority submits to EPA documentation certifying that measures have been implemented such that the average monthly flow to the subject wastewater treatment plant is less than 100% of the monthly average permitted flow for a period of two consecutive months. This provision is also applied to flow exceedances caused by extended periods of rainfall. In most cases this has resulted in relocation of the projects to other areas not affected by the sewer connection limitation, or, in some cases (chiefly residential projects), the delay or cancellation of such projects.

In fiscal year 2008, nine plants that provided approximately 16% of the aggregate Wastewater System capacity were affected by this limitation. Currently, the sewer connection limitation only applies to three small plants. As capacity-related projects in the Five-Year CIP described below are completed, all of the affected localities are expected to be relieved of the limitation over the next few years. These improvements will likely lead to increases in sewer customer connections during the five-year period. Meanwhile, many other areas, particularly those served by the new regional treatment plants, have excess treatment plant capacity which will meet future wastewater demand throughout the island.

The Authority's sanitary sewer system overflows per 100 miles of sewer and their duration continue to be higher than for comparable United States or Canadian wastewater systems by a significant amount. The Authority is required under the 2006 EPA Consent Decree to implement sanitary sewer evaluations and repairs designed to reduce these occurrences and have thus far complied with the 2006 EPA Consent Decree's milestones in this regard. Although the number of reported overflows had declined in recent years, the Consulting Engineer has noted that from fiscal year 2009 to 2010, the number of reported overflows increased and operational performance metrics regarding effectiveness in repairing overflows had fallen. See the *Consulting Engineer's Report* attached as *Appendix II*. The Authority continues to work in the implementation of corrective measures to improve its performance and believes it has improved its sewer overflows metrics throughout fiscal year 2011.

The condition of the Authority's existing Wastewater System facilities varies widely. The newer wastewater treatment plants, including most of the recently-completed regional wastewater treatment plants and those that have recently been upgraded, are mostly in satisfactory condition. Older plants and smaller plants generally are in inadequate condition, with some exceptions.

With the exception of certain regional wastewater treatment plants, the existing wastewater treatment facilities are in need of expansion, upgrading or rehabilitation in order to comply with regulations governing the discharge of pollutants from wastewater treatment plants and to meet customer demand. In 2009, the Consulting Engineer inspected 30 of the 54 wastewater treatment plants currently owned by the Authority and 5% of the 1,000\*

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\* Total number of wastewater pump stations has been updated based on the latest GIS database values.

pump stations and concluded that their condition range from unacceptable to good, with effluent limit compliance (at the treatment plants), equipment malfunctions or inoperability (for the pump stations) along with general insufficient staffing and monitoring being the greatest challenges. In 2010, the Consulting Engineer inspected around 50% of the wastewater treatment plants and 5% of pump stations, and no significant changes were reported in the condition and operation of wastewater treatment plants when compared to 2009 results. According to the Consulting Engineer, compliance with NPDES effluent limits has been the greatest challenge for wastewater treatment plants. For a description of the wastewater treatment plants inspected by the Consulting Engineer and their compliance status, see page 3-11 of the 2010 CE Report attached hereto as *Appendix II*.

In addition, although the Consulting Engineer did not inspect the wastewater collection (sewer) system, the Consulting Engineer believes that a significant portion of the wastewater collection (sewer) system will continue to require structural repairs and rehabilitation in order to reduce inflow and infiltration and to meet regulatory requirements.

Additionally, the Authority believes that the following wastewater treatment facilities require additional improvements and/or rehabilitation of operational equipment which, if left unattended, could potentially cause operational problems in the future: Carolina, Puerto Nuevo, Caguas and Mayaguez. The Authority continues its commitment to correct the problems at these facilities and continues its plant consolidation and decommissioning plan.

The 2006 EPA Consent Decree requires the Authority to develop and implement a sanitary sewer system evaluation plan (“SSSEP”) and a sanitary sewer system repair plan for collection systems associated with seven wastewater treatment plants. For the balance of its wastewater system, the Authority is to develop and implement a preliminary sanitary sewer system evaluation plan (“PSSSEP”), and based on the results of this plan, the Authority may also be required to implement a SSSEP and sanitary sewer system repair plan for some or all of these systems. The Authority is currently negotiating with the EPA implementation of the agreed upon repair plans relating to these seven wastewater treatment plants, as well as the evaluation and repair plans associated with the remaining wastewater collection systems throughout the island for which such plans were deemed needed. To date, the Authority has invested over \$5 million in its Five-Year CIP in studies to achieve compliance with the 2006 EPA Consent Decree. However, the economic impact of developing and implementing the EPA’s repair plans in the remaining wastewater collection systems is uncertain at this time. As such, the Authority is presently unable to determine the total cost of the capital improvement projects to be required to bring the wastewater collection systems into regulatory compliance. In addition, future regulatory requirements may require additional capital improvements which are not contemplated in the Five-Year CIP. As stated in the Consulting Engineer’s Report regarding the Authority’s buried infrastructure (for the Systems), an analysis of the Authority’s renewal and replacement needs and budget is recommended in order to develop a sound renewal and replacement program that will allow the Authority to improve and extend the useful life of the Wastewater System, and potentially reduce its high rate of water leaks and sewer overflows.

The Wastewater System Five-Year CIP is designed to comply with all current requirements of the 2006 EPA Consent Decree, including the specific requirements for plant repair, improvement, expansions or plant decommissioning, as required by the 2006 EPA Consent Decree. See CAPITAL IMPROVEMENT PROGRAM and ENVIRONMENTAL MATTERS. In some of these cases, sewage flows will be diverted from an existing plant to facilities elsewhere. In other locations, as new treatment facilities are completed at the site of older plants, the older plants will be decommissioned and replaced by new facilities. After completion of these projects, additional major improvements (not currently addressed in the Five-Year CIP) will be necessary to continue to improve reliable operation of the Wastewater System and to provide advanced wastewater treatment at certain of the Authority’s wastewater treatment plants and secondary treatment at any plant for which the Authority does not receive approval of a pending application for a waiver of the secondary treatment requirement (see “Other Regulatory and Compliance Matters” under ENVIRONMENTAL MATTERS below).

Details on Wastewater System customers and sewer use trends are provided below.

*Customers of the Wastewater System.* The following table sets forth the number and type of wastewater customers served by the Authority during the five fiscal years ended June 30, 2011:

| <b>Customers with Sewer Service</b> |                    |                   |                   |                     |              |
|-------------------------------------|--------------------|-------------------|-------------------|---------------------|--------------|
| <b>Fiscal Year</b>                  | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Governmental</b> | <b>Total</b> |
| 2007.....                           | 678,437            | 42,380            | 1,145             | 7,451               | 729,413      |
| 2008.....                           | 683,126            | 40,498            | 1,122             | 7,397               | 732,143      |
| 2009.....                           | 691,357            | 40,456            | 1,044             | 7,052               | 739,909      |
| 2010.....                           | 704,817            | 42,383            | 1,006             | 7,145               | 755,351      |
| 2011.....                           | 708,800            | 42,239            | 987               | 7,141               | 759,167      |

*Wastewater Sales.* The Authority meters water consumption but does not meter wastewater usage. Wastewater usage is estimated based on the consumption of water metered for clients with water and sewer services.

### **Operation and Maintenance**

For many years the Authority has not devoted sufficient resources (both financial and operating) to its infrastructure. Once in service, assets have not always been properly maintained and operated. These deficiencies have been caused by the absence of an integrated asset management plan rather than by a lack or misapplication of resources. In the past, spare parts and other inventory management were sometimes substandard, plant staffing levels (on both the operating and maintenance sides) were too low, operations personnel did not always have the required licenses and remote monitoring of unstaffed plants was lacking, which increased (in some cases significantly) the repair response times in emergencies. The conclusions reached by the Consulting Engineer as to the poor condition of a number of the Authority’s operating assets evidence these deficiencies.

Since 2005, the Authority has increased and more efficiently applied the financial and labor resources devoted to operation and maintenance of the Systems and has begun to put in place an integrated preventive maintenance program for the Systems’ assets that, when fully implemented, will be on a par with the asset management programs of other United States and Canadian water and wastewater utilities. Much of this effort has been memorialized in requirements set forth for improving operating and maintenance practices in the 2006 EPA Consent Decree, the 2010 EPA Consent Decree and the 2006 Drinking Water Settlement Agreement with hard deadlines imposed for meeting them and stipulated penalties and the threat of additional criminal sanctions imposed on the Authority for noncompliance. A requirement included in the 2006 EPA Consent Decree, the 2010 EPA Consent Decree and the 2006 Drinking Water Settlement Agreement, is the development and implementation of an integrated preventive maintenance program. The Authority successfully completed the first phases of this program in fiscal year 2009. The program includes a new database system (SAP-ISU) used for: (i) client, consumption, and water sales database; (ii) invoicing; (iii) purchasing and logistics; and (iv) planning and executing corrective and preventive maintenance orders; amongst others. To date, all wastewater facilities, and a portion of water facilities, have been integrated into the program.

The Consulting Engineer concludes in the Consulting Engineer’s Report that the Authority’s operation and maintenance practices are adequate. Currently, certain Authority operational and cost metrics (i.e., accounts per staff, cost per account, and cost per million gallon produced/treated) are generally unfavorable compared to the median values for utilities in the United States, which is not a surprising result considering the size and complexity of the Systems; the Authority’s high staffing levels, which translate into high payroll and benefits costs; and high electricity costs. Given recent staff reductions, certain performance metrics measured and tracked by the Authority including, but not limited to, meter readings and effectiveness in addressing leaks and overflows, have fallen; an issue that the Authority began to address and correct towards the end of fiscal year 2010. Finally, benchmark comparisons show that the Authority has areas that could be improved and that represent large opportunities with regards to the reduction of its NRW and increasing its billings and collections. The Authority continues to develop and implement operational initiatives with the ultimate goal of improving and optimizing its operations.



## RATES, BILLINGS AND COLLECTIONS

### Rate Setting Powers

The Act requires the Authority to fix and revise rates and charges to be collected for its services and facilities. Under the Act, such rates and charges are required to be just and reasonable. The rates and charges are required to be fixed and revised so as to provide funds at all times sufficient to:

- a. pay the cost of maintaining, repairing and operating the Systems, including reserves for such purposes, and for replacement and depreciation;
- b. pay the principal of and interest on revenue bonds issued under the Act as the same shall become due, and reserves therefore; and
- c. provide a margin of safety for making such payments.

The Authority, under the Act, may change its rates and charges upon the holding of a public hearing after publication of reasonable notice, except for a temporary period or in cases of emergency when changes in rates and charges may be imposed without a public hearing. Act No. 21 of the Legislature of Puerto Rico, approved May 31, 1985 ("Act No. 21"), provides uniform procedures for public hearings and review of the actions of certain public corporations, including the Authority, in connection with changes in the rates set by such public corporations. The Authority's rates are not subject to regulation by the Commonwealth or any of its public agencies.

The Authority's covenants under the Trust Agreement with respect to rates and charges for water and wastewater services are summarized in "Rate Covenant" under SECURITY FOR THE BONDS.

In the last quarter of calendar year 2005, the Authority adopted Resolution No. 2167 (as amended, "Resolution 2167") which implemented a two-stage, 128% overall increase in rates in October 2005 and July 2006, froze rates through the end of fiscal year 2009 (June 30, 2009) and set forth the conditions that needed to be met in order to adjust rates upward (without going through the public hearing procedures of Act No. 21) after the end of the rate freeze period. Resolution 2167 sets fiscal year 2007 as the base year against which changes in the Authority's operating margin are calculated, and should the Authority's operating margin fall below the margin for fiscal year 2007, the Authority will be permitted to adjust rates upward after June 30, 2009 as described in and subject to the annual and cumulative rate adjustment caps stated in the next paragraph. Resolution 2167 does not prevent the Authority from raising rates currently should it need to do so in order to meet the rate covenant in the Trust Agreement, but any such rate increases would have to be implemented in compliance with Act No. 21.

The base year (2007) calculation of operating margin takes the total of operating expenses and debt service (including reserves and Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations) and divides that total by total revenues (all calculated in a manner consistent with the way those terms are used in the Trust Agreement). The Authority estimates that this ratio is .94. Beginning after fiscal year 2009, the Authority has calculated its operating margin using the same formula of total operating expenses and debt service (including necessary reserves) divided by total revenues as it used to calculate the base year operating margin. If the ratio in a post-2009 fiscal year is higher than the base year ratio (.94 as set forth above), meaning its operating margin has declined, the Authority will be allowed under Resolution 2167 to adjust its rates upward by the percentage increase that is obtained by dividing the post-2009 fiscal year ratio by the 2007 fiscal year ratio. Regardless of the percentage increase called for by the prior sentence, the Authority may not, without implementing the uniform public hearing and review procedures called for in Act No. 21, adjust rates upward in any post-2009 fiscal year by more than 4.5% nor may its cumulative upward increase in rates from the aforesaid adjustment mechanism exceed 25%. At present, the Authority has not adjusted rates upwards under Resolution 2167.

## **Authority Budgeting Process**

The Authority's long-term financial projections, which are reviewed at least once a year, are the guide for each fiscal year's budget preparation. The Authority's annual detailed budgeting process begins in January/February when departments begin to prepare their budget requests (based on detailed budget guidelines and objectives outlined by the Office of Administration and Finance), to be submitted to the Administration and Finance Department for inclusion in the preliminary budget, which is presented to the Executive President in March/April. The Executive President reviews this preliminary budget and recommends appropriate adjustments and changes, and returns it to the departments for their review. Final recommendations (generally around April/May in each year) are incorporated into a proposed budget prepared by the Office of Administration and Finance that is further reviewed and approved by the Executive President. Pursuant to the provisions of the Fiscal Oversight Agreement, the Authority is also required to provide Government Development Bank a draft of its Annual Budget, capital expenditure budget and Disbursement Schedule no later than April 15 of each year and final copies of these budgets and schedule be delivered to Government Development Bank no later than June 30 of each year. See "Fiscal Oversight Agreement" under SECURITY FOR THE BONDS. The Executive President presents the proposed budget to the Board for final approval (generally in May or June of each year). During June of each year the approved budget is uploaded to the Authority's financial system and each Department receives the final approved budget, which is used as a guideline and for monthly and annual financial analysis and measurement for the following fiscal year. For a detailed description of the Fiscal Oversight Agreement and the Budgetary Reserve Fund, which will be used to cover Operating Revenue shortfalls, See "Fiscal Oversight Agreement" under THE AUTHORITY.

## **Rate Structure and Current Rates**

*Water.* Rates are charged on a monthly basis and for metered customers consist of a base charge and a charge for each cubic meter of use in excess of 10 cubic meters. The amount of the base charge is fixed for each of four classes of service, distinguishing among service classes and diameter of the service line. For example, the monthly base charge to residential customers with ½-inch and ⅝-inch water service lines is \$10.60, while the corresponding charge to commercial, industrial and government customers is \$21.43. If the water service line diameter is ¾-inch, the corresponding charges are \$16.18 and \$31.73, respectively. Larger diameter service lines have correspondingly higher charges, and there are special charges for private hydrants and fire control sprinkler systems. For unmetered water service, charges are established by class of customer and type of use. For example, the average monthly charge for unmetered residential customers is \$19.71.

The Authority also imposes a charge for new connections.

Although all customers pay for service, the Authority provides a 35% subsidy to the base charge for residents over 65 years of age who are eligible under certain government assistance programs. The Authority provides this 35% subsidy to approximately 47,636 customers. Also, since fiscal year 2010, the Authority has been complying with the provisions of Act No. 69, approved by the Legislative Assembly of Puerto Rico on August 11, 2009, which provides a subsidy to all public housing customers by limiting their monthly payments to the water and wastewater base charge. The Authority has approximately 51,476 customers that qualify for this subsidy. In total, the Authority provides annual subsidies of approximately \$16 million to qualifying customers.

*Wastewater.* Wastewater service is billed together with water bills for those clients who have both services. The wastewater rate structure resembles the water rate structure, although the amounts are slightly lower. For example, the monthly base charge to metered residential customers with ½-inch and ⅝-inch water service is \$9.11 while the corresponding charge to commercial, industrial and government customers is \$17.67. The consumption component is calculated by reference to the customer's water use, except for certain commercial and industrial customers that have metered sewer discharges. Premises not discharging substantially the entire volume of their water use into the Wastewater System are allowed an adjustment in the imputed consumption charge, provided the customer installs metering equipment which allows computation of actual discharge to the Wastewater System. Customers with private water supply must also provide the necessary installations to measure the amount of wastewater discharges.

Wastes containing biological oxygen demand and total suspended solids concentrations in excess of 250 mg/l are subject to additional charges set forth in the Authority's regulations. Wastes containing pollutants in excess of local limits established in the Authority's regulations may be subject to penalties and pretreatment requirements of the Authority.

*Water and Wastewater Billings.* The following table sets forth the annual gross water and wastewater billings of the Authority for each of the five fiscal years ended June 30, 2011 after adjustments for incorrect billings, but prior to any reduction due to the amount of uncollectible accounts as is shown in the Authority's financial statements in *Appendix I*.

**Gross Water and Wastewater Billings\***

| <b>Fiscal Year</b> | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Governmental</b> | <b>Total</b>               |
|--------------------|--------------------|-------------------|-------------------|---------------------|----------------------------|
| 2007 .....         | \$510,143,703      | \$133,896,131     | \$37,765,576      | \$106,411,287       | \$788,216,697 <sup>†</sup> |
| 2008 .....         | 471,491,337        | 130,563,228       | 36,825,526        | 98,420,845          | 737,300,936                |
| 2009 .....         | 481,311,814        | 129,750,479       | 36,596,289        | 106,816,013         | 754,474,595                |
| 2010 .....         | 487,960,573        | 126,234,703       | 35,592,257        | 110,373,144         | 760,160,677                |
| 2011 .....         | 470,694,589        | 124,166,489       | 38,486,901        | 106,675,911         | 740,023,890                |

\* Information is presented according to the Authority's financial records.

† Rate increase of 64% (when compared to pre-October 2005 rates) occurred on July 1, 2006.

**Billings and Collections**

The Authority maintains its books of account and prepares its financial statements under the accrual method of accounting, which recognizes revenues when billed and expenses when incurred. However, for Trust Agreement purposes, Authority Revenues are recognized when collected. Current Expenses are recognized when accrued for purposes of the Rate Covenant and the Annual Budget and on a cash basis for all other purposes, including the Disbursement Schedule. See the definition of Current Expenses in *Summary of the Trust Agreement and Summary of the Proposed Amendment to the Trust Agreement in Appendix III*.

The Authority's policy is to treat accounts past due for sixty days or more as in arrears, and its collection policies for arrearages include account monitoring, contacting customers, and service termination. Service termination procedures must comply with the provisions of Act No. 33 of the Legislature of Puerto Rico, approved June 27, 1985, which require customer notification in advance of service termination and the availability of proceedings prior to termination for any delinquent customers seeking to question the Authority bills. In the opinion of the Authority, these procedures, while adding to the complexity of using service terminations to induce and enforce collections, have not had a materially adverse effect on the ability of the Authority to collect its overdue accounts. The Authority has also reduced thefts of service and their impact on collections.

The Authority's rate of collections (collections received divided by amounts billed for the prior month) averaged 93% since the first rate increase on October 2005 through October 2007. The Authority's collection rate during fiscal year 2011 was 97% (this percentage takes into account a 95% collection rate for industrial, commercial and residential accounts resulting from, among other things, a new revenue optimization initiative implemented by the Authority that collected \$74.6 million, and certain one-time, extraordinary collections from government agencies of amounts due for prior fiscal years). The Authority's collection rate for the first six months of fiscal year 2012 was 88%. During January 2012, the Authority experienced an increase in collections that improved the collection rate for the first seven months of fiscal year 2012 to 90%. See "The Water System" under THE WATER AND WASTEWATER SYSTEM.

## ENVIRONMENTAL MATTERS

Congress has provided that many federal environmental protection statutes, including the Clean Water Act and the Safe Drinking Water Act, have the same application in Puerto Rico as in the fifty states. Also, like legislatures of most states, the Legislature of Puerto Rico has enacted local environmental protection laws. These federal and Commonwealth environmental laws and regulations have important effects on the operations of the Systems. Some of the key areas covered by these regulations include: the quality and safety of drinking water; standards and limitations on water and air pollutants released into the environment; availability of water as a resource; handling and disposal of solid waste and wastewater; and health and safety standards for personnel. Compliance with these regulations in the ordinary course of operations requires significant operational and capital expenditures. Failure to comply with these regulations could have material adverse effects including the imposition of civil or criminal liability or fines by regulatory agencies or liability to private parties. See “Regulatory Compliance – 2006 Drinking Water Settlement Agreement” and “— Authority Clean Water Act Litigation” below.

### Water System Regulation

The Safe Drinking Water Act requires EPA to establish national drinking water standards and maximum levels for contaminants. These regulatory standards generally require treatment procedures and techniques by water supply systems so that drinking water will be free from bacteriological and chemical contaminants. States and the Commonwealth assist in the Safe Drinking Water Act enforcement process. In Puerto Rico, enforcement responsibility for Safe Drinking Water Act regulations developed by EPA is delegated to DOH.

Amendments to the Safe Drinking Water Act in 1986 enhanced the public health protection mandated by the Safe Drinking Water Act by imposing additional treatment requirements for surface and subsurface water sources, including criteria, procedures and timetables for state determinations of whether filtration measures are required, maximum permissible levels of coliform bacteria occurrence in distribution systems, and the testing and control of lead and copper in water at the customers’ taps.

When the Safe Drinking Water Act was amended and reauthorized in 1996, the water quality standard setting process was revised, a revolving loan fund for drinking water projects was established, water suppliers were required to issue consumer confidence reports, and a timetable was established for further regulation of microbial pathogens and potentially harmful disinfection by-products in drinking water. As part of such further regulation, the first set of rules, the Interim Enhanced Surface Water Treatment Rule (“ESWTR”) and Stage 1 Disinfectants and Disinfection By-products Rule (“DBPR”) were issued in December 1998, and effective in November 2001. These rules specify further treatment requirements for filtered systems to protect against pathogens and revise the maximum contaminant levels for potentially harmful disinfection by-products.

*Lead and Copper Rule.* Under the Lead and Copper Rule (the “Lead Rule”), water suppliers must conduct sampling and testing programs, identify and implement optimal corrosion control treatment, and provide information to the public on ways to further reduce risk of lead exposure when trigger levels are exceeded. The presence of lead results from corrosion of certain plumbing materials used in the Authority’s and/or in household plumbing’s water system fixtures. The Authority treats its source water, as needed, to reduce the corrosivity of the water so that lead concentrations at customers’ taps are reduced.

Pursuant to the Lead Rule, the Authority is required to conduct sampling to detect the presence of lead and copper in its customers’ tap water. Since 2000, samples collected from the Water System have at times exceeded the trigger levels set by the Lead Rule beyond which remedial action by the Authority is required. These required remedial actions include conducting a public education program and the implementation of a corrosion control treatment and/or service replacement program in affected communities where applicable levels were exceeded. These programs have been implemented in those facilities that have exceeded the trigger levels of the Lead Rule.

*Annual System Report.* The Safe Drinking Water Act requires that all water systems publish an annual drinking water quality report to be distributed to system customers. The report, called a Consumer Confidence Report, is required to contain monitoring results of all detected contaminants that are regulated by EPA. The regulations governing this provision of the Safe Drinking Water Act were promulgated in August 1998. The report

has been published annually since 1998 by the Authority and is available (in Spanish) online at the Authority's website [www.acueductospr.com](http://www.acueductospr.com).

*Security and Bioterrorism.* The Public Health Security and Bioterrorism Response Act of 2002 mandates the preparation of a Vulnerability Assessment and Emergency Response Plan by each public drinking water supplier. The Authority's Vulnerability Assessment was conducted in various stages depending on the population served in each area by the Water System. During 2003 and 2004, EPA received the Authority's Vulnerability Assessments for each of the stages. The Authority has been and will continue developing and designing water system improvements to mitigate, prevent, detect and respond to disruptive acts or terrorist activities based upon the findings of the Vulnerability Assessment and Emergency Response Plan.

The Emergency Response Plan was also prepared in various stages depending on the population served in each area by the Water System. The Authority completed and submitted to EPA certificates of completion for each of the stages during 2003 and 2004. The Emergency Response Plan identifies the actions to be taken in response to major or catastrophic events and terrorist attacks on the Authority's Water System.

*Recent Drinking Water Regulations.* In January 2006, EPA published two drinking water supply regulations, developed pursuant to the Safe Drinking Water Act: the Long Term 2 Enhanced Surface Water Treatment Rule ("LT2") and the Stage 2 Disinfection/Disinfectant By-Products Rule ("DBP2"). Compliance with these new regulations, which phase in starting in 2012, may require additional Authority capital expenses, not all of which are included in the Five-Year CIP.

The purpose of LT2 is to reduce the incidence of waterborne disease by mandating certain levels of inactivation and/or the removal of certain microorganisms in or from water supply systems. The LT2 Rule also mandates that certain uncovered finished water storage facilities be covered or that water from such facilities be filtered. The Authority has completed three monitoring phases of the LT2 Rule and has sampled and characterized its water sources to determine treatment requirements. The Authority is currently conducting the last phase of the LT2 Rule, which requires source water monitoring of small water systems that are under the direct influence of surface water. Based on preliminary monitoring data, eight of the Authority's water systems will require capital improvements to install additional treatment to provide the desired level of microorganism protection. It is expected that other systems could also need capital improvements to remove the microorganisms required to achieve compliance with the LT2 Rule. Also, the Authority has identified two systems with uncovered finished water storage facilities, one of which is scheduled for closure, while the other has a planned capital improvement project. The capital improvement project was reviewed to address compliance with the LT2 Rule. See Section 5 of the *Consulting Engineer's Report* in *Appendix II*.

The DBP2 Rule requires reduction of disinfection byproducts, which are chemical compounds formed when disinfectants such as chlorine are added to drinking water. Based on preliminary assessments, the Authority believes that the mandated level of disinfection byproducts set forth by DBP2 may be exceeded in certain parts of the water systems. The Authority prepared and submitted the monitoring plan to EPA, as required by the DBP2 regulation. The Consulting Engineer's Report notes that slightly over one-third of the Authority's local Water Systems contain disinfection byproducts at levels that will violate DBP2, requiring the Authority to improve management of these systems, change the point of disinfectant addition, use different disinfectants or change the disinfectant removal process. According to the Consulting Engineer's report, these measures have varying degrees of costs. While some measures are associated with administrative and operational changes, others, such as the changes in the removal process, will require capital expenditures.

On November 8, 2006, EPA published the Ground Water Rule ("GWR"). The purpose of GWR is to provide for increased protection against microbial pathogens in public water systems that use ground water sources, particularly those systems that are susceptible to fecal contamination. It establishes a risk-targeted approach of ground water surveys and source water monitoring. GWR requires ground water systems whose surveys and monitoring indicate a risk of fecal contamination to take corrective action to reduce exposure to microbial pathogens. The compliance date for completing actions (triggered monitoring and compliance monitoring) required by the GWR was on December 1, 2009. The Authority is currently complying with the GWR monitoring requirements by the Total Coliform Rule monitoring. Under the GWR, the Authority has worked in action plans for the systems that had showed risk for microbial pathogens, but additional corrective actions to reduce microbial

pathogens may be required in systems that continuously show contamination. In addition, the Authority is currently conducting evaluations at some of its wells to determine whether such wells are under the direct influence of surface water. Wells influenced by surface water may require filtration treatment to remove surface water organisms.

The Safe Drinking Water Act requires EPA to conduct research into the occurrence and health effects of new and emerging contaminants. According to the Consulting Engineer's Report, there are several contaminants that may be regulated in the future based on this requirement. The Consulting Engineer could not make any determinations regarding the likely impact on the Authority due to potential regulations due to these candidate contaminants, but recognized that treatment for some of these contaminants may require more advanced technologies.

In general, the Five-Year CIP does not include projects intended solely to address future regulations, but the Authority is implementing some improvement projects with consideration for compliance with the LT2 Rule. In addition, the Authority has established a policy for new water treatment plants to be designed with the appropriate effluent turbidity levels to aid in compliance with the LT2 rule.

### **Wastewater System Regulation**

*The Clean Water Act.* The Wastewater System is also subject to extensive environmental regulation, principally under the federal Water Pollution Control Act enacted in 1956, as amended by the federal Water Pollution Control Act Amendments of 1972, the Clean Water Act of 1977, and the Water Quality Act of 1987, as amended (collectively, the "Clean Water Act"). The Clean Water Act prohibits wastewater treatment plant discharges of pollutants into waters unless such discharges are in compliance with the terms and conditions of the applicable federal permit. EPA has the responsibility for implementing and enforcing Clean Water Act requirements in Puerto Rico. However, EPA and EQB have signed a memorandum of agreement under which EPA delegates to EQB some of the enforcement powers under the Clean Water Act (but EPA retains the authority to reclaim jurisdiction over such enforcement, on a case by case basis).

Under the Clean Water Act, each of the Authority's wastewater treatment plants that discharge into nearby bodies of water must have a NPDES permit issued by EPA, containing the limits on the pollutants discharged in plant effluent. Discharge limits are established by federal law and regulation and by water quality standards, which in the Commonwealth's case are established by EQB. NPDES permits also contain operating and maintenance requirements for wastewater facilities. Agreements entered into by the Authority as a condition of receiving federal construction grant assistance under the Clean Water Act also impose requirements on many of the Authority's wastewater facilities. In addition, the Clean Water Act requires the Authority to administer an industrial wastewater pretreatment program applicable to many industrial users of its Wastewater System. The Authority administers an EPA-approved pretreatment program.

The rehabilitation, improvement and expansion of the Wastewater System are required in significant respects by the Clean Water Act. In general, the Five-Year CIP contains projects including plant upgrades, capacity expansion and new plant construction intended to achieve compliance with "secondary treatment" effluent standards at all of its plants except for plants for which applications for marine (ocean) discharge waivers from secondary treatment limits have been submitted pursuant to Section 301(h) of the Clean Water Act. Currently, the Authority's six primary treatment plants have been granted such waivers or have waiver requests outstanding. The Authority has initiated a program of extensive interaction with EPA, among other regulatory agencies, to keep it abreast of possible legislative or regulatory changes that might affect its treatment plant operations, including changes that may influence the granting of such secondary treatment waivers. In 2000, the Authority signed a memorandum of agreement with EPA in which the parties agreed that notwithstanding the secondary treatment (301(h)) waivers at these six plants, the Authority and EPA would work cooperatively to achieve voluntary plant upgrades to full secondary treatment over a 20-year period and to secure the necessary capital funding to support these upgrades in the form of federal grants or other means of federal financial assistance (coupled with the required "matching share" of Authority funding (whether through Commonwealth appropriations or otherwise)). The failure by the Authority to comply fully with the existing 301(h) secondary treatment waivers applicable to these plants would entitle EPA to issue and require the Authority to comply with secondary treatment orders for these plants with the concomitant obligation on the Authority to incur the needed capital and operational expenditures to upgrade them. At the time of execution of the memorandum of agreement, the parties estimated that the capital costs involved in those upgrades

exceeded \$500 million with over \$600 million in incremental related operational costs. The Authority has not updated these estimates since the execution of the memorandum of agreement but believes that these capital costs may be significantly in excess of these amounts. The Authority, however, continues to operate these primary treatment plants and believes that it will continue to obtain waivers pursuant to Section 301(h) of the Clean Water Act. In this respect, in January 2012, the Authority received a 5-year extension to its waivers for the Puerto Nuevo and Bayamón wastewater treatment plants, which are the two largest plants of the Wastewater System.

As discussed in more detail below for the Wastewater System, the Authority has in the past received numerous EPA administrative orders under the Clean Water Act requiring the Authority to cease non-compliant discharges into bodies of water and implement remedial measures to address these non-compliant discharges, and has entered into consent decrees with EPA for these types of violations of the Clean Water Act.

In addition, as further discussed below, in connection with the Wastewater System, the 2006 EPA Consent Decree, which also addresses non-compliant sanitary sewer overflows, requires the Authority to conduct a sanitary sewer evaluation and implement a related repair plan at several specified sewer systems. The Authority has also received EPA administrative orders under the Clean Water Act requiring the Authority to cease non-compliant discharges into bodies of water and implement remedial measures addressing sanitary sewer and combined system overflows and a notice from the Department of Justice recommending the filing of federal action against the Authority for alleged violations of the Clean Water Act for unauthorized combined sewer discharges from the Puerto Nuevo wastewater treatment plant. The Authority is the owner or the operator of sewer systems that were either designed and/or constructed in the mid-twentieth century as combined sewer systems or sanitary systems with stormwater sewer interconnections that create a combined sewer. Typically, combined sewer systems transport all of their wastewater to wastewater treatment plants, where wastewater is treated and then discharged into a body of water. During rainfall events, wastewater volume in combined sewer systems can exceed the capacity of the sewer system or the wastewater treatment plant causing combined sewer overflows that discharge excess wastewater into nearby bodies of water. Although detailed information regarding combined sewer systems is not available, the Authority is currently performing sanitary sewer evaluations to determine which systems are conveying sanitary wastewater and stormwater and to identify needed corrective actions. While the evaluation process of these combined sewer systems is completed, the Authority obtained permit waivers to address non-compliant combined discharges.

*Further Clean Water Act Considerations.* Statutory and regulatory evolution of Clean Water Act requirements impose continuing environmental planning and compliance requirements on the Authority in addition to compliance with the current terms of the 2006 EPA Consent Decree and the 2010 EPA Consent Decree. These include, but are not limited to, the imposition of more stringent monitoring limits for parameters such as fecal coliform and phosphorus and the inclusion of additional monitoring parameters such as enterococcus. Compliance with future regulatory requirements will almost certainly result in the Authority having to make capital and operating expenditures that are not reflected in the Five-Year CIP and the Authority's financial projections. Generally, future regulatory requirements provide for a period of time to achieve compliance and/or compliance plans. It is not possible for the Authority to determine at this point the magnitude of such expenditures, but it is possible that it may be significant.

## **Regulatory Compliance**

*Clean Water Act and Safe Drinking Water Act Litigation against the Authority.* In the past, many wastewater plants were unable to meet the deadlines of the Clean Water Act for attaining improved wastewater treatment quality. Since 1978, the Authority has been the object of numerous notices of violations to environmental laws by the EPA. EPA has filed many administrative orders against the Authority for violations to the Authority's NPDES permits. Under delegated authority from EPA, DOH has filed many administrative orders against the Authority for violations to the requirements of the Safe Drinking Water Act. EPA and DOH have also filed enforcement actions against the Authority in the United States District Court for the District of Puerto Rico and the equivalent Commonwealth court, respectively, seeking compliance by the Authority with the provisions of environmental laws and the imposition of civil and criminal penalties.

EPA's litigation against the Authority spans several decades resulting in various consent decrees, administrative orders and settlement agreements in connection with alleged violations of the Clean Water Act. The

Authority is currently subject to two consent decrees executed with EPA in 2006 and 2010 (the 2006 EPA Consent Decree and the 2010 EPA Consent Decree) for alleged violations of the Clean Water Act, which consolidate the requirements of prior enforcement actions and supersede these (with the exception of a prior Consent Decree known as PRASA IV which is in existence but has been complied with). Under these consent decrees, the Authority agreed to comply with federal mandates to meet schedules for numerous and extensive plant capital and operating and maintenance improvements in wastewater treatment plants (within the Wastewater System, as well as wastewater treatment facilities and sludge treatment plants within the Water System), among others. In addition, the consent decrees contain stipulated penalties for violations of their requirements. The Authority was also the subject of numerous administrative orders issued by the DOH and several settlement agreements with the DOH for alleged violations by its water treatment plants of the water quality contaminant limits and related requirements under the Safe Drinking Water Act. In 2006, the Authority entered into the 2006 Drinking Water Settlement Agreement with the DOH to settle alleged violations of this nature and consolidate and supersede prior administrative orders and settlement agreements. The 2006 Drinking Water Settlement Agreement provides for remedial and compliance actions by the Authority in its water treatment plants in accordance with agreed-upon schedules and for the payment of stipulated penalties for non-compliance. In addition, the 2010 EPA Consent Decree requires the Authority to implement remedial measures at three unfiltered surface water treatment plants (including the construction of a new water treatment plant) to ensure compliance with the Safe Drinking Water Act. From the commencement of these litigations against the Authority through May 2006, the Authority had paid substantial (multi-million dollars) in fines and penalties for non-compliance to EPA and the Commonwealth and was required to spend and has spent hundreds of millions of dollars on capital improvements to the Systems in an effort to bring the Authority's Systems into substantial compliance with the various regulatory regimes. Since 2006, the Authority's record of compliance with its existing consent decrees, administrative orders and settlement agreements and the noticeable transformation in communications with regulatory agencies further supports the Authority's efforts and ongoing commitment to bring its Systems into compliance. A description of prior consent decrees is included in the *Consulting Engineer's Report* in Appendix II.

*2006 EPA Consent Decree.* In 2004, EPA and the Department of Justice convened a grand jury seeking grounds to indict the Authority for criminal violations of the Clean Water Act. At the same time, EPA and the Authority began negotiations to come to an agreement that would establish an achievable and realistic compliance program for the Authority regarding plant operations under the Clean Water Act. In June 2006, the grand jury indicted the Authority, charging 15 felony counts of violating the Clean Water Act through the illegal discharge of pollutants from nine sanitary wastewater treatment plants and sludge treatment systems of five drinking water treatment plants. Under a guilty plea agreement, the Authority was placed on probation for five years, commencing on April 19, 2007 and paid a criminal fine of \$9 million to the federal government, among other things. On June 22, 2006, EPA and the Authority filed with the federal court in Puerto Rico a comprehensive and all inclusive consent decree, the 2006 EPA Consent Decree, which is summarized below. The 2006 EPA Consent Decree was approved on January 10, 2007, and compliance with its terms by the Authority, in addition to those required by the criminal indictment, is required for the Authority not to violate the terms of its probation. The Authority is working to meet all schedules and requirements in the 2006 EPA Consent Decree and has met all deadlines to date. The 2006 EPA Consent Decree assumes jurisdiction over all wastewater treatment plant and NPDES permit issues and closes a related prior consent decree dating to 1978. The 2006 EPA Consent Decree requires the Authority to undertake extensive remedial and capacity expansion measures over the next 15 to 20 years at all of its wastewater treatment plants and sanitary sewer and collection systems (obligating the Authority to complete approximately 145 short-, mid-, and long-term capital projects, which will include installing dechlorination equipment, installing flow proportional chlorination equipment, repairing and replacing equipment, and implementing a chemical treatment program for phosphorous removal, among other things) as well as a \$3 million supplemental environmental project ("SEP") (designed to provide sewer service to an unsewered community located at the La Plata Watershed and approved by EPA and for which the Authority has made the first two required escrow deposits). The scope of work that the Authority will perform for the SEP was submitted on schedule. To achieve compliance with NPDES effluent limits, the Authority is obligated to adopt and implement integrated preventive maintenance and implement spill response and cleanup programs. EPA oversight is augmented by the Authority's tri-annual submission of progress reports and progress meetings with EPA. Under the 2006 EPA Consent Decree, the Authority is also required to pay stipulated penalties for failure to comply with various requirements contained therein, some of which are deposited in an escrow account. The Authority has the opportunity to recover certain stipulated penalties in this escrow account if it complies with or completes required remedial measures and capital improvement projects before the applicable completion deadlines. Non-compliance by the Authority with the terms of the 2006 EPA



Consent Decree may violate the terms of its probation, result in possible additional criminal sanctions, including fines and injunctive relief or additional remedial actions, and in all likelihood subject the Authority to stipulated penalties. A summary of the 2006 EPA Consent Decree is contained in the *Consulting Engineer's Report in Appendix II*.

*2006 Drinking Water Settlement Agreement.* The Water System was subject to approximately 180 administrative orders arising from enforcement actions by DOH (EPA's local delegate for Safe Drinking Water Act implementation and enforcement) against the Authority for violations of the Safe Drinking Water Act and to three administrative consent agreements with DOH addressing monitoring and turbidity violations. On December 2006, the Authority entered into the 2006 Drinking Water Settlement Agreement, a comprehensive settlement agreement with DOH to resolve litigation brought in February 2006 against the Authority seeking enforcement of the administrative orders of DOH under the Safe Drinking Water Act and the violations by the Authority of two of the prior consent agreements. The 2006 Drinking Water Settlement Agreement was filed on December 15, 2006 with the Court of First Instance, Superior Court of San Juan, was approved on June 16, 2008, and is now in effect. The 2006 Drinking Water Settlement Agreement replaces and supersedes all prior DOH administrative orders and consent agreements. It obligates the Authority to carry out approximately 210 projects over the next 15 years along with many other shorter-term remedial actions that will involve both capital expenditures and expenditures for operating, maintenance and training programs and evaluations and studies centered on ensuring that the quality of drinking water provided by the Authority to its customers meets all federal and Commonwealth regulatory standards. Under the 2006 Drinking Water Settlement Agreement, the Authority paid a \$1 million civil penalty to the Commonwealth and is required to pay stipulated penalties for violations of the agreement. Certain stipulated penalties paid by the Authority may be returned to the Authority under certain circumstances to be used to finance any action directed at achieving or maintaining compliance with the Authority's obligations under the 2006 Drinking Water Settlement Agreement and under local and federal laws applicable to the Water System. The Authority submits quarterly progress reports to the DOH to inform on its compliance with the terms of the 2006 Drinking Water Settlement Agreement and self-assesses any applicable stipulated penalties. A summary of the 2006 Drinking Water Settlement Agreement is contained in the *Consulting Engineer's Report in Appendix II*

*2010 EPA Consent Decree.* In April 6, 2010, the United States of America, at the request of the EPA, and the Authority entered into the 2010 EPA Consent Decree to resolve alleged Clean Water Act and Safe Drinking Water Act violations at the Authority's water treatment plants and certain unresolved administrative enforcement actions and existing consent decrees related to sludge treatment systems ("STS") at water treatment plants. The 2010 EPA Consent Decree implements a system-wide NPDES permits compliance plan and measures to properly handle sludge disposals and the discharge of pollutants from water treatment plants, supersedes prior administrative enforcement actions and water treatment plant STS consent decrees, and consolidates all STS compliance projects, simplifying both the Authority's management and regulatory agency monitoring of required improvements. The 2010 EPA Consent Decree was approved by the United States District Court for the District of Puerto Rico on August 24, 2010 and applies to all of the Authority's water treatment plants and three unfiltered plants located at Naguabo, Lares and Las Marias.

Under the 2010 EPA Consent Decree, the Authority must implement remedial measures to address washwater discharges at water treatment plants owned and operated by the Authority, as well as a \$2.5 million SEP to provide for an aeration system for Lake Toa Vaca. These remedial measures shall be completed in three phases, consisting in short-term remedial measures, mid-term remedial measures and long-term capital improvements. Also, the Authority must monitor and sample the washwater discharges from each STS, and comply with the respective interim limitations set forth in the 2010 EPA Consent Decree. Existing STS will be evaluated to determine: (1) whether the existing STS has the capacity to adequately treat the water treatment plant washwater discharges to comply with the effluent limitations contained in its NPDES permit; and (2) identify the actions the Authority must undertake to ensure that washwaters are adequately treated including, but not limited to, the construction of additional facilities to adequately treat the sludge and achieve compliance with the respective NPDES permit. Additionally, the Authority must provide the necessary training to its operators, standardize all record keeping and reporting procedures for STS at its water treatment plants, and operate and maintain all STS in accordance with the EPA-approved integrated preventive maintenance program. Finally, pursuant to the 2010 EPA Consent Decree, the Authority paid a \$1.02 million civil penalty and is required to pay stipulated penalties for failure to comply with various requirements of the 2010 EPA Consent Decree, some of which may be partially returned to the Authority if

it completes remedial measures prior to the applicable deadlines. A summary of the 2010 EPA Consent Decree is contained in the Consulting Engineer's Report in *Appendix II*

Although the Authority is committed to bringing the Systems into compliance with applicable law, it is presently unable to comply fully with all the requirements of the above mentioned consent decrees, administrative orders and settlement agreements and expects that it will have to continue to pay stipulated penalties and to make additional capital expenditures (some not included in the Five-Year CIP) in the future. To prepare for this potential liability, the Authority makes a risk assessment of the average exposure for payment of stipulated penalties and non-compliance with its consent decrees, administrative orders and settlement agreements and creates a reserve for the amounts it believes should be sufficient to pay the stipulated penalties at current levels of non-compliance. In addition, the Five-Year CIP is structured to modernize and help bring the Systems into compliance with applicable environmental laws. See CAPITAL IMPROVEMENT PROGRAM. No assurance can be given, however, that the amounts budgeted for payment of stipulated penalties will be in all cases sufficient to cover potential civil, administrative or criminal liabilities or that the Five-Year CIP will result in regulatory compliance. However, the Authority expects to comply with its regulatory obligations in the near future.

*Impact of Five-Year CIP.* As set forth in more detail under CAPITAL IMPROVEMENT PROGRAM, the Authority estimates that the capital cost of complying with the terms of the 2006 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement, and the 2010 EPA Consent Decree will be approximately \$635 million from July 1, 2011 through June 30, 2016 based on project cost estimates included in the Five-Year CIP. The Consulting Engineer has reviewed the consent decrees and settlement agreement described above, the Authority's actions to date and its expected actions thereunder and has concluded that the Five-Year CIP adequately addresses the requirements of these consent decrees and settlement agreement. See *Consulting Engineer's Report* attached hereto as *Appendix II* (page ES-10 of the Supplemental CE Report and page 5-35 of the 2010 CE Report).

Although, the Five-Year CIP does not include projects specifically to address future regulations, the Authority is making allowances in its new designs to improve capabilities to meet certain future regulations. As the effects of future regulations become more defined, the Authority may need to modify its Five-Year CIP to accommodate resulting needs.

### **Other Regulatory and Compliance Matters**

In common with most water and wastewater operating agencies, the Authority's operations and improvements for its Systems are subject to numerous environmental regulatory requirements in addition to the Safe Drinking Water Act and the Clean Water Act. These include environmental impact assessment requirements under the National Environmental Policy Act, air quality protection requirements, permitting requirements under various federal, Commonwealth and local laws for construction projects, various requirements affecting the Authority's properties and operations under the Resource Conservation and Recovery Act of 1976 and the Comprehensive Environmental Response, Compensation and Liabilities Act of 1980, including the Superfund Amendments and Reauthorization Act of 1986, as amended. Statutes and regulations of the Commonwealth cover matters, such as water quality standards, control of solid waste and air pollution control requirements. The Authority currently has no litigation with respect to any of these regulatory requirements. In addition, plans and specifications for many projects are subject to review and approval by Commonwealth agencies and the EPA. Permitting and environmental compliance procedures for many of the Authority's construction projects are complex and may in some cases lead to unforeseeable delay or expense. These complexities are faced by many, if not most, public sector utilities, and management of the Authority does not anticipate that they will result in substantial delays or cost increases.

## CAPITAL IMPROVEMENT PROGRAM

### General

The Authority continues the implementation of a comprehensive capital improvement program. The purpose of the Five-Year CIP is to modernize the Systems, protect public health and safeguard environmental quality as mandated by the Act, allow continued economic development and bring the Systems into compliance with all regulatory requirements, including the 2006 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement, and the 2010 EPA Consent Decree. As set forth in the Consulting Engineer's Report, the Authority has also engaged the services of recognized program management consultants in order to assist it in the planning, design and management of the Five-Year CIP.

The Five-Year CIP totals \$1.56 billion, in current dollars, and includes annual expenditures for projects under construction as of June 30, 2011 and new projects scheduled to be executed in each of the years covered by the Five-Year CIP. As shown in the following table, the Five-Year CIP consists of \$544 million for improvements to the Water System and \$473 million for improvements to the Wastewater System. The remainder of the Five-Year CIP is for program areas of preventive maintenance, planning, renovation and replacement, meter replacement and upgrades, buildings, technological improvements and vehicles. Of the total projected to be spent during the five-year period, \$635 million is required for projects specified by the terms of the 2006 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement, the 2010 EPA Consent Decree and other regulatory requirements. The Authority expects that additional substantial expenditures will be necessary after fiscal 2016 in order to comply with the long-term aspects of the 2006 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement and the 2010 EPA Consent Decree.

The Five-Year CIP is based on project-by-project cost estimates and includes allowances for indirect costs, inflation and contingencies. The estimates of annual expenditures for individual projects are based on construction industry averages and the Authority's experience with similar projects. Individual projects and their cost estimates are subject to periodic revision to reflect updated information regarding design, site considerations, value engineering, changing regulatory requirements, and overall program development. The Authority reviews and revises its capital improvement program to reflect current data and requirements at least annually. Moreover, under the Fiscal Oversight Agreement, the Authority is required to provide Government Development Bank with a revised capital improvement program at least annually covering the next succeeding five fiscal years. As mentioned in AUTHORITY CONSULTANTS above, the Authority uses the services of recognized engineering firms and program management consultants to assist it with the planning, design and management of its capital improvement program.

## Summary of Five-Year CIP

The following table summarizes the Five-Year CIP by year and by major expenditure category followed by a table breaking down the Five-Year CIP into mandatory expenditures and other categories (all amounts in millions). Moreover, the Five-Year CIP includes an annual cost escalation of 3.8% for contracts whose performance has not yet begun.

| Category Type                                   | Sub-Category                   | Fiscal Year Ending June 30, |                |                |                |                | Total <sup>†</sup> |
|---|--------------------------------|-----------------------------|----------------|----------------|----------------|----------------|--------------------|
|   |                                | 2012                        | 2013           | 2014           | 2015           | 2016           | 2012-2016          |
| <b>Water System</b>                             | Water Supply.....              | \$ 16.5                     | \$ 23.9        | \$ 28.9        | \$ 17.6        | \$ 14.6        | \$ 101.5           |
|   | Water Pump Stations.....       | 5.8                         | 3.1            | 0.2            | 0.0            | 0.0            | 9.1                |
|   | WTP Capacity Increase.....     | 0.8                         | 2.9            | 5.7            | 6.7            | 1.0            | 17.1               |
|   | WTP Improvements.....          | 57.6                        | 68.9           | 38.2           | 12.0           | 10.8           | 187.5              |
|   | WTP New.....                   | 21.6                        | 19.4           | 24.8           | 13.5           | 7.9            | 87.2               |
|   | Water Distribution.....        | 77.8                        | 39.9           | 18.3           | 4.5            | 1.4            | 141.9              |
|   | Subtotal.....                  | 180.1                       | 158.1          | 116.1          | 54.3           | 35.7           | 544.3              |
| <b>Wastewater System</b>                        | Wastewater Pump Stations.....  | 8.9                         | 9.7            | 1.6            | 0.1            | 0.0            | 20.3               |
|   | WWTP Capacity Increase.....    | 8.6                         | 14.9           | 27.2           | 46.0           | 65.2           | 161.9              |
|   | WWTP Improvements.....         | 15.5                        | 12.3           | 9.5            | 5.0            | 8.0            | 50.3               |
|   | WWTP New.....                  | 7.3                         | 2.8            | 0.0            | 0.0            | 3.3            | 13.4               |
|   | Wastewater Collection.....     | 64.2                        | 68.0           | 47.0           | 21.8           | 26.5           | 227.5              |
|   | Subtotal.....                  | 104.5                       | 107.7          | 85.3           | 72.9           | 103.0          | 473.4              |
| <b>Meters</b>                                   | Water Meters.....              | 36.0                        | 24.2           | 16.8           | 18.3           | 22.9           | 118.2              |
| <b>Buildings</b>                                | Buildings.....                 | 5.3                         | 3.3            | 0.8            | 0.0            | 0.0            | 9.4                |
| <b>Fleet</b>                                    | Fleet.....                     | 2.5                         | 2.7            | 2.9            | 3.0            | 5.5            | 16.6               |
| <b>Preventative Maintenance<sup>†</sup></b>     | Water & Wastewater.....        | 16.2                        | 7.1            | 0.0            | 0.0            | 0.0            | 23.3               |
| <b>Renewal and Replacement – Infrastructure</b> | Water & Wastewater.....        | 22.0                        | 38.4           | 51.4           | 53.8           | 57.6           | 223.2              |
| <b>Technology</b>                               | Water & Wastewater.....        | 40.1                        | 54.3           | 23.5           | 2.3            | \$4.7          | 124.9              |
| <b>Other (studies, renovation, etc.)</b>        | Water & Wastewater.....        | -                           | -              | 3.4            | 9.6            | 12.4           | 25.4               |
|   | Subtotal.....                  | 122.1                       | 130.0          | 98.8           | 87.0           | 103.1          | 541.0              |
|   | <b>Total<sup>*</sup></b> ..... | <b>\$406.7</b>              | <b>\$395.8</b> | <b>\$300.2</b> | <b>\$214.2</b> | <b>\$241.8</b> | <b>\$1,558.7</b>   |

\* Numbers may vary due to rounding.

† Takes into account only the renewal and replacement component.

The annual level of expenditures projected for the Five-Year CIP averages, over the five-year period, approximately \$291 million.

| Project Category   | Fiscal Year Ending June 30,    |                |                |                |                | Total <sup>†</sup> |                  |
|--|--------------------------------|----------------|----------------|----------------|----------------|--------------------|------------------|
|  | 2012                           | 2013           | 2014           | 2015           | 2016           | 2012-2016          |                  |
| Mandatory (Consent Decrees, Agreements, etc.).....               | \$140.0                        | \$158.8        | \$137.4        | \$ 93.6        | \$104.9        | \$ 634.7           |                  |
| Non-Mandatory Compliance.....                                    | 73.6                           | 73.0           | 47.1           | 31.2           | 40.6           | 265.5              |                  |
| Non-Mandatory Quality, Efficiency, Reliability & Redundancy..... | 169.2                          | 153.4          | 111.7          | 85.2           | 93.0           | 612.5              |                  |
| Non-Mandatory Growth.....  | 14.8                           | 6.6            | 3.6            | 4.2            | 3.3            | 32.5               |                  |
| Non-Mandatory Other.....   | 9.1                            | 4.1            | 0.3            | -              | -              | 13.5               |                  |
|  | <b>Total<sup>*</sup></b> ..... | <b>\$406.7</b> | <b>\$395.9</b> | <b>\$300.1</b> | <b>\$214.2</b> | <b>\$241.8</b>     | <b>\$1,558.7</b> |

\* Numbers may vary due to rounding

The Consulting Engineer has reviewed the Five-Year CIP and has concluded that it addresses the general needs of the Systems, properly prioritizes projects and complies with the commitments the Authority has made to EPA and DOH as set forth in the 2006 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement and the 2010 EPA Consent Decree. See *Consulting Engineer's Report* attached hereto as *Appendix II* (page ES-10 of the Supplemental CE Report and page 5-35 of the 2010 CE Report).

On February 2009, the Authority contracted with a consultant for the preparation of an updated Water and Wastewater Infrastructure Master Plan extending through 2030 (the "2011-2030 Master Plan"). The 2011-2030 Master Plan provides a clear roadmap for the implementation of its future investments in water and wastewater infrastructure over the next 20 years and will allow the Authority to review in detail and update its capital improvement program. The 2010-2030 Master Plan was completed in April 2011. The 2011-2030 Master Plan concludes that, for the 20-year planning period, the total investment cost for water infrastructure and compliance cost is approximately \$4.31 billion and that the total investment cost for Wastewater System infrastructure projects is approximately \$308 million. The Authority continues to evaluate and revise its capital improvement projections to align efforts with regulatory obligations and recommendations included in the 2010-2030 Master Plan. This effort is expected to be completed in fiscal year 2012.

### Sources of Funds

Set forth below is a table showing the various sources which the Authority expects to use in financing the Five-Year CIP (in thousands). The table was prepared assuming the Authority will issue additional Senior and Senior Subordinate Bonds annually through June 30, 2016.

|   | Fiscal Year Ending June 30, |                  |                  |                  |                  |
|---|-----------------------------|------------------|------------------|------------------|------------------|
|   | 2012                        | 2013             | 2014             | 2015             | 2016             |
| <u>USES OF FUNDS</u>                          |                             |                  |                  |                  |                  |
| Repair & Replacement of Fixed Assets          | \$ 21,980                   | \$ 38,385        | \$ 51,367        | \$ 53,824        | \$ 57,628        |
| CIP Infrastructure Projects                   | 384,772                     | 357,548          | 248,717          | 160,376          | 184,126          |
| <b>Total Projected Capital Expenses</b>       | <b>\$406,751</b>            | <b>\$395,933</b> | <b>\$300,084</b> | <b>\$214,200</b> | <b>\$241,754</b> |
| <u>SOURCES OF FUNDS</u>                       |                             |                  |                  |                  |                  |
| Federal Funds – Rural Development Bonds / LOC | \$ 20,000                   | \$ 15,000        | \$ 15,000        | \$ 15,000        | \$ 15,000        |
| Federal Funds – State Revolving Funds         | 57,155                      | 50,933           | 45,084           | 49,200           | 46,754           |
| Federal Economic Stimulus – Grants            | 18,475                      | -                | -                | -                | -                |
| Federal Economic Stimulus – Loans             | 9,179                       | -                | -                | -                | -                |
| Local Stimulus                                | 1,942                       | -                | -                | -                | -                |
| Interim Financing                             | 300,000                     | -                | -                | -                | -                |
| Bond Proceeds (Subsequent Issues)             | -                           | 330,000          | 240,000          | 150,000          | 180,000          |
| <b>Total Sources</b>                          | <b>\$406,751</b>            | <b>\$395,933</b> | <b>\$300,084</b> | <b>\$219,329</b> | <b>\$241,754</b> |

## DEBT

From the late 1940's until the early 1990's, the Authority's capital improvements were financed in large part by bonds issued by the Authority and secured by a pledge of its operating revenues remaining after payment of its current expenses and reserves therefor. The bonds were issued publicly and were augmented, in the case of financing for rural aqueduct projects on the island, by revenue bonds issued (on parity as to their claim on net revenues to the publicly offered revenue bonds) to the Rural Utility Service (formerly Farmers Home Administration) of the United States Department of Agriculture ("RUS").

Beginning in the early 1990's as a result of a confluence of factors including, among others, an inability to control operating expenditures and a failure to raise rates for water and wastewater service, revenues became insufficient to pay debt service on its revenue bonds. To provide funds adequate for the Authority's capital and operating needs, the Commonwealth gave substantial operating subsidies to the Authority and placed its full faith and credit guarantee on the Authority's 1995 Commonwealth Guaranteed Bonds (subsequently extended to the Guaranteed RUS Bonds in the late 1990s) upon passage of Act No. 45 of the Legislative Assembly of Puerto Rico, approved July 28, 1994, as amended. As described below in "Commonwealth Guaranteed Indebtedness," the Authority refinanced the 1995 Commonwealth Guaranteed Bonds with the proceeds of the 2008 Commonwealth Guaranteed Bonds. Under the Guaranteed Bond Resolution, the Authority is permitted to issue bonds and other obligations having a claim on Operating Revenues senior to the claim thereon of the Guaranteed Bonds. The 2012 Senior Bonds have such senior claims on Operating Revenues.

With the implementation of the rate increase during fiscal years 2006 and 2007, the creation of a new organizational and management structure, and the improved cooperation between the Authority and its labor unions, the financial condition of the Authority improved significantly from that which existed from the early 1990's until fiscal 2006 and required substantial annual operating and capital subsidies from the Commonwealth.

The following table sets forth the debt of the Authority as of December 31, 2011, and as adjusted as of February 15, 2012 and to give effect to the issuance of the 2012 Senior Bonds. Following the table is a discussion of the material terms of certain debt instruments the Authority has incurred or expects to incur to finance the Five-Year CIP. The Operating Reserve Fund Line of Credit, which matures on June 30, 2013, allows the Authority to draw up to \$150 million for paying Current Expenses and other purposes set forth in the Trust Agreement. As of December 31, 2011 there is no outstanding balance under such line of credit.

|   | <u>12/31/2011</u>         | <u>As Adjusted</u>        |
|---|---------------------------|---------------------------|
|   | (in thousands)            |                           |
| Revenue Bonds:  |                           |                           |
| 2008 Series A Bonds (Senior) .....  | \$1,344,255               | \$1,344,255               |
| 2008 Series B Bonds (Senior) .....  | 22,445                    | 22,445                    |
| 2012 Senior Bonds .....   | -                         | 2,095,695                 |
| Commonwealth Guaranteed Indebtedness:   |                           |                           |
| 2008 Commonwealth Guaranteed Bonds .....  | 284,755                   | 284,755                   |
| Guaranteed RUS Bonds .....  | 376,086                   | 372,968                   |
| Revolving Funds Loans .....   | 416,178                   | 435,727                   |
| Commonwealth Supported Obligations (PFC Superaqueduct Bonds) <sup>†</sup> ..... | 162,700                   | 162,700                   |
| Notes:  |                           |                           |
| Term Loan (Senior Subordinate lien) <sup>‡</sup> .....                          | 240,272                   | -                         |
| Lines of Credit .....   | 1,139,356                 | 37,614                    |
| Operating Reserve Fund Line of Credit .....                                     | -                         | -                         |
| Transition Line of Credit .....   | -                         | -                         |
| <b>Total bonds and notes payable .....</b>                                      | <b><u>\$3,986,047</u></b> | <b><u>\$4,756,159</u></b> |

\* Includes accreted value of approximately \$28 million related to Convertible Capital Appreciation Bonds issued as part of the 2008 Senior Bonds.

<sup>†</sup> Represents Commonwealth Appropriation Debt that the Authority has agreed to pay as long as its Operating Revenues are sufficient for such purposes. See "Commonwealth Supported Obligations" under DEBT for a description of other Commonwealth Appropriations Debt related to the Authority.

<sup>‡</sup> Repaid on January 17, 2012 with the proceeds of a bond anticipation note to be repaid with the proceeds of the Series B Bonds.

## **Commonwealth Guaranteed Indebtedness**

*2008 Commonwealth Guaranteed Bonds and Guaranteed RUS Bonds.* As of December 31, 2011, the Authority had outstanding \$284.8 million principal amount of the 2008 Commonwealth Guaranteed Bonds that were issued under Resolution No. 1583. The proceeds of the 2008 Commonwealth Guaranteed Bonds were used to refinance the Authority's outstanding \$262,825,000 Revenue Refunding Bonds, Series 1995, Guaranteed by the Commonwealth of Puerto Rico, in order to achieve cash flow benefits. Under Act No. 45 of the Legislative Assembly of Puerto Rico, approved July 28, 1994, as amended, the full faith, credit and taxing power of the Commonwealth are pledged to the payment of the 2008 Commonwealth Guaranteed Bonds, in the event Authority Revenues after payment of all Senior Indebtedness are insufficient to pay debt service on the 2008 Commonwealth Guaranteed Bonds as they become due.

Rural Utility Service assists in the financing of water and sewer facilities in rural areas of Puerto Rico by purchasing from the Authority bonds which bear interest from 4.25% to 5%. The Commonwealth agreed to guarantee the payment of debt service of bonds issued to RUS to finance certain urban aqueduct projects. As of December 31, 2011, \$376.1 million principal amount of such Guaranteed RUS Bonds was outstanding. The Rural Development Bonds are guaranteed by the Commonwealth, and Act No. 75 of July 12, 2010 provides that Revolving Funds obligations incurred by the Authority on or before June 30, 2015 will be guaranteed by the Commonwealth.

The Authority's obligations under 2008 Commonwealth Guaranteed Bonds and Guaranteed RUS Bonds are subordinate to the Senior, Senior Subordinate and Subordinate Indebtedness and are payable from the Commonwealth Payments Fund.

*Revolving Funds.* PRIFA administers the financial matters of the Puerto Rico Water Pollution Control Revolving Fund (the "Pollution Control Revolving Fund") and the Puerto Rico Safe Drinking Water Revolving Fund (the "Drinking Water Revolving Fund," and together with the Pollution Control Revolving Fund, the "Revolving Funds") and receives capitalization grants from the federal government for uses permitted under Title VI of the Clean Water Act and Title I of the Drinking Water Act. Annually, the Commonwealth appropriates and deposits a portion of its available revenues into the Revolving Funds to meet its responsibility for matching funds requirements under these federal laws (approximately 20% of the applicable federal capitalization grant). Moneys in the Revolving Funds are then loaned to the Authority on a revolving basis at below market interest rates (usually 2%) to finance certain of the Authority's ongoing capital projects (including a portion of the Five-Year CIP). The Authority's obligations under such revolving loans are subordinate to the Senior, Senior Subordinate and Subordinate Indebtedness and are payable from the Commonwealth Payments Fund. Most of the Authority's existing obligations to the Revolving Funds are guaranteed by the Commonwealth, and Act No. 75 of July 12, 2010 provides that Revolving Funds obligations incurred by the Authority on or before June 30, 2015 will be guaranteed by the Commonwealth.

PRIFA provides administrative and managerial assistance to the Authority through the Revolving Funds, which were created by Commonwealth legislation and are constituted separately and independently from each other as well as any other funds or resources of the Commonwealth. As of December 31, 2011, the Revolving Funds' loans had an outstanding principal amount of \$416.2 million.

*Future Guaranteed Obligations.* Act No. 75 of July 12, 2010 authorized the Authority to incur before July 1, 2015 Indebtedness that is guaranteed by the Commonwealth. Until June 30, 2015, any Authority bonds purchased by U.S Department of Agriculture – Rural Development acting on behalf of Rural Utilities Service and loans taken from the Revolving Funds will be guaranteed and included as Commonwealth Guaranteed Indebtedness under the Trust Agreement.

## **Commonwealth Supported Obligations**

The outstanding Commonwealth Supported Obligations consist of notes of the Authority held by PFC, which notes secure the outstanding PFC Bonds and state that debt service thereunder is payable solely from budgetary appropriations to be made by the Commonwealth. Under an agreement reached with the Commonwealth in 2006, the Authority, subject to its having available Operating Revenues, will make debt service payments on the

PFC Superaqueduct Bonds in lieu of the Commonwealth making said budgetary appropriations, although the Commonwealth would once again be obligated to make such debt service budgetary appropriations should the Authority's Operating Revenues be insufficient for such purpose.

The projected operating results prepared by the Authority and reviewed by the Consulting Engineer have taken the Authority's debt service obligations on these notes into account. As of December 31, 2011, \$386.8 million principal amount of such notes were outstanding, of which \$162.7 million secure the PFC Superaqueduct Bonds.

### **Operating Reserve Fund Line of Credit**

The Operating Reserve Fund Line of Credit referred to in the table above was provided to the Authority by Government Development Bank simultaneously with the issuance of the 2008 Senior Bonds and expires on June 30, 2013. Under this line, the Authority is authorized to draw funds in situations and for the purposes set forth and described in the Trust Agreement. The Authority is currently negotiating with Government Development Bank in order to increase the aggregate principal amount of the line of credit by approximately \$30 million in order to satisfy certain requirements under the Trust Agreement and extend the term until June 2016. To the extent the Authority is unable to substitute or extend the term of this line of credit, it will be required to start making cash deposits to the Operating Reserve Fund so that the available balance is always equal to at least 90 days of the prior Fiscal Year's Current Expenses.

### **Lines of Credit**

Government Development Bank has approved various lines of credit to the Authority to borrow up to \$1.3 billion to finance a part of the Five-Year CIP and for working capital, of which \$1.1 billion has been advanced. The lines of credit expire at various dates through January 31, 2013 and the amounts borrowed thereunder will be paid, in whole or in part, from the proceeds of the 2012 Senior Bonds, federal funds (Rural Development Bonds and/or State Revolving Funds) or from moneys in the Surplus Fund under the Trust Agreement.

The Authority is also negotiating with Government Development Bank a new line of credit in an aggregate principal amount of \$150 million. The Authority has requested this line of credit, which would allow it to make draws during the first three months after its effectiveness, as a measure to provide liquidity, if needed, during a three-month transition period after the effectiveness of the Trust Agreement, as amended and restated as of February 15, 2012.



## ANNUAL DEBT SERVICE

Annual Debt Service for the Bonds in any Fiscal Year, as defined in the Trust Agreement, comprises the sum of principal, including Sinking Fund Requirement, and interest which is payable after July 1 during such Fiscal Year and on July 1 of the next Fiscal Year. The following table shows the Annual Debt Service, after taking into effect the issuance of the 2012 Senior Bonds, for (i) all outstanding Senior Indebtedness as of December 31, 2011, (ii) the Series B Bonds, (iii) the Series A Bonds, and (iv) all outstanding indebtedness subordinate to the Senior Indebtedness, which obligations include all Commonwealth Guaranteed Indebtedness (the 2008 Commonwealth Guaranteed Bonds, the Guaranteed RUS Bonds and the Authority's obligations related to the State Revolving Funds) and the PFC Superaqueduct Bonds. See discussion regarding Subordinate Obligations under DEBT.

| July 1,                  | Series B Bonds                  |                      |                       |                      | Series A Bonds <sup>†</sup> | Total Outstanding Senior Indebtedness | Outstanding Commonwealth Guaranteed Indebtedness | PFC Superaqueduct Bonds <sup>‡</sup> | Grand Total            |
|--------------------------|---------------------------------|----------------------|-----------------------|----------------------|-----------------------------|---------------------------------------|--|--------------------------------------|------------------------|
|                          | Outstanding Senior Indebtedness | Principal            | Interest <sup>*</sup> | Total                |                             |                                       |  |                                      |                        |
| 2012                     | \$51,444,862                    | -                    | -                     | -                    | -                           | \$51,444,862                          | \$43,818,301                                     | -                                    | \$95,263,163           |
| 2013                     | 90,600,220                      | -                    | -                     | -                    | -                           | 90,600,220                            | 66,262,771                                       | -                                    | 156,862,991            |
| 2014                     | 90,599,970                      | \$ 31,035,000        | \$ 14,019,360         | \$45,054,360         | \$95,132,213                | 230,786,543                           | 66,267,975                                       | -                                    | 297,054,518            |
| 2015                     | 90,602,470                      | -                    | 12,979,688            | 12,979,688           | 127,207,213                 | 230,789,371                           | 66,099,778                                       | \$1,594,384                          | 298,483,533            |
| 2016                     | 90,600,970                      | 33,665,000           | 12,979,688            | 46,644,688           | 93,545,463                  | 230,791,121                           | 65,301,202                                       | 8,999,425                            | 305,091,748            |
| 2017                     | 90,603,970                      | -                    | 11,660,020            | 11,660,020           | 128,525,463                 | 230,789,453                           | 65,061,785                                       | 8,999,425                            | 304,850,663            |
| 2018                     | 90,602,960                      | 36,705,000           | 11,660,020            | 48,365,020           | 91,820,263                  | 230,788,243                           | 62,769,503                                       | 8,999,425                            | 302,557,171            |
| 2019                     | 90,603,150                      | -                    | 10,026,648            | 10,026,648           | 130,160,263                 | 230,790,061                           | 61,266,193                                       | 8,999,425                            | 301,055,679            |
| 2020                     | 90,600,860                      | 40,255,000           | 10,026,648            | 50,281,648           | 89,908,013                  | 230,790,521                           | 60,215,834                                       | 8,999,425                            | 300,005,780            |
| 2021                     | 90,602,420                      | -                    | 8,054,153             | 8,054,153            | 132,133,013                 | 230,789,586                           | 67,499,631                                       | 8,999,425                            | 307,288,642            |
| 2022                     | 90,603,550                      | -                    | 8,054,153             | 8,054,153            | 132,131,763                 | 230,789,466                           | 67,505,992                                       | 8,999,425                            | 307,294,883            |
| 2023                     | 90,599,950                      | 46,470,000           | 8,054,153             | 54,524,153           | 85,664,063                  | 230,788,166                           | 67,492,401                                       | 8,999,425                            | 307,279,992            |
| 2024                     | 90,602,340                      | -                    | 5,730,653             | 5,730,653            | 134,454,063                 | 230,787,056                           | 70,615,042                                       | 8,999,425                            | 310,401,523            |
| 2025                     | 90,600,510                      | -                    | 5,730,653             | 5,730,653            | 134,457,588                 | 230,788,751                           | 70,550,899                                       | 8,999,425                            | 310,339,075            |
| 2026                     | 90,603,510                      | 53,535,000           | 5,730,653             | 59,265,653           | 80,920,000                  | 230,789,163                           | 69,685,558                                       | 8,999,425                            | 309,474,146            |
| 2027                     | 90,603,260                      | 53,580,000           | 2,866,530             | 56,446,530           | 83,740,000                  | 230,789,790                           | 67,716,301                                       | 18,878,875                           | 317,384,966            |
| 2028                     | 90,601,760                      | -                    | -                     | -                    | 140,188,100                 | 230,789,860                           | 66,422,842                                       | 34,879,225                           | 332,091,927            |
| 2029                     | 90,600,760                      | -                    | -                     | -                    | 140,186,375                 | 230,787,135                           | 60,274,502                                       | 34,883,538                           | 325,945,175            |
| 2030                     | 90,599,960                      | -                    | -                     | -                    | 140,191,725                 | 230,791,685                           | 58,584,776                                       | 34,880,675                           | 324,257,136            |
| 2031                     | 90,598,760                      | -                    | -                     | -                    | 140,188,975                 | 230,787,735                           | 53,315,618                                       | 34,880,825                           | 318,984,178            |
| 2032                     | 90,600,560                      | -                    | -                     | -                    | 140,191,475                 | 230,792,035                           | 52,083,830                                       | 34,883,625                           | 317,759,490            |
| 2033                     | 90,603,160                      | -                    | -                     | -                    | 140,185,725                 | 230,788,885                           | 52,074,423                                       | -                                    | 282,863,308            |
| 2034                     | 90,599,060                      | -                    | -                     | -                    | 140,188,475                 | 230,787,535                           | 52,070,566                                       | -                                    | 282,858,101            |
| 2035                     | 90,600,760                      | -                    | -                     | -                    | 140,191,269                 | 230,792,029                           | 19,432,648                                       | -                                    | 250,224,677            |
| 2036                     | 90,599,560                      | -                    | -                     | -                    | 140,190,806                 | 230,790,366                           | 18,445,868                                       | -                                    | 249,236,234            |
| 2037                     | 90,601,760                      | -                    | -                     | -                    | 140,185,044                 | 230,786,804                           | 18,159,133                                       | -                                    | 248,945,937            |
| 2038                     | 90,607,760                      | -                    | -                     | -                    | 140,181,425                 | 230,789,185                           | 17,879,551                                       | -                                    | 248,668,736            |
| 2039                     | 90,598,690                      | -                    | -                     | -                    | 140,191,063                 | 230,789,753                           | 17,819,285                                       | -                                    | 248,609,038            |
| 2040                     | 90,600,190                      | -                    | -                     | -                    | 140,186,650                 | 230,786,840                           | 16,320,343                                       | -                                    | 247,107,183            |
| 2041                     | 90,598,690                      | -                    | -                     | -                    | 140,189,538                 | 230,788,228                           | 15,293,737                                       | -                                    | 246,081,965            |
| 2042                     | 90,602,490                      | -                    | -                     | -                    | 140,189,238                 | 230,791,728                           | 14,475,652                                       | -                                    | 245,267,380            |
| 2043                     | 90,598,690                      | -                    | -                     | -                    | 52,000,000                  | 142,598,690                           | 14,089,084                                       | -                                    | 156,687,774            |
| 2044                     | 90,599,390                      | -                    | -                     | -                    | 49,600,000                  | 140,199,390                           | 12,264,028                                       | -                                    | 152,463,418            |
| 2045                     | 90,600,190                      | -                    | -                     | -                    | 47,200,000                  | 137,800,190                           | 11,121,711                                       | -                                    | 148,921,901            |
| 2046                     | 90,598,460                      | -                    | -                     | -                    | 44,800,000                  | 135,398,460                           | 9,931,070  | -                                    | 145,329,530            |
| 2047                     | 90,601,980                      | -                    | -                     | -                    | 42,400,000                  | 133,001,980                           | 9,931,689  | -                                    | 142,933,669            |
| 2048                     | -                               | -                    | -                     | -                    | -                           | -                                     | 6,023,563  | -                                    | \$6,023,563            |
| 2049                     | -                               | -                    | -                     | -                    | -                           | -                                     | 4,117,773  | -                                    | 4,117,773              |
| 2050                     | -                               | -                    | -                     | -                    | -                           | -                                     | 3,510,813  | -                                    | 3,510,813              |
| 2051                     | -                               | -                    | -                     | -                    | -                           | -                                     | 3,528,554  | -                                    | 3,528,554              |
| 2052                     | -                               | -                    | -                     | -                    | -                           | -                                     | -  | -                                    | -                      |
| <b>Total<sup>§</sup></b> | <b>\$3,222,487,602</b>          | <b>\$295,245,000</b> | <b>\$127,573,020</b>  | <b>\$422,818,017</b> | <b>\$3,878,625,264</b>      | <b>\$7,523,930,886</b>                | <b>\$1,645,300,225</b>                           | <b>\$293,874,822</b>                 | <b>\$9,463,105,933</b> |

\* Approximately \$18.8 million of interest on the Series B Bonds has been capitalized through July 1, 2013.

† Approximately \$127.4 million of interest on the Series A Bonds has been capitalized through July 1, 2013.

‡ Approximately \$26.6 million of interest on the PFC Superaqueduct Bonds has been capitalized through December 15, 2014.

§ Total may not add due to rounding of figures.

## OPERATING RESULTS

Set forth below is a table showing and a brief discussion of the changes in revenues and expenses of the Authority (amounts in the table in thousands) within the three fiscal years ended June 30, 2011 and the five-month period ended November 30, 2010 and November 30, 2011. This information should be read together with the Authority's financial statements and the related notes included in *Appendix I* to this Official Statement.

|   | Audited                   |                           |                           | Unaudited                 |                           |
|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|   | 2009                      | 2010                      | 2011                      | 11/30/2010                | 11/30/2011                |
| Operating revenue:  |                           |                           |                           |                           |                           |
| Water.....  | \$491,641                 | \$503,888                 | \$492,847                 | \$207,864                 | \$205,865                 |
| Sewer .....   | 271,280                   | 262,447                   | 253,657                   | 107,540                   | 107,233                   |
| Commonwealth Budgetary Appropriations ..  | -                         | -                         | 85,000                    | 85,000                    | 76,183                    |
| Bad Debt Expense .....  | (58,464)                  | (53,547)                  | (22,396)                  | (28,255)                  | (21,815)                  |
| Total net operating revenue .....   | <u>704,457</u>            | <u>712,788</u>            | <u>809,108</u>            | <u>372,149</u>            | <u>367,466</u>            |
| Operating expenses:   |                           |                           |                           |                           |                           |
| Payroll and payroll related.....  | 279,606                   | 266,099                   | 250,968                   | 116,443                   | 111,140                   |
| Service contract - Superaqueduct.....   | 25,476                    | 22,800                    | 28,473                    | 11,994                    | 2,443                     |
| Professional and consulting services.....   | 17,796                    | 21,395                    | 34,138                    | 9,421                     | 12,613                    |
| Chemicals .....   | 27,310                    | 26,279                    | 29,453                    | 13,500                    | 16,817                    |
| Materials and replacements .....  | 15,454                    | 14,529                    | 16,110                    | 8,518                     | 8,148                     |
| Repairs and maintenance of capital assets ...   | 32,003                    | 39,990                    | 45,405                    | 17,295                    | 15,603                    |
| Electricity.....  | 136,497                   | 140,131                   | 156,583                   | 60,800                    | 82,289                    |
| Insurance.....  | 9,513                     | 9,443                     | 9,276                     | 5,117                     | 5,171                     |
| Other operating expenses .....  | 80,849                    | 78,685                    | 77,248                    | 29,827                    | 34,359                    |
| Operating expenses (excluding depreciation and amortization)....  | <u>624,504</u>            | <u>619,351</u>            | <u>647,654</u>            | <u>272,915</u>            | <u>288,583</u>            |
| Depreciation and amortization .....   | 143,687                   | 151,767                   | 201,037                   | 71,468                    | 85,809                    |
| Total operating expenses .....  | <u>768,191</u>            | <u>771,118</u>            | <u>848,691</u>            | <u>344,383</u>            | <u>374,392</u>            |
| Operating income (loss).....  | <u>(63,734)</u>           | <u>(58,330)</u>           | <u>(39,583)</u>           | <u>27,766</u>             | <u>(6,926)</u>            |
| Non-operating revenue and expenses:   |                           |                           |                           |                           |                           |
| Interest expense, net of amortization of debt issuance cost, bond premium and discount, and deferred refunding loss ..... | (126,978)                 | (137,063)                 | (153,068)                 | (84,036)                  | (92,926)                  |
| Commonwealth contributions for principal payments on bonds and notes .....  | -                         | 8,275                     | 819                       | 819                       | -                         |
| Commonwealth contributions for interest payments on bonds and notes.....  | 18,233                    | 37,190                    | 37,749                    | 19,181                    | -                         |
| Interest income .....   | 5,202                     | 4,269                     | 4,578                     | 1,988                     | 1,114                     |
| Other income .....  | 5,104                     | 7,084                     | 3,012                     | 1,194                     | 2,357                     |
| Total non-operating expense, net .....  | <u>(98,439)</u>           | <u>(80,245)</u>           | <u>(106,910)</u>          | <u>(60,854)</u>           | <u>(89,455)</u>           |
| Loss before capital contributions .....   | <u>(162,173)</u>          | <u>(138,575)</u>          | <u>(146,493)</u>          | <u>(33,088)</u>           | <u>(96,381)</u>           |
| Capital contributions:  |                           |                           |                           |                           |                           |
| Federal grants and other contributions .....  | 21,592                    | 26,498                    | 31,798                    | 14,119                    | 24,084                    |
| Other Commonwealth contributions .....  | 541                       | 942,879                   | 2,477                     | 1,272                     | 1,411                     |
| Total capital contributions.....  | <u>22,133</u>             | <u>969,377</u>            | <u>34,275</u>             | <u>15,391</u>             | <u>25,495</u>             |
| Change in net assets.....   | <u>(140,440)</u>          | <u>830,802</u>            | <u>(112,218)</u>          | <u>(17,697)</u>           | <u>(70,886)</u>           |
| Net assets at beginning of period.....  | 2,355,868                 | 2,215,828                 | 3,046,630                 | 3,046,632                 | 2,934,413                 |
| Net assets at end of period.....  | <u><b>\$2,215,828</b></u> | <u><b>\$3,046,630</b></u> | <u><b>\$2,934,412</b></u> | <u><b>\$3,028,935</b></u> | <u><b>\$2,863,527</b></u> |

## **Management's Discussion of Historical Operating Results**

### ***Five-month period ending November 30, 2011 compared to five-month period ending November 30, 2010***

The Authority's net assets decreased by \$53.2 million, primarily as the net result of a decrease of \$4.7 million in operating revenues, an increase of \$30.0 million in total operating expenses, including depreciation and amortization, an increase of \$28.6 million in non-operating expenses, and an increase of \$10.1 million in capital contributions.

Although payroll and related expenses decreased \$5.3 million, operating expenses, excluding depreciation and amortization, increased by \$15.7 million mainly due to an increase of \$21.5 million in electricity expenses due to higher oil costs during the year. The decrease in the Service Contract - Superaqueduct expense is due to the termination of the service contract and the Authority's takeover of the operation of the NCS. The cost for fiscal year 2012 is assigned to each expense line instead of to the Service Contract - Superaqueduct expense line, which only includes the fee paid to the company contracted to operate this system. The increase of \$14.3 million in depreciation and amortization expense is due to the additions to the system.

The increase in non-operating expenses reflects an increase of \$8.9 million in interest expense and a reduction of \$20 million in the contributions made by the Commonwealth to pay for the Authority's debt service.

The increase in capital contributions is primarily due to contributions from United States Department of Agriculture - Rural Development for capital improvement projects.

### ***Fiscal Year 2011 compared to Fiscal Year 2010***

The Authority's net assets decreased by \$112.2 million, or 3.7%, primarily as the net result of an increase of \$96.3 million in operating revenues, an increase of \$77.6 million in total operating expenses, including depreciation and amortization, an increase of \$26.7 million in non-operating expenses, and a decrease of \$935.1 million in capital contributions.

Operating revenues increased by \$96.3 million, or 13.5%, as a result of a decrease in water and sewer revenues of \$19.8 million, a decrease in the provision for bad debts of \$31.2 million, and an increase of \$85.0 million in Commonwealth budgetary appropriations.

Although payroll and related expenses decreased \$15.1 million, operating expenses, including depreciation and amortization, increased by \$77.6 million, or 10%, mainly due to the following offsetting effects: the NCS service contract increased by \$5.7 million as a result of inflation and an increase in pass-through costs, such as electricity and fuel and chemicals, professional and consulting services increased by \$12.7 million, chemical expenses increased by \$3.2 million resulting from inflation and worldwide demand as they are mostly commodities, repairs and maintenance expenses increased by \$5.4 million, electricity expenses increased by \$16.5 million due to higher oil costs during the year, and depreciation and amortization expenses increased by \$49.3 million.

Capital contributions decreased by \$935.1 million, primarily because of a \$933.4 million decline in capital assets transferred by PRIFA. See explanation of this transfer below.

### ***Fiscal Year 2010 compared to Fiscal Year 2009***

The Authority's net assets increased by \$830.8 million, or 37%, primarily as the net result of an increase of \$8.3 million in water and wastewater revenues, an increase of \$2.9 million in total operating expenses, including depreciation, a decrease of \$18.2 million in non-operating expenses, and an increase of \$947.2 million in Commonwealth capital contributions.

Operating revenues increased by \$8.3 million, or 1%, due to an increase of \$3.4 million in water and wastewater revenues and a decrease of \$4.9 million in the provision for bad debts.

Operating expenses, including depreciation, increased by \$2.9 million, or 0.4%, primarily as a result of a decrease of \$13.5 million in payroll and related expenses, a decrease of \$2.6 million in the NCS service contract, an increase of \$3.6 million in professional and consulting services, a decrease of \$1 million in chemical expenses, an increase of \$7.9 million in repairs and maintenance expenses, an increase of \$3.6 million in electricity expenses, and an increase of \$8.1 million in depreciation expenses.

Capital contributions increased by \$947.2 million, as a result of the transfer by PRIFA to the Authority of capital assets constituting capital improvement projects that PRIFA undertook on behalf of the Authority in the amount of \$933.4 million.

### **Management's Discussion of Projected Operating Results**

The financial estimates and projections contained herein are subject to certain contingencies which cannot be quantified and are subject to the uncertainties inherent in any attempt to predict the results of future operations; accordingly, such forecasts are subject to periodic revision which may involve substantial changes. The Authority makes no representation or warranty that these estimates and projections will be realized. Moreover, the Authority has not met previously published projections.

The projections set forth below for the five fiscal years ending June 30, 2016 are based upon management's assumptions of future events and circumstances and sets forth the "base case" projections of Authority Revenues, Annual Debt Service, and ratios of Authority Revenues and Operating Revenues to Annual Debt Service. These projections assume, among other things, the funding of the Budgetary Reserve Fund with the proceeds of the Series A Bonds, the implementation of the Fiscal Oversight Agreement, and the Authority obtaining additional cash inflows from either Commonwealth budgetary appropriations or other unidentified measures, which may include rate adjustments, or a combination of the two. It is projected that expenses will increase primarily due to higher electricity and chemical costs, increases in payroll and benefits (as a result of salary increases over the forecast period), and less capitalized additional costs. The figures for Annual Debt Service assume that the Authority issues the 2012 Senior Bonds and certain additional Senior Bonds to provide funds for the Five-Year CIP and are reduced by the interest that is expected to be capitalized through the issuance of the 2012 Senior Bonds and future bond issues in the following amounts: \$37.0 million in July 1, 2012, \$54.6 million in January 1, 2013, \$63.1 million in July 1, 2013, \$6.2 million in July 1, 2014, \$3.9 million in July 1, 2015, and \$4.7 million in July 1, 2016. See PLAN OF FINANCING and Sources of Funds in CAPITAL IMPROVEMENT PROGRAM. A recitation of all the assumptions used in the preparation of the below projections and the conclusions of the Consulting Engineer concerning the projections of operating results presented below, is set forth in the Supplemental CE Report in *Appendix II*.

|  | <b>Fiscal Year Ending June 30,</b> |                 |                  |                  |                  |
|--|------------------------------------|-----------------|------------------|------------------|------------------|
|  | <b>2012</b>                        | <b>2013</b>     | <b>2014</b>      | <b>2015</b>      | <b>2016</b>      |
| <b>Revenues</b>  |                                    |                 | ('000s)          |                  |                  |
| Base Fee and Service Charges .....                                     | \$740,000                          | \$730,000       | \$730,000        | \$730,000        | \$730,000        |
| Average Annual Growth .....  | -                                  | -               | -                | -                | -                |
| Rate Increases (Additional).....                                       | -                                  | -               | -                | -                | -                |
| Rate Adjustments .....   | -                                  | -               | -                | -                | -                |
| Operational Initiatives .....  | 60,000                             | 60,000          | 60,000           | 44,000           | 45,000           |
| Reserve for Uncollectible Accounts.....                                | (54,309)                           | (75,190)        | (75,190)         | (75,190)         | (75,190)         |
| Collection Lag .....   | -                                  | -               | -                | -                | -                |
| Actual Collections Adjustment .....                                    | -                                  | -               | -                | -                | -                |
| Subsidies .....  | (16,000)                           | (16,000)        | (16,000)         | (16,000)         | (16,000)         |
| Other Income .....   | 4,000                              | 4,000           | 4,000            | 4,000            | 4,000            |
| Special Assessments.....   | 5,000                              | 3,000           | 3,000            | 3,000            | 3,000            |
| Interest Income .....  | -                                  | -               | -                | -                | -                |
| <b>Total Operating Revenues, Net .....</b>                             | <b>738,691</b>                     | <b>705,810</b>  | <b>705,810</b>   | <b>689,810</b>   | <b>690,810</b>   |
| <b>Additional Revenues</b>   |                                    |                 |                  |                  |                  |
| Budgetary Reserve Fund Draw .....                                      | 95,000                             | 145,000         | -                | -                | -                |
| Commonwealth Budgetary Appropriation.....                              | 70,264                             | -               | -                | -                | -                |
| Projected Additional Necessary Support*                                | -                                  | -               | 330,000          | 385,000          | 420,000          |
| <b>Total Additional Revenues.....</b>                                  | <b>165,264</b>                     | <b>145,000</b>  | <b>330,000</b>   | <b>385,000</b>   | <b>420,000</b>   |
| <b>Total Authority Revenues .....</b>                                  | <b>903,955</b>                     | <b>850,810</b>  | <b>1,035,810</b> | <b>1,074,810</b> | <b>1,110,810</b> |
| <b>Debt Service of Bonds and Other System Indebtedness</b>             |                                    |                 |                  |                  |                  |
| 1) Senior .....  | 90,600                             | 90,600          | 251,268          | 269,606          | 271,421          |
| 2) Senior Bond DSRF Replenishment .....                                | -                                  | -               | -                | -                | -                |
| 3) Senior Subordinate .....  | 6,696                              | -               | -                | -                | 9,310            |
| 4) Senior Subordinate DSRF Replenishment.....                          | -                                  | -               | -                | -                | -                |
| 5) Subordinate .....   | -                                  | -               | -                | -                | -                |
| <b>Total Debt Service of Bonds and Other System Indebtedness .....</b> | <b>97,296</b>                      | <b>90,600</b>   | <b>251,268</b>   | <b>269,606</b>   | <b>280,079</b>   |
| <b>Revenues Available for Operating Expenses .....</b>                 | <b>806,660</b>                     | <b>760,210</b>  | <b>784,542</b>   | <b>805,204</b>   | <b>830,079</b>   |
| <b>Operating Expenses</b>  |                                    |                 |                  |                  |                  |
| Payroll and Related .....  | 283,493                            | 292,123         | 296,819          | 301,474          | 307,954          |
| Electric Power .....   | 175,000                            | 180,250         | 185,658          | 191,227          | 196,964          |
| Chemicals .....  | 30,000                             | 30,900          | 31,827           | 32,782           | 33,765           |
| Service Contract - Superaqueduct.....                                  | 26,900                             | 27,169          | 27,441           | 27,715           | 27,992           |
| Insurance.....   | 12,410                             | 12,782          | 13,166           | 13,561           | 13,968           |
| Other Expenses.....  | 178,658                            | 173,220         | 178,416          | 183,768          | 189,281          |
| Capitalized Operating Expenses.....                                    | (39,422)                           | (40,837)        | (41,800)         | (42,780)         | (43,886)         |
| <b>Total Operating Expenses.....</b>                                   | <b>667,039</b>                     | <b>675,607</b>  | <b>691,527</b>   | <b>707,747</b>   | <b>726,038</b>   |
| <b>Revenues Available for Other Debt Service.....</b>                  | <b>139,621</b>                     | <b>84,603</b>   | <b>93,015</b>    | <b>97,457</b>    | <b>104,041</b>   |
| <b>Other Debt Service</b>  |                                    |                 |                  |                  |                  |
| 1) LOC Fees for Operating Reserve Funds.....                           | -                                  | -               | -                | -                | -                |
| 2) Capital Improvement Fund .....                                      | -                                  | -               | -                | -                | -                |
| 3) Commonwealth Guaranteed Indebtedness .....                          | 109,649                            | 80,934          | 84,593           | 87,296           | 86,496           |
| 4) Commonwealth Supported Obligations.....                             | 27,714                             | -               | -                | 1,594            | 8,999            |
| <b>Total Other Debt Service .....</b>                                  | <b>137,363</b>                     | <b>80,934</b>   | <b>84,593</b>    | <b>88,890</b>    | <b>95,495</b>    |
| <b>Remaining Revenues.....</b>   | <b>\$ 2,258</b>                    | <b>\$ 3,669</b> | <b>\$ 8,422</b>  | <b>\$ 8,567</b>  | <b>\$ 8,546</b>  |
| <b>Debt Service Coverage<sup>†</sup></b>                               |                                    |                 |                  |                  |                  |
| Senior   |                                    |                 |                  |                  |                  |
| Authority Revenues   | 9.98x                              | 9.39x           | 4.12x            | 3.99             | 4.09x            |
| Operating Revenues   | 8.15x                              | 7.79x           | 2.81x            | 2.56x            | 2.55x            |
| Senior and Senior Subordinate  |                                    |                 |                  |                  |                  |
| Authority Revenues   | 9.29x                              | 9.39x           | 4.12x            | 3.99x            | 3.96x            |
| Operating Revenues   | 7.59x                              | 7.79x           | 2.81x            | 2.56x            | 2.46x            |
| Other Debt Service   |                                    |                 |                  |                  |                  |
| Revenues Available for Other Debt Service                              | 1.02x                              | 1.05x           | 1.10x            | 1.10x            | 1.09x            |
| Rate Covenant (coverage > 1x)  | 1.00x                              | 1.00x           | 1.01x            | 1.01x            | 1.01x            |

\* Represents the additional revenues necessary to meet debt service and operating expenses, which would have to come from an increase in rates, additional Commonwealth budgetary appropriations or the implementation of further revenue raising and/or expense reduction measures.

† Includes debt service requirements for (i) the outstanding Senior Bonds, (ii) 2012 Senior Bonds expected to be issued at prevailing market rates, and (iii) Senior Bonds and Senior Subordinate Bonds expected to be issued in each of fiscal years 2013-2016 to fund the Five-Year CIP at an assumed interest rate of 6% with interest capitalized for five months. See PLAN OF FINANCING and "Sources of Funds" under CAPITAL IMPROVEMENT PROGRAM. Actual Debt Service will vary based on the actual principal and interest on the future Senior Bonds and Senior Subordinate Bonds issued and no assurance can be given that the assumed Debt Service will match the projections provided on the table.

## PUERTO RICO INFRASTRUCTURE FINANCING AUTHORITY

PRIFA was created (i) for the purpose of providing financial, administrative, consulting, technical, advisory, managerial and other types of assistance to other public corporations and governmental instrumentalities of the Commonwealth authorized to develop infrastructure facilities, and (ii) to establish alternate means for financing infrastructure facilities. The Board of Directors of PRIFA is composed of the Board of Directors of Government Development Bank (the “GDB Board”) and the Secretary of the Treasury of the Commonwealth (in the event he is not a member of GDB Board). Since its creation in 1988, PRIFA has provided substantial financial and other assistance to the Authority by issuing its bonds (secured by a portion of certain federal excise taxes on alcoholic beverages, which taxes are paid by the United States into the Treasury of Puerto Rico and assigned to PRIFA by the Commonwealth) to finance a portion of the Five-Year CIP and administering the operation of and providing other financial assistance to the Authority in connection with the Revolving Funds (described above in “Commonwealth Guaranteed Indebtedness–Revolving Funds” under DEBT).

### **The PRIFA-PRASA Agreement**

The Authority and PRIFA have entered into an agreement (the “PRIFA-PRASA Agreement”) which provides a contractual framework for PRIFA to assist the Authority to implement the capital improvement program and improve the operation and maintenance of the Systems. Until these objectives are met, the Authority is subject to a “special period” during which the Authority must provide PRIFA with reports regarding the Authority’s infrastructure and/or its operation and financial condition and special reports that PRIFA deems necessary by reason of the conditions that warrant a “special period”. The “special period” will continue until, among other things, (1) the Authority has delivered to PRIFA an acceptable report showing that the Systems are being properly maintained and operated in compliance with material environmental laws, regulations, permits and orders, and that the Authority is implementing substantially the provisions of its capital improvement program; and (2) PRIFA has determined that the Authority is able to finance its capital improvements on acceptable terms.

Under the PRIFA-PRASA Agreement, PRIFA may not take actions which would cause the Authority to be in violation of the Trust Agreement. PRIFA shall not be deemed to be acting on behalf of or have incurred any liability in respect of the holders or Beneficial Owners of 2012 Senior Bonds, notwithstanding that PRIFA has taken or not taken any action which has an effect on the Authority.

In fiscal year 2006 PRIFA transferred to the Authority primary responsibility for undertaking and implementing projects that were being developed by PRIFA as of that date. Projects undertaken and completed by PRIFA or as to which PRIFA provided financial assistance, were transferred to the Authority in fiscal year 2010 for the amount of \$933.4 million.

## LITIGATION

There is no pending litigation of any nature restraining or enjoining or seeking to restrain or enjoin the issuance, sale or delivery of the 2012 Senior Bonds or in any way contesting or affecting the validity of the 2012 Senior Bonds, the resolutions or the proceedings of the Authority taken with respect to the authorization, issuance or sale thereof, or the pledge or application of any moneys under the Trust Agreement or the existence or powers of the Authority.

The Authority is a defendant in litigation brought by the United States for the purpose of enforcing compliance with the Clean Water Act and Safe Drinking Water Act. See “Regulatory Compliance” in ENVIRONMENTAL MATTERS.

The Authority is a defendant in various lawsuits arising in the normal course of its business, including contract, construction and miscellaneous environmental claims. In the opinion of the Authority and its General Counsel, the ultimate disposition of such existing proceedings will not have a material adverse effect on the financial position or operations of the Authority. Additional information relating to Authority lawsuits can be found in note 20 of the Authority’s basic financial statements in *Appendix I*.

## TAX MATTERS

The following is a summary of the opinion of Pietrantoní Méndez & Álvarez LLC, counsel to the Underwriter and Special Puerto Rico Tax Counsel, regarding certain Puerto Rico and United States federal tax consequences of the ownership of the Series B Bonds by Puerto Rico residents.

**This section does not purport to cover all of the Puerto Rico and United States federal tax consequences arising from the purchase and ownership of the Series B Bonds. The following is based upon laws, regulations, judicial decisions and administrative pronouncements now in effect and subject to change, and any change may apply retroactively and affect the accuracy of the opinions, statements and conclusions set forth in this discussion. You should consult your independent tax advisor as to the application to your particular situation of the tax discussion described below, as well as the effect of any foreign, state or other laws.**

An opinion of counsel represents only such counsel's best legal judgment and is not binding on the Treasury Department, any municipality or agency of Puerto Rico, the Internal Revenue Service (the "IRS") or the courts. Accordingly, there can be no assurance that the opinions set forth herein, if challenged, would be sustained. Moreover, this section is not to be construed as a substitute for careful tax planning. Prospective investors are urged to consult their own tax advisors with specific reference to their own tax situations, including the application and effect of other tax laws and any possible changes in the tax laws after the date of this official statement.

In the opinion of Pietrantoní Méndez & Álvarez LLC, under the provisions of the Acts of Congress and the laws of Puerto Rico in force as of the date of issuance of the Series B Bonds:

1. Interest on the Series B Bonds is:
  - (a) exempt from Puerto Rico income taxes under Section 1031.02(a)(3)(B) of the Internal Revenue Code for a New Puerto Rico, Act No. 1-2011 of the Legislature of Puerto Rico, approved January 31, 2011, as amended (the "PR Code") and Section 15 of the Act;
  - (b) excluded under Section 1022.04(b)(2) of the PR Code from the "adjusted net book income" of a corporation for purposes of computing the alternative minimum tax imposed by Section 1022.03(a) of the PR Code;
  - (c) exempt from the Puerto Rico alternative basic tax under Section 1021.02(a)(2) of the PR Code; and
  - (d) exempt from Puerto Rico municipal license taxes under Section 9(25) of the Puerto Rico Municipal License Tax Act of 1974, as amended.
2. The Series B Bonds are exempt from Puerto Rico personal property tax pursuant to Section 3.11 of the Puerto Rico Municipal Property Tax Act of 1991, as amended, and Section 3 of the Puerto Rican Federal Relations Act.
3. The Series B Bonds are exempt from Puerto Rico (i) gift tax with respect to donors who are residents of Puerto Rico at the time the gift is made and (ii) estate tax with respect to estates of decedents who are residents of Puerto Rico at the time of death and who acquired their United States citizenship solely by reason of birth or residence in Puerto Rico.
4. The Series B Bonds will be considered an obligation of an instrumentality of Puerto Rico for purposes of: (i) the non-recognition of gain rules under Section 1034.04(f)(2)(A) of the PR Code applicable to certain involuntary conversions; and (ii) the exemption from the surtax imposed by Section 1022.05 of the PR Code available to corporations and partnerships that have a certain percentage of their net income invested in obligations of instrumentalities of Puerto Rico and certain other investments pursuant to Section 1022.05(g) of the PR Code.

5. Interest on the Series B Bonds constitutes industrial development income under Section 2(j) of the Economic Incentives for the Development of Puerto Rico Act, or under analogous provisions of similar prior acts (collectively referred to as the “Acts”), when received by a holder of a grant of tax exemption issued under any of the Acts that acquired the bonds with eligible funds, as such term is defined in the Acts.

The PR Code does not contain any provisions regarding the treatment of the excess of a Series B Bond’s redemption price at maturity over its initial issue price (original issue discount). However, under the administrative practice followed by the Treasury Department with respect to the repealed Puerto Rico Internal Revenue Code of 1994, original issue discount was treated as interest.

Prospective owners of the Series B Bonds should be aware that, pursuant to Section 1033.17(a)(10) of the PR Code, ownership of the Series B Bonds may, under certain circumstances, result in a disallowance, for Puerto Rico income tax purposes, of interest expense related to an investment in the Series B Bonds.

IRS Circular 230 Disclosure: The following U.S. tax discussion is general in nature and is not intended to be a tax opinion or tax advice. The U.S. tax discussion was prepared to support the promotion and marketing of the Series B Bonds. No taxpayer can rely on the U.S. tax discussion to avoid penalties that may be imposed on the taxpayer by the IRS. Each prospective purchaser should seek advice from an independent tax advisor about the tax consequences under its own particular circumstances of investing in the Series B Bonds.

Based upon the provisions of the United States Internal Revenue Code of 1986, as amended (the “US Code”), now in force and the rules and regulations thereunder, in the opinion of Pietrantoní Méndez & Alvarez LLC:

1. Interest or original issue discount on the Series B Bonds owned by an individual is excludable from the gross income of the individual for United States federal income tax purposes under Section 933 of the US Code if (a) the individual is a bona fide resident of Puerto Rico during the entire taxable year in which such interest or original issue discount is to be recognized for purposes of the US Code and (b) such interest or original issue discount is not, and is not treated as, income effectively connected with, or attributable to, the conduct of a trade or business within the United States by such individual under the US Code.

2. Interest or original issue discount on the Series B Bonds derived by a corporation organized under the laws of Puerto Rico or by any foreign corporation for purposes of the US Code is not subject to United States federal income tax under the US Code if: (a) such interest or original issue discount is not, and is not treated as, income effectively connected with, or attributable to, the conduct of a trade or business in the United States by such corporation under the US Code; (b) such corporation is not a controlled foreign corporation or a passive foreign investment company under the US Code; and (c) such corporation is not treated as a domestic corporation for purposes of the US Code.

3. United States taxpayers, other than individuals who comply with the requirements set forth below, may be subject to federal income tax on any gain realized upon sale of the Series B Bonds. Pursuant to Notice 89-40, issued by the United States Internal Revenue Service on March 27, 1989, and the regulations issued under Section 937 of the US Code, the gain from the sale of the Series B Bonds by an individual who is a bona fide resident of Puerto Rico will constitute Puerto Rico source income, and therefore will qualify for exclusion from gross income under Section 933 of the US Code, provided (i) said Series B Bonds do not constitute inventory in the hands of such individual, (ii) such gain is not attributable to an office or fixed place of business of the individual located outside of Puerto Rico and (iii) the individual has been a bona fide resident of Puerto Rico for the shorter of (1) the full period during which the individual has owned the Series B Bonds or (2) each of the ten years preceding the year of the sale. In the case the individual is a bona fide resident of Puerto Rico for the tax year for which the source of income must be determined and the individual was a United States citizen or resident (other than a bona fide resident of Puerto Rico) for any of the ten years preceding said year, the individual may elect to treat as gain from sources within Puerto Rico the portion of the gain attributable to the individual’s holding period in Puerto Rico.

Special Puerto Rico Tax Counsel’s opinion is limited to the above, and Special Puerto Rico Tax Counsel has not expressed any other opinion regarding the Puerto Rico or United States federal tax consequences arising



from ownership or disposition of the Series B Bonds. Such opinion is based upon Special Puerto Rico Tax Counsel's reliance upon the continued accuracy of the representations, warranties and covenants made by the the Authority in the Contract of Purchase.

Prospective owners of the Series B Bonds should consult their tax advisors with respect to the precise determination of the Puerto Rico and United States federal tax consequences arising from ownership or disposition of the Series B Bonds.

### CONTINUING DISCLOSURE

In accordance with the requirements of Rule 15c2-12, as amended (the "Rule"), promulgated by the SEC, the Authority has covenanted in a Continuing Disclosure Agreement for the benefit of the Beneficial Owners (as defined in such Continuing Disclosure Agreement and, generally, the tax owners of the 2012 Senior Bonds):

(a) to file within 275 days after the end of each fiscal year with EMMA (<http://emma.msrb.org>) established by the MSRB, core financial information and operating data for the prior fiscal year, including (i) the Authority's audited financial statements, prepared in accordance with generally accepted accounting principles in effect from time to time, and (ii) material historical quantitative data (including financial information and operating data) on the Authority's System and revenues, expenditures, financial operations and indebtedness generally found in this Official Statement (but excluding the Commonwealth's Annual Financial Report and the Commonwealth Report incorporated by reference herein); and

(b) to file in a timely manner, not in excess of ten business days after the occurrence of the event, with the MSRB through EMMA, notice of failure of the Authority to comply with clause (a) above and notice of any of the following events with respect to the 2012 Senior Bonds:

1. principal and interest payment delinquencies;
2. non-payment related defaults, if material;
3. unscheduled draws on debt service reserves reflecting financial difficulties;
4. unscheduled draws on credit enhancements reflecting financial difficulties;
5. substitution of credit or liquidity facility providers, or their failure to perform;
6. adverse tax opinions, the issuance by the IRS of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB) or other material notices or determinations with respect to the tax status of the Bonds, or other material events affecting the tax status of the 2012 Senior Bonds;
7. modifications to rights of the holders (including Beneficial Owners) of the 2012 Senior Bonds, if material;
8. 2012 Senior Bond calls, if material;
9. defeasances;
10. release, substitution, or sale of property securing repayment of the 2012 Senior Bonds, if material;
11. rating changes;
12. tender offers;
13. bankruptcy, insolvency, receivership, or similar proceeding of the Authority;
14. the consummation of a merger, consolidation or acquisition involving the Authority or the sale of substantially all of the assets of the Authority, other than in the ordinary course of business, the entry into a definitive agreement to undertake such action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material; and

15. the appointment of a successor or additional trustee, or the change of name of a trustee, if material.

With respect to event (4) and (5), the Authority does not undertake to provide any notice with respect to credit enhancement added after the primary offering of the 2012 Senior Bonds, unless the Authority applies for or participates in obtaining the enhancement.

With respect to event (8), the Authority does not undertake to provide notice of a mandatory scheduled redemption not otherwise contingent upon the occurrence of an event if (i) the terms, dates and amounts of redemption are set forth in detail in this Official Statement under “Redemption” under THE SERIES B BONDS above, (ii) the only open issue is which 2012 Senior Bonds will be redeemed in the case of a partial redemption, (iii) notice of redemption is given to the Beneficial Owners as required under the terms of the 2012 Senior Bonds, (iv) public notice of the redemption is given pursuant to the Release Number 34-23856 of the SEC under the 1934 Act, even if the originally scheduled amounts are reduced by prior optional redemptions or bond purchases.

According to the Rule, event (13) is considered to occur when any of the following occur: the appointment of a receiver, fiscal agent or similar officer for an obligated person in a proceeding under the United States Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the obligated person, or if such jurisdiction has been assumed by leaving the existing governing body and officials or officers in possession but subject to the supervision and orders of a court or governmental authority, or the entry of an order confirming a plan of reorganization, arrangement or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the obligated person.

The Authority may from time to time choose to provide notice of the occurrence of certain other events in addition to those listed above if, in the judgment of the Authority, such other event is material with respect to the 2012 Senior Bonds, but the Authority does not undertake to provide any such notice of the occurrence of any material event except those events listed above.

The Authority has made similar continuing disclosure covenants in connection with prior bond issuances, and has complied with all such covenants.

No Beneficial Owner may institute any suit, action or proceeding at law or in equity (“Proceeding”) for the enforcement of the continuing disclosure undertaking (the “Undertaking”) or for any remedy for breach thereof, unless such Beneficial Owner shall have filed with the Authority evidence of ownership and a written notice of and request to cure such breach, the Corporation shall have refused to comply within a reasonable time and such Beneficial Owner stipulates that (a) no challenge is made to the adequacy of any information provided in accordance with the Undertaking and (b) no remedy is sought other than substantial performance of the Undertaking. All Proceedings shall be instituted only as specified herein, in any Commonwealth court located in the Municipality of San Juan, Puerto Rico, and for the equal benefit of all beneficial owners of the outstanding bonds benefited by the same or a substantially similar covenant, and no remedy shall be sought or granted other than specific performance of the covenant at issue.

An amendment to the Undertaking may only take effect if:

- (a) the amendment is made in connection with a change in circumstances that arises from a change in legal requirements, change in law, or change in the identity, nature, or status of the Authority, or type of business conducted; the Undertaking, as amended, would have complied with the requirements of the Rule at the time of award of a series of bonds, after taking into account any amendments or interpretations of the Rule, as well as any change in circumstances; and the amendment does not materially impair the interests of Beneficial Owners of bonds, as determined by parties unaffiliated with the Authority (such as, but without limitation, the Authority’s financial advisor or bond counsel); or

(b) all or any part of the Rule, as interpreted by the staff of the SEC at the date of the issue of a series of bonds ceases to be in effect for any reason, and the Authority elects that the Undertaking shall be deemed terminated or amended (as the case may be) accordingly.

For purposes of the Undertaking, a beneficial owner of a bond includes any person who, directly or indirectly, through any contract, arrangement, understanding, relationship, or otherwise has or shares investment power which includes the power to dispose, or to direct the disposition of, such bond, subject to certain exceptions as set forth in the Undertaking. Any assertion of beneficial ownership must be filed, with full documentary support, as part of the written request described above.

### **ELIGIBILITY OF 2012 SENIOR BONDS**

The 2012 Senior Bonds will be eligible for deposit by banks in Puerto Rico to secure public funds and will be approved investments for insurance companies to qualify them to do business in Puerto Rico as required by law.

### **UNDERWRITING**

The Underwriters have agreed jointly and severally, subject to certain conditions, to purchase the Series B Bonds from the Authority at a discount of \$3,069,671.47 from the initial public offering prices set forth (or derived from information set forth) on the inside cover page. The Underwriters are obligated to take up and pay for all of such Series B Bonds if any are taken. The obligation of the Underwriters to purchase such Bonds is subject to certain conditions. Such Series B Bonds may be offered and sold to certain dealers (including dealers depositing them into investment trusts) and institutional purchasers at prices lower than the public offering prices which may be changed, from time to time, by the Underwriters.

The Authority has agreed to indemnify the Underwriters against certain liabilities, including liabilities under the federal securities laws.

The Underwriters and their respective affiliates are financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, principal investment, hedging, financing and brokerage activities. Certain of the Underwriters and their respective affiliates have, from time to time, performed, and may in the future perform, various investment banking services for the Authority, the Commonwealth and/or its instrumentalities, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the Underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (which may include bank loans and/or credit default swaps) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve securities and instruments of the Authority, the Commonwealth and/or its instrumentalities.

Santander Securities LLC (“Santander Securities”) and Merrill Lynch, Pierce, Fenner & Smith Incorporated (“Merrill”) have entered into an agreement pursuant to which they will provide services and advice to each other related to the structuring and execution of certain municipal finance transactions for the Commonwealth’s governmental entities in the global capital markets and in the United States market and in the Puerto Rico market if issued in connection with such global or United States issuances. Santander Securities and Merrill will be entitled to receive a portion of each other’s revenues from the underwriting of the Series B Bonds as consideration for their professional services.

Citigroup Inc., parent company of Citigroup Global Markets Inc., an underwriter of the Series B Bonds, has entered into a retail brokerage joint venture with Morgan Stanley. As part of the joint venture, Citigroup Global Markets Inc. will distribute municipal securities to retail investors through the financial advisor network of a new broker-dealer, Morgan Stanley Smith Barney LLC. This distribution arrangement became effective on June 1, 2009.

As part of this arrangement, Citigroup Global Markets Inc. will compensate Morgan Stanley Smith Barney LLC for its selling efforts with respect to the Series B Bonds.

J.P. Morgan Securities LLC (“JPMS”), one of the Underwriters of the Series B Bonds, has entered into a negotiated dealer agreement (the “Dealer Agreement”) with Charles Schwab & Co., Inc. (“CS&Co.”) for the retail distribution of certain securities offerings at the original issue prices. Pursuant to the Dealer Agreement, CS&Co. will purchase Series B Bonds from JPMS at the original issue price less a negotiated portion of the selling concession applicable to any Series B Bonds that CS&Co. sells. JPMS has also entered into an agreement with FirstBank Puerto Rico Securities Corp. to assist the Commonwealth, its public corporations, agencies, instrumentalities, and municipalities in structuring and facilitating the issuance of certain municipal securities. Pursuant to the terms of the agreement and in compliance with applicable rules, compensation with respect to the underwriting of such municipal securities will be allocated between the parties.

Oriental Financial Services Corp. (“Oriental”) and Raymond James & Associates, Inc. (“Raymond James”) have entered into an agreement under which the parties provide services and advice to each other to assist the Commonwealth and its issuers in the structuring and execution of their municipal securities offerings. As part of the agreement, Oriental and Raymond James share in the risk from the underwriting of the Series B Bonds as part of the consideration for their professional services.

#### **MATERIAL RELATIONSHIPS**

The Consulting Engineer has been engaged to provide consulting and engineering services to the Authority as required by the Trust Agreement. The Consulting Engineer’s Report is included in *Appendix II* in reliance on the expertise and consent of the Consulting Engineer.

Merrill, the lead underwriter for the 2012 Senior Bonds, has purchased a bond anticipation note from the Authority in an aggregate principal amount of \$241 million, all of which is currently outstanding. This bond anticipation note is expected to be repaid with the proceeds of the Series B Bonds.

#### **COMMONWEALTH COVENANT**

The Commonwealth has pledged to all holders of the Bonds that it will not limit or alter the rights or powers vested in the Authority by the Act so as to impair the rights of such holders until the Bonds and the interest thereon are fully met and discharged.

#### **GOVERNMENT DEVELOPMENT BANK FOR PUERTO RICO**

As required by Act No. 272 of the Legislature of Puerto Rico, approved May 15, 1945, as amended, Government Development Bank has acted as financial advisor to the Authority in connection with the Series B Bonds offered hereby. As financial advisor, Government Development Bank participated in the selection of the Underwriters of the Bonds. Certain of the Underwriters have been selected by Government Development Bank to serve from time to time as underwriters of its obligations and the obligations of the Commonwealth, its instrumentalities and public corporations. Certain of the Underwriters or their affiliates also participate in other financial transactions with Government Development Bank.

#### **LEGAL MATTERS**

Legal matters incident to the authorization, issuance, sale and delivery of the Series B Bonds are subject to the unqualified approving legal opinion of Nixon Peabody LLP, New York, New York. The form of opinion of Bond Counsel is set forth in *Appendix IV*. Pietrantonio Mendez & Alvarez LLC, San Juan, Puerto Rico, will pass upon certain legal matters for the Underwriters and will act as Special Puerto Rico Tax Counsel. The form of opinion of Special Tax Counsel is set forth in *Appendix V*. Certain legal matters will be passed upon for the Authority by its Special Counsel, Cancio Covas & Santiago, LLP, San Juan, Puerto Rico.

## INDEPENDENT AUDITORS

The financial statements of the Authority as of and for the years ended June 30, 2011 and 2010 included in *Appendix I* hereto have been audited by Ernst & Young LLP, San Juan, Puerto Rico, independent auditors, as stated in their report appearing therein.

The prospective financial information included in this Official Statement has been prepared by, and is the responsibility of the management of the Authority. Ernst & Young LLP has neither examined nor compiled the accompanying prospective financial information, and accordingly, Ernst & Young LLP does not express an opinion or any other form of assurance with respect thereto. The Ernst & Young LLP report for fiscal years 2011 and 2010 included in *Appendix I* to this Official Statement relates to the historical financial information of the Authority. Such report does not extend to the prospective financial information and should not be read to do so.

## RATINGS

The 2012 Senior Bonds have been assigned a rating of “Baa2” (negative outlook) by Moody’s, “BBB-” (stable outlook) by S&P and “BBB” (stable outlook) by Fitch.

Ratings reflect only the respective views of the rating agencies and an explanation of the significance of each rating may be obtained only from the respective rating agency. Such rating agencies were provided with materials relating to the Authority and the 2012 Senior Bonds and other relevant information, and no application has been made to any other rating agency for the purpose of obtaining a rating on the 2012 Senior Bonds.

There is no assurance that such ratings will remain in effect for any given period of time or that they will not be revised downward or withdrawn entirely by any or all of such rating agencies, if in the judgment of any or all, circumstances so warrant. Any such downward revision or withdrawal of such ratings, or either of them, may have an adverse effect on the market prices of the Bonds.

## MISCELLANEOUS

The foregoing references to and summaries of certain federal, Commonwealth and local laws, including, but not limited to, the laws of the Commonwealth, the Act, the Clean Water Act, the Safe Drinking Water Act, and documents, agreements and court decisions, orders and decrees, including but not limited to, the 2006 EPA Consent Decree, the 2010 EPA Consent Decree, the 2006 Drinking Water Settlement Agreement, the Trust Agreement and the 2012 Series Supplement, are made subject to all the detailed provisions thereof. Such references and summaries do not purport to be complete and are qualified in their entirety by reference to such acts, laws, documents, agreements or decisions. Copies of the Trust Agreement and the 2012 Series Supplement are available for inspection during regular business hours at the office of Government Development Bank, Roberto Sánchez Vilella Government Center, Avenida de Diego, Parada 22, San Juan, Puerto Rico 00940, telephone number (787) 722-2525, or at the principal corporate trust office of the Trustee.

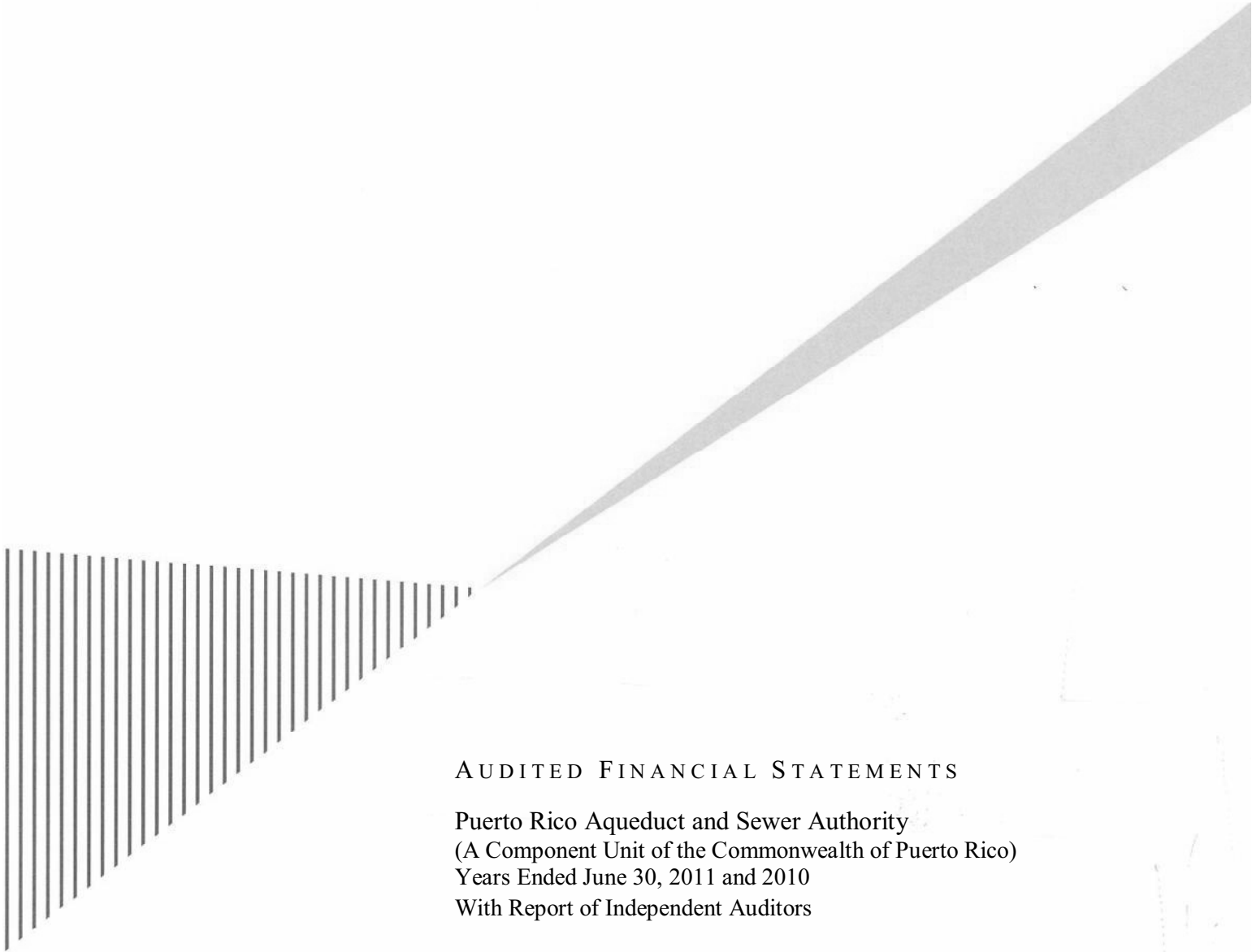
Any statements in this Official Statement involving matters of opinion, whether or not expressly so stated, are intended as such and not as representations of fact.

This Official Statement will be filed with the MSRB through EMMA.

This Official Statement has been duly authorized, executed and delivered by the Authority.

There are appended to this Official Statement: in *Appendix I*, the financial statements of the Authority for the fiscal years ended June 30, 2011 and June 30, 2010, together with the independent accountants’ report of Ernst & Young LLP; in *Appendix II*, the Consulting Engineer’s Report; in *Appendix III*, a summary of the Trust Agreement and a summary of a proposed amendment to the Trust Agreement; in *Appendix IV*, the proposed form of opinion of Nixon Peabody LLP, Bond Counsel; and in *Appendix V*, the proposed form of opinion of Pietrantonio Méndez & Alvarez LLC, Special Puerto Rico Tax Counsel.





AUDITED FINANCIAL STATEMENTS

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)  
Years Ended June 30, 2011 and 2010  
With Report of Independent Auditors

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Audited Financial Statements

Years Ended June 30, 2011 and 2010

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## Report of Independent Auditors

The Board of Directors  
Puerto Rico Aqueduct and Sewer Authority

We have audited the accompanying balance sheets of the Puerto Rico Aqueduct and Sewer Authority, a component unit of the Commonwealth of Puerto Rico (the Authority), as of June 30, 2011 and 2010, and the related statements of revenues, expenses and changes in net assets and cash flows for the years then ended. These financial statements are the responsibility of the Authority's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. We were not engaged to perform an audit of the Authority's internal control over financial reporting. Our audit included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Authority's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Puerto Rico Aqueduct and Sewer Authority at June 30, 2011 and 2010, and the changes in its financial position and its cash flows for the years then ended in conformity with U.S. generally accepted accounting principles.

In accordance with *Government Auditing Standards*, we have also issued our report dated November 11, 2011, on our consideration of the Puerto Rico Aqueduct and Sewer Authority's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* and should be considered in assessing the results of our audit.

The management's discussion and analysis and schedule of funding progress for postemployment healthcare benefits on pages 3 through 20 and page 70 are not a required part of the basic financial statements but are supplementary information required by the *Governmental Accounting Standards Board*. We have applied certain limited procedures, which consisted principally of inquiries of management regarding the methods of measurement and presentation of the required supplementary information. However, we did not audit the information and express no opinion on it.

*Ernst + Young LLP*

November 11, 2011

Stamp No. 2614124  
affixed to  
original of  
this report.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Management's Discussion and Analysis

Year Ended June 30, 2011

As management of Puerto Rico Aqueduct and Sewer Authority (the Authority), we offer readers of the Authority's annual financial report our discussion and analysis of the Authority's financial performance during the fiscal years ended on June 30, 2011, 2010 and 2009. Please read it in conjunction with the Authority's financial statements, which follow this section.

**June 30, 2011 and 2010 Financial Highlights**

- The Authority's net assets decreased by \$112.2 million to \$2,934.4 million, or 3.7%, primarily as the net result of an increase in operating revenues of \$96.3 million, an increase in total operating expenses, including depreciation and amortization, of \$77.6 million, an increase in nonoperating expenses of \$26.7 million and a decrease of capital contributions of \$935.1 million.
- Operating revenues increased by \$96.3 million to \$809.1 million, or 13.5%, due to a decrease in water and sewer revenues of \$19.8 million, a decrease in the provision for bad debts of \$31.2 million and an increase of \$85.0 million from appropriations received from Central Government.
- Operating expenses, including depreciation and amortization, increased by \$77.6 million to \$848.7 million, or 10%, primarily as a result of a decrease in payroll and related expenses of \$15.1 million, an increase of the service contract of the Superaqueduct of \$5.7 million, an increase of professional and consulting services of \$12.7 million, an increase in chemical expenses of \$3.2 million, an increase in repairs and maintenance expenses of \$5.4 million, an increase in electricity expenses of \$16.5 million, and an increase in depreciation and amortization expense of \$49.3 million.
- Capital contributions decreased by \$935.1 million to \$34.3 million. For fiscal year ended June 30, 2010, the Puerto Rico Infrastructure Authority (PRIFA) transferred to the Authority capital assets in the amount of \$933.4 million. There were no capital assets transfers during the fiscal year ended June 30, 2011.
- Total assets increased by \$174.5 million to \$7,741.0 million or 2.3%, primarily due to an increase by \$127.0 million in the Authority's capital assets. Total liabilities increased by \$286.7 million to \$4,806.6 or 6.3%, primarily as a result of an increase in long term debt of \$312.1 million and a decrease in other liabilities of \$25.4 million.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**June 30, 2010 and 2009 Financial Highlights**

- The Authority's net assets increased by \$830.8 million to \$3,046.6 million, or 37%, primarily as the net result of an increase in water and sewer revenues of \$8.3 million, an increase in total operating expenses, including depreciation, of \$2.9 million, a decreased in non operating expenses of \$18.2 million and an increase of capital contributions of \$947.2 million.
- Operating revenues increased by \$8.3 million to \$712.8 million, or 1%, due to an increase in water and sewer revenues of \$3.4 million and a decrease in the provision for bad debts of \$4.9 million.
- Operating expenses, including depreciation, increased by \$2.9 million to \$771.1 million, or 0.4%, primarily as a result of a decrease in payroll and related expenses of \$13.5 million, a decrease of the service contract of the Superaqueduct of \$2.6 million, an increase of professional and consulting services of \$3.6 million, a decrease in chemical expenses of \$1.0 million, an increase in repairs and maintenance expense of \$7.9 million, an increase in electricity expense of \$3.6 million and an increase in depreciation expense of \$8.1 million.
- Capital contributions increased by \$947.2 million to \$969.4 million, primarily as a result of capital assets transferred by Puerto Rico Infrastructure Authority (PRIFA) for the amount of \$933.4 million.
- Total assets increased by \$1,082.8 million to \$7,566.5 million or 17%, primarily due to an increase by \$1,092.2 million in the Authority's capital assets transfer attributable to PRIFA. Total liabilities increased by \$252.0 million to \$4,519.9 million or 6%, primarily as a result of an increase in long term debt of \$358.7 million and a decrease in other liabilities of \$106.7 million.

**Overview of the Financial Statements**

This annual report includes the management's discussion and analysis report, the independent auditors' report, the basic financial statements and the required supplementary information of the Authority. The basic financial statements include notes that explain in more detail the information contained in the basic financial statements.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Financial Analysis of the Authority**

The balance sheets and the statement of revenues, expenses, and changes in net assets report the net assets of the Authority and the changes therein. The Authority's net assets – the difference between assets and liabilities – can be used to measure its financial health or financial position. Increases or decreases in the Authority's net assets are one indicator of whether its financial health is improving or deteriorating. However, other nonfinancial factors need to be considered such as changes in economic conditions and new or changed government regulations.

**Analysis of Financial Results**

The following table provides a summary of the Authority's net assets as of June 30 of the years indicated (in thousands):

|   | June 30             |                     | Change              |
|---|---------------------|---------------------|---------------------|
|   | 2011                | 2010                |                     |
| Current and other assets                        | \$ 529,006          | \$ 481,507          | \$ 47,499           |
| Capital assets, net                             | <u>7,212,020</u>    | <u>7,084,994</u>    | <u>127,026</u>      |
| Total assets                                    | <u>7,741,026</u>    | <u>7,566,501</u>    | <u>174,525</u>      |
| Long-term debt outstanding                      | 4,264,882           | 3,952,743           | 312,139             |
| Other liabilities                               | <u>541,732</u>      | <u>567,128</u>      | <u>(25,396)</u>     |
| Total liabilities                               | <u>4,806,614</u>    | <u>4,519,871</u>    | <u>286,743</u>      |
| Net assets:                                     |                     |                     |                     |
| Invested in capital assets, net of related debt | 3,374,252           | 3,544,720           | (170,468)           |
| Restricted                                      | 24,482              | 17,642              | 6,840               |
| Unrestricted deficit                            | <u>(464,322)</u>    | <u>(515,732)</u>    | <u>51,410</u>       |
| Total net assets                                | <u>\$ 2,934,412</u> | <u>\$ 3,046,630</u> | <u>\$ (112,218)</u> |

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Analysis of Financial Results (continued)**

|   | June 30             |                     | Change            |
|---|---------------------|---------------------|-------------------|
|   | 2010                | 2009                |                   |
| Current and other assets                        | \$ 481,507          | \$ 490,941          | \$ (9,434)        |
| Capital assets, net                             | 7,084,994           | 5,992,747           | 1,092,247         |
| Total assets                                    | <u>7,566,501</u>    | <u>6,483,688</u>    | <u>1,082,813</u>  |
| Long-term debt outstanding                      | 3,952,743           | 3,594,067           | 358,676           |
| Other liabilities                               | 567,128             | 673,793             | (106,665)         |
| Total liabilities                               | <u>4,519,871</u>    | <u>4,267,860</u>    | <u>252,011</u>    |
| Net assets:                                     |                     |                     |                   |
| Invested in capital assets, net of related debt | 3,544,720           | 2,963,993           | 580,727           |
| Restricted                                      | 17,642              | 14,481              | 3,161             |
| Unrestricted deficit                            | <u>(515,732)</u>    | <u>(762,646)</u>    | <u>246,914</u>    |
| Total net assets                                | <u>\$ 3,046,630</u> | <u>\$ 2,215,828</u> | <u>\$ 830,802</u> |

**Net Assets**

***June 30, 2011 and 2010***

The Authority's net assets as of June 30, 2011 were approximately \$2,934.4 million. This is a \$112.2 million decrease from the net assets as of June 30, 2010 of \$3,046.6 million. Total assets increased by \$174.5 million during the fiscal year ended June 30, 2011. This is primarily a result of a net increase in capital assets of \$127.0 million due to current year net additions of \$328.0 million offset by current year depreciation and amortization of \$201.0 million.

Unrestricted and restricted cash and cash equivalents as of June 30, 2011, increased by \$49.9 million when compared with June 30, 2010. The increase is primarily due to deposits made to restricted accounts to pay debt service and reimbursement of funds requested for payment of capital projects. Accounts receivable, net, decreased by \$29.1 million primarily due the net effect of a decrease of \$1.7 million in accounts receivable from water and sewer services customers and an increase in the allowance for doubtful accounts of \$27.4 million.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Net Assets (continued)**

***June 30, 2011 and 2010 (continued)***

Total liabilities increased by \$286.7 million. This is primarily due to an increase of \$312.1 million in long-term debt outstanding, mainly representing the net effect of an (1) increase in lines of credit of \$278.7 million, (2) an increase in notes payable of \$34.7 million (3) a decrease in bonds payable of \$1.2 million. A decrease of \$25.4 million in other current and noncurrent liabilities is primarily due to an increase of \$16 million in accounts payable, a decrease in accrued liabilities of \$22.1 million, a decrease in accrued interest of \$20.3 million, and an increase of \$1 million in unearned revenues, accrued compensated absences and customer deposits.

***June 30, 2010 and 2009***

The Authority's net assets as of June 30, 2010 were approximately \$3,046.6 million. This is an \$830.8 million increase from the net assets as of June 30, 2009 of \$2,215.8 million. Total assets increased by \$1,082.8 million during the fiscal year ended June 30, 2010. This is primarily a result of a net increase in capital assets of \$1,092.2 million due to current year net additions of \$1,242.9 million offset by current year depreciation and amortization of \$150.6 million. This increase in capital assets is mainly due to the assets transferred from PRIFA for the amount of \$933.4 million.

Unrestricted and restricted cash and cash equivalents as of June 30, 2010, increased by \$13.6 million when compared with June 30, 2009. The increase is primarily due to deposits made to restricted accounts to pay debt service and reimbursement of funds requested for payment of capital projects. Accounts receivable, net, decreased by approximately \$22.8 million primarily due the net effect of an increase of \$35.5 million in accounts receivable from water and sewer services customers and an increase in the allowance for doubtful accounts of \$58.3 million.

Total liabilities increased by \$252.0 million. This is primarily due to an increase of \$358.7 million in long-term debt outstanding, mainly representing the net effect of an (1) increase in lines of credit of \$292.9 million, (2) an increase in notes payable of \$51.8 million (3) an increase in bonds payable of \$14 million to finance the Authority's capital improvement program. A decrease of \$106.7 million in other current and noncurrent liabilities is primarily due to a decrease of \$111.3 million in accounts payable, accrued liabilities and accrued interest and an increase of \$4.6 million customer's deposits and compensated absences and postemployment benefits.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Capital Assets**

Capital assets as of June 30, 2011 and 2010 were as follows (in thousands):

|   | June 30             |                     |                   |
|---|---------------------|---------------------|-------------------|
|   | 2011                | 2010                | Change            |
| Capital assets being depreciated          | \$ 8,276,363        | \$ 8,049,013        | \$ 227,350        |
| Accumulated depreciation and amortization | <u>(2,843,090)</u>  | <u>(2,642,053)</u>  | <u>(201,037)</u>  |
|   | 5,433,273           | 5,406,960           | 26,313            |
| Land and other nondepreciable assets      | 66,851              | 61,765              | 5,086             |
| Construction in progress                  | <u>1,711,896</u>    | <u>1,616,269</u>    | <u>95,627</u>     |
| Capital assets, net                       | <u>\$ 7,212,020</u> | <u>\$ 7,084,994</u> | <u>\$ 127,026</u> |

|   | June 30             |                     |                     |
|---|---------------------|---------------------|---------------------|
|   | 2010                | 2009                | Change              |
| Capital assets being depreciated          | \$ 8,049,013        | \$ 6,831,835        | \$ 1,217,178        |
| Accumulated depreciation and amortization | <u>(2,642,053)</u>  | <u>(2,491,389)</u>  | <u>(150,664)</u>    |
|   | 5,406,960           | 4,340,446           | 1,066,514           |
| Land and other nondepreciable assets      | 61,765              | 60,323              | 1,442               |
| Construction in progress                  | <u>1,616,269</u>    | <u>1,591,978</u>    | <u>24,291</u>       |
| Capital assets, net                       | <u>\$ 7,084,994</u> | <u>\$ 5,992,747</u> | <u>\$ 1,092,247</u> |

**June 30, 2011 and 2010**

The net increase of \$127.0 million in capital assets includes additions of \$328.0 million, reduced by \$201.0 million in depreciation and amortization. The \$328.0 million in capital investment is broken down as follows:

- \$277.9 million in the Authority's capital improvement program;
- \$50.1 million in renewal and replacement projects;

The Authority has approximately \$1,711.9 million in construction in progress as of June 30, 2011, and has construction commitments of approximately \$50.9 million.



Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Capital Assets (continued)**

***June 30, 2011 and 2010 (continued)***

On August 16, 2011, the Authority entered into an Asset Purchase Agreement (the Agreement) with the Puerto Rico Industrial, Tourism, Educational, Medical and Environmental Facilities Financing Authority (AFICA), a public corporation of the Commonwealth of Puerto Rico, to purchase certain assets that were being used to develop the Southern Gas Pipeline Project for a total purchase price of approximately \$23.5 million and assumed the rights and obligations of PREPA under a Subordinated Loan Agreement between AFICA and PREPA and a Subordinated Note and Loan Agreement of approximately \$31 million.

***June 30, 2010 and 2009***

The net increase of \$1,092.2 million in capital assets includes additions of \$1,242.8 million, reduced by \$150.6 million in depreciation and amortization. The \$1,242.8 million in capital investment is broken down as follows:

- \$261.6 million in the Authority's capital improvement program;
- \$47.8 million in renewal and replacement projects;
- \$933.4 million for projects transferred from PRIFA, component unit of the Commonwealth.

The Authority has approximately \$1,616.3 million in construction in progress as of June 30, 2010, and has construction commitments of approximately \$155 million.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Debt Administration**

Long-term debt for the years ended June 30, 2011 and 2010 was as follows (in thousands):

|   | June 30             |                     | Change            |
|---|---------------------|---------------------|-------------------|
|   | 2011                | 2010                |                   |
| Bonds payable:                                      |                     |                     |                   |
| 2001 Series A Commonwealth<br>Appropriation Bonds   | \$ 8,985            | \$ 17,600           | \$ (8,615)        |
| Act 164 PFC Commonwealth<br>Appropriation Bonds     | 341,565             | 341,565             | -                 |
| 2004 Series A Commonwealth<br>Appropriation Bonds   | 326,785             | 326,785             | -                 |
| Revenue Bonds:                                      |                     |                     |                   |
| 2008 Series A, Serial Bonds                         | 93,155              | 93,155              | -                 |
| 2008 Series A, Convertible Capital<br>Appreciation  | 155,975             | 146,843             | 9,132             |
| 2008 Series A Term Bonds                            | 1,095,125           | 1,095,125           | -                 |
| 2008 Series B Serial Bonds                          | 22,445              | 22,445              | -                 |
| 2008 Series A and B Revenue<br>Refunding Term Bonds | 284,755             | 284,755             | -                 |
| Rural Development Serial Bonds                      | 306,030             | 312,079             | (6,049)           |
| Add premium on bonds refunding                      | 34,609              | 36,316              | (1,707)           |
| Less :  |                     |                     |                   |
| Bond discount                                       | (15,805)            | (16,244)            | 439               |
| Deferred loss from refunding                        | (73,884)            | (79,445)            | 5,561             |
| Total bonds   | <u>\$ 2,579,740</u> | <u>\$ 2,580,979</u> | <u>\$ (1,239)</u> |

*(Continued)*

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Management's Discussion and Analysis (continued)

**Debt Administration (continued)**

|   | June 30      |              | Change     |
|---|--------------|--------------|------------|
|   | 2011         | 2010         |            |
| Bonds payable   | \$ 2,579,740 | \$ 2,580,979 | \$ (1,239) |
| Notes payable:  |              |              |            |
| Water Pollution Control and Drinking Water<br>Treatment Revolving Funds Loans | 413,449      | 375,793      | 37,656     |
| Notes with commercial banks   | 241,744      | 244,688      | (2,944)    |
| Total notes   | 655,193      | 620,481      | 34,712     |
| Lines of credit   | 1,029,949    | 751,283      | 278,666    |
| Long-term debt outstanding  | 4,264,882    | 3,952,743    | 312,139    |
| Other long term liabilities:  |              |              |            |
| Accrued compensated absences  | 46,442       | 49,338       | (2,896)    |
| Net OPEB obligation   | 17,148       | 12,453       | 4,695      |
| Early retirement obligation   | 2,308        | 3,639        | (1,331)    |
| Customer deposits   | 80,098       | 79,840       | 258        |
| Total other liabilities   | 145,996      | 145,270      | 726        |
| Total – long-term obligations   | 4,410,878    | 4,098,013    | 312,865    |
| Current portion   | 322,942      | 48,631       | –          |
| Long-term obligations, less<br>current portion                                | \$ 4,087,936 | \$ 4,049,382 | \$ 312,865 |

The Authority's long-term debt increased by \$312.1 million from \$3,952.7 million as of June 30, 2010, to \$4,264.9 million as of June 30, 2011.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Debt Administration (continued)**

*June 30, 2011*

Bonds Payable

Bonds outstanding as of June 30, 2011 decreased by \$1.2 million, mainly from the net effect of an increase in accreted value of 2008 Series A Revenue Bonds of \$9.1 million, and a decrease of \$14.6 million in payments of principal and an increase for the amortization of bonds discount, bonds premium, and bonds deferred lost from bonds refunding of \$4.3 million.

On September 14, 2011, the Authority issued approximately \$70.2 million of Series HH of USDA Rural Development Program Bonds, at a maximum interest of 4.25% of interest, payable semiannually and maturing in semiannual installments through July 1, 2051.

Notes Payable

The Authority finances the cost of design and construction of certain capital improvements projects with notes from the Puerto Rico Water Pollution Control Revolving Fund and the Puerto Rico Safe Drinking Water Treatment Revolving Loan Fund programs that bear interest at 2%. As of June 30, 2011, the Authority's loans outstanding under these programs amounted to approximately \$413.4 million. These loans increased approximately \$37.6 million due to the net effect of drawings of approximately \$55.1 million for payment of capital improvements and payment of principal on loans outstanding of approximately \$17.5 million.

On September 8, 2006, the Authority entered into a term loan agreement with various commercial banks amounting to \$250 million to repay various lines of credit with Government Development Bank (GDB) and to pay the costs associated with the loan. As of June 30, 2011, the outstanding balance of the term loan was approximately \$241.7 million. On August 17, 2011, the maturity date of this term loan was extended from September 1, 2011 to January 16, 2012. The Authority has plans to restructure its debt and is evaluating various alternatives.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Debt Administration (continued)**

***June 30, 2011 (continued)***

Lines of Credit

During 2011, the Authority entered into revolving lines of credit with GDB for the purpose of financing the Authority's capital improvement program for approximately \$21.7 million and \$250.0 million. As of June 30, 2011, approximately \$136.0 million under these lines of credit was outstanding.

The existing \$250.0 million line of credit was increased by approximately \$19.5 million to approximately \$269.0 million to pay accrued interest.

The existing \$269.0 million, \$87.6 million, \$125.0 million, \$36.7 million, \$150.0 million, \$70.0 million, and \$200.0 million capital improvement program revolving lines of credit with GDB had an outstanding balance as of June 30, 2011 of approximately \$893.9 million.

The \$150.0 million revolving line of credit with GDB for the purpose of financing the operating reserve, required by the Master Agreement of Trust securing its revenue bonds, had no outstanding balance as of June 30, 2011.

Detailed information regarding long-term debt activity is included in notes 9 through 13 to the financial statements.

***June 30, 2010***

Bonds Payable

Bonds outstanding as of June 30, 2010 increased by \$13.9 million, mainly from the net effect of an increase in accreted value of 2008 Series A Revenue Bonds of \$8.6 million, an increase of \$15 million on issuance of Rural Development Bonds Series GG, a decrease of \$14 million in payments of principal and an increase for the amortization of bonds discount, bonds premium, and bonds deferred lost from bonds refunding of \$4.3 million.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Debt Administration (continued)**

*June 30, 2010 (continued)*

Notes Payable

The Authority finances the cost of design and construction of certain capital improvements projects with notes from the Puerto Rico Water Pollution Control Revolving Fund and the Puerto Rico Safe Drinking Water Treatment Revolving Loan Fund programs that bear interest at 2%. As of June 30, 2010, the Authority's loans outstanding under these programs amounted to approximately \$375.8 million. These loans increased approximately \$54.6 million due to the net effect of drawings of approximately \$69.5 million for payment of capital improvements and payment of principal on loans outstanding of \$14.9 million.

On September 8, 2006, the Authority entered into a term loan agreement with various commercial banks amounting to \$250 million to repay various lines of credit with Government Development Bank (GDB) and to pay the costs associated with the loan. As of June 30, 2010, the outstanding balance of the term loan was \$244.7 million.

Lines of Credit

During 2010, the Authority entered into revolving lines of credit with GDB for the purpose of financing the Authority's capital improvement program for \$125 million, \$36.7 million, \$150 million, \$70 million and \$113 million. As of June 30, 2010, approximately \$413.7 million under these lines of credit was outstanding.

The existing \$250 million and \$87.6 million capital improvement program revolving lines of credit with GDB had an outstanding balance as of June 30, 2010 of \$250 million and \$87.6 million, respectively.

The \$150 million revolving line of credit with GDB for the purpose of financing the operating reserve, required by the Master Agreement of Trust securing its revenue bonds, had no outstanding balance as of June 30, 2010.

Detailed information regarding long-term debt activity is included in notes 9 through 13 to the financial statements.

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Summary of Revenues, Expenses, and Changes in Net Assets**

The following table provides a summary of the Authority's changes in net assets for the years ended June 30, 2011 and 2010 (in thousands):

|  | Years Ended June 30 |                     | Change              |
|--|---------------------|---------------------|---------------------|
|  | 2011                | 2010                |                     |
| Operating revenue:   |                     |                     |                     |
| Revenues from water and sewer, net                           | \$ 724,108          | \$ 712,788          | \$ 11,320           |
| Central Government appropriations                            | 85,000              | –                   | 85,000              |
| Total operating revenues                                     | <b>\$ 809,108</b>   | <b>\$ 712,788</b>   | <b>\$ 96,320</b>    |
| Operating expenses:  |                     |                     |                     |
| Payroll and payroll related expenses                         | 250,968             | 266,099             | (15,131)            |
| Service contract – Superaqueduct                             | 28,473              | 22,800              | 5,673               |
| Professional and consulting services                         | 34,138              | 21,395              | 12,743              |
| Chemicals  | 29,453              | 26,279              | 3,174               |
| Materials and replacements                                   | 16,110              | 14,529              | 1,581               |
| Repairs and maintenance of capital assets                    | 45,405              | 39,990              | 5,415               |
| Electricity  | 156,583             | 140,131             | 16,452              |
| Insurance  | 9,276               | 9,443               | (167)               |
| Other operating expenses                                     | 77,248              | 78,685              | (1,437)             |
| Operating expenses (excluding depreciation and amortization) | <b>647,654</b>      | 619,351             | 28,303              |
| Depreciation and amortization                                | <b>201,037</b>      | 151,767             | 49,270              |
| Total operating expenses                                     | <b>848,691</b>      | 771,118             | 77,573              |
| Operating loss   | <b>(39,583)</b>     | (58,330)            | 18,747              |
| Nonoperating expenses, net                                   | <b>(106,910)</b>    | (80,245)            | (26,665)            |
| Loss before capital contributions                            | <b>(146,493)</b>    | (138,575)           | (7,918)             |
| Capital contributions  | <b>34,275</b>       | 969,377             | (935,102)           |
| (Decrease) increase in net assets                            | <b>(112,218)</b>    | 830,802             | (943,020)           |
| Net assets at beginning of year                              | <b>3,046,630</b>    | 2,215,828           | 830,802             |
| Net assets at end of year                                    | <b>\$ 2,934,412</b> | <b>\$ 3,046,630</b> | <b>\$ (112,218)</b> |

Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Summary of Revenues, Expenses, and Changes in Net Assets (continued)**

The following table provides a summary of the Authority's changes in net assets for the years ended June 30, 2010 and 2009 (in thousands):

|  | Years Ended June 30 |              | Change     |
|--|---------------------|--------------|------------|
|  | 2010                | 2009         |            |
| Operating revenue:   |                     |              |            |
| Revenues from water and sewer, net                           | \$ 712,788          | \$ 704,457   | \$ 8,331   |
| Operating expenses:  |                     |              |            |
| Payroll and payroll related expenses                         | 266,099             | 279,606      | (13,507)   |
| Service contract – Superaqueduct                             | 22,800              | 25,476       | (2,676)    |
| Professional and consulting services                         | 21,395              | 17,796       | 3,599      |
| Chemicals  | 26,279              | 27,310       | (1,031)    |
| Materials and replacements                                   | 14,529              | 15,454       | (925)      |
| Repairs and maintenance of capital assets                    | 39,990              | 32,003       | 7,987      |
| Electricity  | 140,131             | 136,497      | 3,634      |
| Insurance  | 9,443               | 9,513        | (70)       |
| Other operating expenses                                     | 78,685              | 80,849       | (2,164)    |
| Operating expenses (excluding depreciation and amortization) | 619,351             | 624,504      | (5,153)    |
| Depreciation and amortization                                | 151,767             | 143,687      | 8,080      |
| Total operating expenses                                     | 771,118             | 768,191      | 2,927      |
| Operating loss   | (58,330)            | (63,734)     | 5,404      |
| Nonoperating expenses, net                                   | (80,245)            | (98,439)     | 18,194     |
| Loss before capital contributions                            | (138,575)           | (162,173)    | 23,598     |
| Capital contributions  | 969,377             | 22,133       | 947,244    |
| Increase (decrease) in net assets                            | 830,802             | (140,040)    | 970,842    |
| Net assets at beginning of year                              | 2,215,828           | 2,355,868    | (140,040)  |
| Net assets at end of year                                    | \$ 3,046,630        | \$ 2,215,828 | \$ 830,802 |



Puerto Rico Aqueduct and Sewer Authority  
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Management's Discussion and Analysis (continued)

**Summary of Revenues, Expenses, and Changes in Net Assets (continued)**

***June 30, 2011 and 2010***

Net assets decreased by \$112.2 million, from \$3,046.6 million in 2010 to \$2,934.4 million in 2011, due to the results of current year operations.

Major fluctuations that resulted in a decrease in net assets are broken down as follows (in thousands):

|                                   |                            |
|-----------------------------------|----------------------------|
| Increase in operating revenues    | \$ 96,320                  |
| Increase in operating expenses    | (77,573)                   |
| Increase in nonoperating expenses | (26,665)                   |
| Decrease in capital contributions | <u>(935,102)</u>           |
| Net change                        | <u><u>\$ (943,020)</u></u> |

Operating revenues increased as a result of a decrease in water and sewer billed of \$19.8 million, a decrease in the provision for bad debt of \$31.2 million and an increase of \$85.0 million from appropriations received from the Commonwealth during the fiscal year ended June 30, 2011.

Operating expenses increased by \$77.6 million primarily due to the net effect of the following:

- A decrease of \$15.1 million in payroll and payroll related expenses.
- An increase of \$16.5 million in electricity expenses.
- An increase of \$5.7 million in Service Contract – Superaqueduct expenses.
- An increase of \$3.2 million in chemical expenses.
- An increase of \$49.3 million in depreciation and amortization expense.
- An increase of \$5.4 million in repair and maintenance of capital assets.
- An increase of \$12.7 million in professional and consulting services expenses

Service contract – Superaqueduct expenses pertain to a contract signed with Thames-Dick for the operation and maintenance of the North Coast Aqueduct (Superaqueduct).

On July 19, 2011, the Authority and Thames-Dick agreed to cancel the Master Agreement and transfer responsibility to the Authority of the operation and administration of the North Coast Aqueduct.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Management's Discussion and Analysis (continued)

**Summary of Revenues, Expenses, and Changes in Net Assets (continued)**

***June 30, 2011 and 2010 (continued)***

Nonoperating expenses increased by \$26.7 million when compared with previous fiscal year. This is primarily the net effect of an increase of \$16.0 million in interest expense on bonds, notes and lines of credits, a decrease in Commonwealth contributions of \$6.9 million for the payment of principal and interest on outstanding debt, and a decrease in other income of \$4.1 million.

Capital contributions decreased by \$935.1 million. This is primarily due to capital assets transferred from by PRIFA in the amount of \$933.4 million during fiscal 2010.

***June 30, 2010 and 2009***

Net assets increased by \$830.8 million, from \$2,215.8 million in 2009 to \$3,046.6 million in 2010, due to the results of current year operations.

Major fluctuations that resulted in an increase in net assets are broken down as follows (in thousands):

|                                   |                          |
|-----------------------------------|--------------------------|
| Increase in operating revenues    | \$ 8,331                 |
| Increase in operating expenses    | (2,927)                  |
| Decrease in nonoperating expenses | 18,194                   |
| Increase in capital contributions | <u>947,244</u>           |
| Net change                        | <u><u>\$ 970,842</u></u> |

Operating revenues increased as a result of an increase in water and sewer billed of \$3.4 million and a decrease in the provision for bad debt of \$4.9 million during the fiscal year ended June 30, 2010.

Operating expenses increased by \$2.9 million primarily due to the net effect of the following:

- A decrease of \$13.5 million in payroll and payroll related expenses.
- A decrease of \$2.6 million in Service Contract – Superaqueduct expenses.
- A decrease of \$2.2 million in other operating expenses.
- An increase of \$7.9 million in depreciation expense.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Management's Discussion and Analysis (continued)

**Summary of Revenues, Expenses, and Changes in Net Assets (continued)**

***June 30, 2010 and 2009 (continued)***

- An increase of \$8.0 million in repair and maintenance of capital assets.
- An increase of \$3.6 million in electricity expenses.
- An increase of \$3.5 million in professional and consulting services expenses.

The decrease in payroll expenses are the result of a reduction in the number of employees and changes in benefits granted.

Service contract – Superaqueduct expenses pertain to a contract signed with Thames-Dick for the operation and maintenance of the North Coast Aqueduct (Superaqueduct).

Non-operating revenue increased by \$18.2 million when compared with previous fiscal year. This is primarily the net effect of an increase of \$10.1 million in interest expense on bonds, notes and lines of credits and the increase in Commonwealth contributions of \$27.2 million for the payment of principal and interest on outstanding debt.

Capital contributions increased by \$947.2 million. This is primarily due to capital assets transferred from by PRIFA for the amount of \$933.4 million.

**Economic Factors and Next Year's Budgets and Rates**

Puerto Rico's economy is currently in a recession that began in the fourth quarter of fiscal year 2006. Although Puerto Rico's economy is closely linked to the United States economy, for fiscal years 2007, 2008, 2009, and 2010, Puerto Rico's real gross national product decreased by 1.2%, 2.9%, 4.8%, and 3.8%, respectively, while the United States real gross domestic product grew at a rate of 1.9% and 2.0% during fiscal years 2007 and 2008, respectively, contracted during fiscal year 2009 at a rate of 2.8% and grew by 0.7% in fiscal year 2010. According to the Puerto Rico Planning Board's (the Planning Board) latest projections made in March 2011, which take into account the preliminary results of fiscal year 2010, the economic impact of the disbursement of funds from the American Recovery and Reinvestment Act of 2009 (ARRA) and other economic factors, the real gross national product for fiscal year 2011 is forecasted to contract by 1.0%. The gross national product for fiscal year 2012, however, is forecasted to grow by 0.7%.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Management's Discussion and Analysis (continued)

**Economic Factors and Next Year's Budgets and Rates (continued)**

The economic situation impacted the Authority's collection rate. During fiscal year 2011, management has been focusing in minimize the financial impact of the current situation by the implementation of a revenue optimization program directed to, among other things, increase collections and replace meters to increase billed water consumption.

During June 2011, the Authority adopted a balanced operational budget for fiscal year 2012. In addition, the Authority's Capital Improvement Program for the fiscal year 2012 is estimated in \$407 million.

The Authority's credit ratings are "Baa1" by Moody's Investors Service, "BBB-" by Standard and Poor's Ratings Services and "BBB" by Fitch Ratings.

**Contacting the Authority's Financial Management**

This financial report is designed to provide the Authority's customers and creditors and other interested persons with a general overview of its finances and to demonstrate the Authority's accountability for the funds it receives. If you have questions about this report, or need additional financial information, contact the Director of Finance at 604 Barbosa Avenue, Suite 406, San Juan, Puerto Rico 00917-4310 or (787) 620-3791.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Balance Sheets

(In thousands)

|  | June 30      |              |
|--|--------------|--------------|
|  | 2011         | 2010         |
| <b>Assets</b>  |              |              |
| Current assets:  |              |              |
| Cash and cash equivalents  | \$ 62,630    | \$ 12,713    |
| Accounts receivable, net   | 163,589      | 192,703      |
| Receivables from federal agencies  | 3,344        | 3,417        |
| Materials and supplies inventory, net  | 28,572       | 24,163       |
| Prepayments and other current assets   | 6,130        | 5,870        |
| Total current assets   | 264,265      | 238,866      |
| Noncurrent assets:   |              |              |
| Restricted cash and cash equivalents   | 209,852      | 185,425      |
| Capital assets:  |              |              |
| Capital assets being depreciated   | 8,276,363    | 8,049,013    |
| Accumulated depreciation and amortization  | (2,843,090)  | (2,642,053)  |
|  | 5,433,273    | 5,406,960    |
| Land and other nondepreciable assets   | 66,851       | 61,765       |
| Construction in progress   | 1,711,896    | 1,616,269    |
| Total capital assets, net  | 7,212,020    | 7,084,994    |
| Other assets:  |              |              |
| Deferred debt issuance cost, net of accumulated<br>amortization of \$12,224 and \$9,897<br>for 2011 and 2010, respectively | 54,889       | 57,216       |
| Total assets   | \$ 7,741,026 | \$ 7,566,501 |

(Continued)

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Balance Sheets (continued)

(In thousands)

|  | June 30             |                     |
|--|---------------------|---------------------|
|  | 2011                | 2010                |
| <b>Liabilities and net assets</b>                                      |                     |                     |
| Current liabilities:   |                     |                     |
| Bonds payable  | \$ 7,815            | \$ 7,316            |
| Notes payable  | 260,041             | 19,448              |
| Lines of credit  | 27,770              | -                   |
| Accounts payable   | 162,858             | 146,862             |
| Accrued liabilities  | 151,747             | 173,893             |
| Accrued interest   | 61,862              | 82,141              |
| Unearned revenue   | 19,269              | 18,962              |
| Customers' deposits  | 6,146               | 5,766               |
| Compensated absences and postemployment benefits                       | 21,170              | 16,101              |
| Total current liabilities  | <u>718,678</u>      | 470,489             |
| Noncurrent liabilities:  |                     |                     |
| Bonds payable  | 2,571,925           | 2,573,663           |
| Notes payable  | 395,152             | 601,033             |
| Lines of credit  | 1,002,179           | 751,283             |
| Customers' deposits  | 73,952              | 74,074              |
| Compensated absences and postemployment benefits                       | 44,728              | 49,329              |
| Total noncurrent liabilities   | <u>4,087,936</u>    | 4,049,382           |
| Total liabilities  | <u>4,806,614</u>    | 4,519,871           |
| Net assets:  |                     |                     |
| Invested in capital assets, net of related debt                        | 3,374,252           | 3,544,720           |
| Restricted for environmental compliance, capital activity<br>and other | 24,482              | 17,642              |
| Unrestricted   | (464,322)           | (515,732)           |
| Total net assets   | <u>2,934,412</u>    | 3,046,630           |
| Total net assets and liabilities                                       | <u>\$ 7,741,026</u> | <u>\$ 7,566,501</u> |

See accompanying notes.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Statements of Revenues, Expenses, and Changes in Net Assets

(In thousands)

|  | <b>Year Ended June 30</b> |                  |
|--|---------------------------|------------------|
|  | <b>2011</b>               | <b>2010</b>      |
| Operating revenues:  |                           |                  |
| Water  | \$ 492,847                | \$ 503,888       |
| Sewer  | 253,657                   | 262,447          |
| Central Government appropriations  | 85,000                    | –                |
| Bad debt expense   | (22,396)                  | (53,547)         |
| Total net operating revenues   | <b>809,108</b>            | 712,788          |
| Operating expenses:  |                           |                  |
| Payroll and payroll related  | 250,968                   | 266,099          |
| Service contract – Superaqueduct   | 28,473                    | 22,800           |
| Professional and consulting services   | 34,138                    | 21,395           |
| Chemicals  | 29,453                    | 26,279           |
| Materials and replacements   | 16,110                    | 14,529           |
| Repairs and maintenance of capital assets  | 45,405                    | 39,990           |
| Electricity  | 156,583                   | 140,131          |
| Insurance  | 9,276                     | 9,443            |
| Other operating expenses   | 77,248                    | 78,685           |
| Operating expenses (excluding depreciation and amortization)   | <b>647,654</b>            | 619,351          |
| Depreciation and amortization  | <b>201,037</b>            | <b>151,767</b>   |
| Total operating expenses   | <b>848,691</b>            | <b>771,118</b>   |
| Operating loss   | <b>(39,583)</b>           | <b>(58,330)</b>  |
| Nonoperating revenues (expenses):  |                           |                  |
| Interest expense, net of amortization of debt issuance cost,<br>bond premium and discount, and deferred refunding loss | (153,068)                 | (137,063)        |
| Commonwealth contributions for principal payments on bonds and notes   | 819                       | 8,275            |
| Commonwealth contributions for interest payments on bonds and notes  | 37,749                    | 37,190           |
| Interest income  | 4,578                     | 4,269            |
| Other income   | 3,012                     | 7,084            |
| Total nonoperating expenses, net   | <b>(106,910)</b>          | (80,245)         |
| Loss before capital contributions  | <b>(146,493)</b>          | <b>(138,575)</b> |
| Capital contributions:   |                           |                  |
| Federal grants and other contributions   | 31,798                    | 26,498           |
| Other Commonwealth contributions   | 2,477                     | 942,879          |
| Total capital contributions  | <b>34,275</b>             | 969,377          |
| Change in net assets   | <b>(112,218)</b>          | 830,802          |
| Net assets at beginning of year  | <b>3,046,630</b>          | 2,215,828        |
| Net assets at end of year  | <b>\$ 2,934,412</b>       | \$ 3,046,630     |

*See accompanying notes.*

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Statements of Cash Flows

(In thousands)

|  | <b>Year Ended June 30</b> |             |
|--|---------------------------|-------------|
|  | <b>2011</b>               | <b>2010</b> |
| <b>Cash flows from operating activities</b>  |                           |             |
| Cash received from customers   | \$ 748,865                | \$ 733,762  |
| Cash received from Commonwealth  | 85,000                    | –           |
| Cash paid to suppliers   | (380,937)                 | (469,108)   |
| Cash paid to employees   | (254,239)                 | (271,787)   |
| Net cash provided by (used in) operating activities                                    | 198,689                   | (7,133)     |
| <b>Cash flows from noncapital financing activities</b>                                 |                           |             |
| Payments of lines of credit  | –                         | (150,000)   |
| Payments of notes  | (2,944)                   | (2,748)     |
| Net cash from other income   | 3,012                     | 7,084       |
| Interest paid on notes and lines of credit   | (8,026)                   | (8,121)     |
| Net cash used in noncapital financing activities                                       | (7,958)                   | (153,785)   |
| <b>Cash flows from capital and related financing activities</b>                        |                           |             |
| Additions to utility plant and other capital assets                                    | (350,819)                 | (322,914)   |
| Proceeds from capital contributions  | 39,196                    | 40,389      |
| Proceeds from issuance of bonds  | –                         | 15,047      |
| Proceeds from issuance of notes payable  | 74,663                    | 69,452      |
| Proceeds from borrowings from lines of credit  | 297,069                   | 459,156     |
| Payments of bonds and notes  | (31,328)                  | (20,584)    |
| Payment of lines of credit   | (37,926)                  | (16,260)    |
| Interest paid on bonds, notes and lines of credit                                      | (111,820)                 | (54,039)    |
| Net cash (used in) provided by capital and related financing activities                | (120,965)                 | 170,247     |
| <b>Cash flows from investing activities</b>  |                           |             |
| Interest received on investments   | 4,578                     | 4,269       |
| Net cash provided by investing activities  | 4,578                     | 4,269       |
| Net increase in cash and cash equivalents  | 74,344                    | 13,598      |
| Cash and cash equivalents at beginning of year   | 198,138                   | 184,540     |
| Cash and cash equivalents at end of year   | \$ 272,482                | \$ 198,138  |
| <b>For purposes of the statement of cash flows, cash and cash equivalents include:</b> |                           |             |
| Unrestricted   | \$ 62,630                 | \$ 12,713   |
| Restricted   | 209,852                   | 185,425     |
|  | \$ 272,482                | \$ 198,138  |

(Continued)



Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Statements of Cash Flows (continued)

(In thousands)

|   | <b>Year Ended June 30</b> |             |
|---|---------------------------|-------------|
|   | <b>2011</b>               | <b>2010</b> |
| <b>Reconciliation of operating loss to cash provided by</b>                                     |                           |             |
| <b>(used in) operating activities</b>   |                           |             |
| Operating loss  | \$ (39,583)               | \$ (58,330) |
| Adjustments to reconcile operating loss to net cash provided by (used in) operating activities: |                           |             |
| Depreciation and amortization   | 201,037                   | 151,767     |
| Provision for uncollectible accounts  | 22,396                    | 53,547      |
| Change in assets and liabilities:   |                           |             |
| Decrease (increase) in accounts receivable  | 1,796                     | (35,205)    |
| Decrease (increase) in accounts receivable from federal agencies                                | 73                        | (247)       |
| Increase in materials and supplies inventory  | (4,409)                   | (1,732)     |
| Increase in prepayments and other current assets  | (260)                     | (70)        |
| Increase (decrease) in accounts payable   | 38,752                    | (110,268)   |
| Increase in unearned revenue  | 307                       | 347         |
| Increase in accrued compensated absences and early retirement obligation                        | 468                       | 2,191       |
| Decrease in accrued liabilities   | (22,146)                  | (11,418)    |
| Increase in customers' deposits   | 258                       | 2,285       |
| Total adjustments   | 238,272                   | 51,197      |
| Net cash provided by (used in) operating activities   | \$ 198,689                | \$ (7,133)  |
| <br><b>Noncash noncapital financing activities</b>  |                           |             |
| Amortization of debt issuance cost  | \$ 332                    | \$ 332      |
| <br><b>Noncash capital and related financing activities</b>                                     |                           |             |
| Net additions to utility plant and other capital assets   | 22,757                    | 921,100     |
| Write-off of capital contributions  | 4,922                     | 4,411       |
| Amortization of:  |                           |             |
| Debt issuance cost  | 1,996                     | 1,995       |
| Bond premiums and discounts   | 1,269                     | 1,269       |
| Deferred refunding loss   | 5,561                     | 5,561       |
| Accretion of interest on capital appreciation bonds   | 9,132                     | 8,598       |
| Principal paid by the Commonwealth  | 819                       | 8,275       |
| Interest paid by the Commonwealth   | 37,749                    | 37,190      |

*See accompanying notes.*

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements

June 30, 2011

**1. Reporting Entity and Summary of Significant Accounting Policies**

The Puerto Rico Aqueduct and Sewer Authority (the Authority) is a component unit of the Commonwealth of Puerto Rico (the Commonwealth). The Authority was created in 1945 under Act No. 40 (the Act), as amended and reenacted, for the purpose of owning, operating, and developing all of the public aqueduct and sewer systems in Puerto Rico. The Authority provides water and wastewater services to the Commonwealth, businesses, and residents of Puerto Rico. As a public corporation and an instrumentality of the Commonwealth, the Authority is exempt from the payment of income, property and municipal taxes. Under the terms of the Act, the Authority has broad powers, including, among others, to borrow money and issue revenue bonds for any of its corporate purposes. The Authority receives, in addition to its funds derived from operating its water and wastewater systems, grants from various agencies of the federal government of the United States of America and donations in kind or in cash from developers and various governmental agencies and instrumentalities of the Commonwealth.

**Summary of Significant Accounting Policies**

The accounting and reporting policies of the Authority conform to the accounting rules prescribed by the Governmental Accounting Standards Board (GASB). Under GASB Statement No. 20, *Accounting and Financial Reporting for Proprietary Funds and Other Governmental Entities that Use Proprietary Fund Accounting*, the Authority has elected not to apply Financial Accounting Standards Board pronouncements issued after November 30, 1989. The Authority functions as an enterprise fund and maintains its accounting records on the accrual basis of accounting in conformity with U.S. generally accepted accounting principles. The following describes the most significant accounting policies followed by the Authority.

**Measurement Focus and Basis of Accounting**

The Authority's operations are accounted for on a flow of economic resources measurement focus, using the accrual basis of accounting. Under this method, all assets and liabilities associated with operations are included on the balance sheet, and revenues are recorded when earned and expenses are recorded at the time liabilities are incurred.

Revenues are recorded when utility services are provided to customers. All customers are billed on a monthly basis. Revenues are presented net of estimated allowances for uncollectible accounts. The Authority recognizes revenue on unbilled utility services based on estimated consumption.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Measurement Focus and Basis of Accounting (continued)**

The Authority distinguishes operating revenues and expenses from nonoperating items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with the Authority's principal ongoing operations. The principal operating revenues of the Authority are charges to customers for water and sewer related sales and services. Operating expenses of the Authority include the cost of sales and services, administrative expenses, and depreciation on capital assets. All revenues and expenses not meeting this definition are reported as nonoperating revenues and expenses.

**Cash and Cash Equivalents**

Cash equivalents include all highly liquid instruments with maturities of three months or less at the time of acquisition. If such instruments are included in restricted assets, they are considered cash equivalents for purposes of the statements of cash flows.

The Authority maintains some construction fund accounts related to past bond issuances invested in mutual funds. As of June 30, 2011 and 2010, the account balances amounted to approximately \$17.9 million and \$21.7 million, respectively. The accounts are held under the Puerto Rico Government Investment Trust Fund (the Trust Fund), a collective investment trust created by the Secretary of the Treasury of Puerto Rico as settler and the Government Development Bank of Puerto Rico as trustee. The Trust Fund seeks to maintain a constant net asset value per unit of \$1 through investment in high-grade short term money market instruments with a dollar-weighted average portfolio maturity of less than 60 days, including, but not limited to, obligations of the U.S. Government, the Puerto Rico Government, their respective agencies and instrumentalities, repurchase agreements with respect to obligations of the U.S. Government, certificates of deposit, time deposits, bank notes and banker's acceptances issued by the U.S. or Puerto Rico regulated banks, commercial paper and corporate obligations. The Authority can invest, reinvest or redeem units acquired at any time without charge or penalty.

The Trust Fund values its investments on the basis of amortized cost. Although the Trust Fund's policies are designed to help maintain a stable net asset value per unit of \$1, all money market instruments can change in value when interest rates or issuers' creditworthiness change, or if an issuer or guarantor of a security fails to pay interest or principal when due. As of June 30, 2011 and 2010 the net asset value per unit of the Trust Fund was \$1.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Restricted Assets**

Funds set aside for construction or other specific purposes are classified as restricted assets since their use is limited for these purposes by the applicable agreements.

When both restricted and unrestricted resources are available for a specific use, it is the Authority's policy to use restricted resources first, then unrestricted resources as they are needed.

**Receivables**

Receivables are stated net of estimated allowances for uncollectible accounts, which allowances are determined based upon past collection experience and current economic conditions, among other factors.

**Materials and Supplies Inventory**

Materials and supplies inventory is stated at average cost, not to exceed market. Inventory is presented net of a reserve for obsolescence totaling approximately \$3.8 million and \$3.5 million as of June 30, 2011 and 2010 respectively.

**Unamortized Debt Issuance Costs, Premiums, Discounts and Deferred Refunding Losses**

Debt issuance costs, premiums and discounts are deferred and amortized to expense over the life of the related debt using the straight-line method, which approximates the effective interest method.

The excess of reacquisition costs over the carrying value of refunded long-term debt is deferred and amortized to expense using the straight-line method over the remaining term of the original debt, or the term of the new debt, whichever is shorter.

Bonds payable are reported net of applicable bond premium or discount and deferred refunding loss. Unamortized debt issuance costs are reported as an asset on the balance sheets.

**Capital Assets**

The Authority defines capital assets as tangible and intangible assets used in the Authority's operations with a useful live longer than a year, not held for sale and with an individual cost of over \$1,000 for technology hardware and software and over \$2,000 for all other capital assets.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Capital Assets (continued)**

Utility plant is carried at cost, which includes capitalized labor, materials, administrative costs, and interest on debt financed construction. Interest capitalized by the Authority for the years ended June 30, 2011 and 2010 amounted to approximately \$67.2 million and \$57 million, respectively.

Recurring maintenance and repair costs are charged to expense, whereas major repairs, improvements, and replacements are capitalized. When capital assets are disposed, the cost and applicable accumulated depreciation are removed from the respective accounts, and the resulting gain or loss is recorded in operations.

All utility plant and other capital assets are recorded at historical cost or estimated historical cost.

Depreciation and amortization expense is calculated using the straight-line method.

During fiscal year 2011, the Authority performed an assessment of the useful lives of all its depreciable capital assets by category. In evaluating useful lives, the Authority considered the industry averages for similar types of assets, the geological and hydrological conditions unique to Puerto Rico and engineering judgments of the Authority's historical maintenance and replacement trends. This assessment indicated that some assets will continue to be used for a longer period than previously anticipated and others whose periods were reduced or remained the same. As a result, effective July 1, 2011, the Authority revised the useful lives as follows:

| Description  | Former<br>Useful Life                            | Revised<br>Useful Life                      |
|--|--|---|
| Wells and tanks                                    | Forty-eight (48) years                           | Fifty (50) years                            |
| Equipment and vehicles                             | Five (5) years                                   | Five (5) years                              |
| Furniture and fixtures                             | Ten (10) years                                   | Ten (10) years                              |
| Water and sewer plants, tanks and<br>pump stations | Forty-eight (48) years                           | Thirty (30) years                           |
| Buried infrastructure                              | Forty-eight (48) years                           | Range from Fifty (50) to Seventy (70) years |
| Dams   | Range from Fifty (50) to One-Hundred (100) years | Seventy (70) years                          |
| Buildings  | Range from Twenty (20) to Fifty (50) years       | Forty (40) years                            |

Changes in estimates are accounted for on a prospective basis, by depreciating assets' current carrying values over their revised remaining useful lives. The effect of this change in estimate, compared to the original depreciation had an impact of approximately \$18.5 million increasing the depreciation expense for fiscal year 2011.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Capital Assets (continued)**

Construction in progress represents the accumulated costs of various construction projects. If construction plans are abandoned, such costs are expensed.

**Unearned Revenue**

Unearned revenue arises from advances received from the Commonwealth and other governmental agencies in accordance with a consumption schedule for water and sewer services. Unearned revenue also arises from water and sewer services paid by residential, commercial or industrial customers over periodic billings that are adjusted.

**Accounting for Compensated Absences**

Employees earn vacation and sick leave based on a prescribed formula. The amount of vacation and sick leave earned and not used by the Authority's employees is accrued as a liability as the benefits are earned by the employees and if the employees' rights to receive compensation are attributable to services already rendered and it is probable that the Authority will compensate the employees for the benefits through paid time off or some other means, such as cash payments at termination or retirement. Accrued compensated absences include payroll related expenses.

The cost of compensated absences expected to be paid in the next twelve months is classified as a current liability while amounts expected to be paid after twelve months are classified as noncurrent liabilities.

**Postemployment Health Benefits**

The Authority provides certain healthcare benefits for retired employees. Substantially all of the Authority's employees may become eligible for these benefits if they meet the required years of service working for the Authority.

The Authority has the obligation to contribute a maximum of \$125 monthly per retired employee for coverage under the medical plan. The Authority accounts for its postretirement healthcare benefits in accordance with GASB Statement No. 45, *Accounting and Financial Reporting by Employers for Postemployment Benefits Other than Pensions*.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Postemployment Health Benefits (continued)**

The Authority maintains an Early Retirement Program established during fiscal year 2002, which provides for a monthly payment to certain retired employees to cover healthcare premiums for a maximum of \$280 per month, up to the age of seventy (70) years or for a maximum of ten (10) years, whichever occurs first. The present value of future healthcare benefit contributions for these early retired employees is accrued and reported as a liability in the accompanying balance sheets. As of June 30, 2011 and 2010, the accrued liability for early retirement amounted to approximately \$1.9 million and \$2.9 million, respectively.

The cost of healthcare benefits paid to retired employees amounted to approximately \$3.6 million and \$2.9 million for 2011 and 2010 respectively.

**Pension Benefits**

The Authority's employees participate in the Government of Puerto Rico Employees Retirement System (the Plan), a cost-sharing multiple-employer plan. The Authority recognizes annual pension expense equal to its required contribution to the Plan. The Commonwealth funds any past or future unfunded liability related to the Authority's employees.

**Net Assets**

Net assets are reported in three categories:

- ▶ ***Invested in Capital Assets, Net of Related Debt*** – These consists of capital assets, net of accumulated depreciation and amortization and reduced by outstanding balances for bonds, notes, and other debt that are attributed to the acquisition, construction, or improvement of those assets. Debt pertaining to significant unspent debt proceeds is not included in the calculation of invested in capital assets, net of related debt.
- ▶ ***Restricted Net Assets*** – These result when constraints, on the use of net assets are either externally imposed by creditors, grantors, contributors, and the like, or imposed by law through constitutional provisions or enabling legislation. At June 30, 2011 and 2010, the Authority had no assets restricted by enabling legislation.
- ▶ ***Unrestricted Net Assets*** – These consist of net assets, which do not meet the definition of the two preceding categories. Unrestricted net assets could be designated to indicate that management does not consider them to be available for general operations. Unrestricted net assets often have constraints on resources that are imposed by management, but can be removed or modified.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Use of Estimates**

Management of the Authority has made a number of estimates and assumptions relating to the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the basic financial statements and the reported amounts of revenue and expenses during the period. Actual results could differ from those estimates.

**Future Adoption of Accounting Standards**

GASB has issued the following accounting standards that the Authority has not yet adopted:

| <u>GASB<br/>Statement</u> |  | <u>Adoption<br/>required in<br/>fiscal year</u> |
|---------------------------|--|---|
| 57                        | OPEB Measurements by Agent Employers and Agent Multiple-Employer Plans   | 2012  |
| 60                        | Accounting and Financial Reporting for Service Concession Arrangements   | 2012  |
| 61                        | Accounting and Financial Reporting Entity: Omnibus-an amendment of GASB Statements No. 14 and No. 34                         | 2013  |
| 62                        | Codification of Accounting and Financial Reporting Guidance Contained in Pre-November 30, 1989 FASB and AICPA Pronouncements | 2013  |
| 63                        | Financial Reporting of Deferred Outflows of Resources, Deferred Inflows of Resources, and Net Position                       | 2013  |
| 64                        | Derivative Instruments: Application of Hedge Accounting Termination Provisions - an amendment of GASB Statement No. 53       | 2012  |

The impact of these standards has not yet been determined.

**Effects of New Pronouncements**

In June 2010, GASB issued Statement No. 59, *Financial Instruments Omnibus*. The objective of this Statement is to update and improve existing standards regarding financial reporting and disclosure requirements of certain financial instruments and external investment pools for which significant issues have been identified in practice. The Authority adopted the provisions of GASB Statement No. 59 during the year ended June 30, 2011. The adoption of GASB Statement No. 59 had no impact on the Authority.



Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**1. Reporting Entity and Summary of Significant Accounting Policies (continued)**

**Commonwealth Appropriations**

The Authority receives appropriations from the Commonwealth. Appropriations are classified as operating revenues, non-operating revenues and capital contributions as specified in Joint Resolutions approved by the Puerto Rico Legislature. Appropriations to pay for operating expenses are classified as operating revenues. Appropriations to pay for debt service are classified as non-operating revenues and appropriations for capital projects are classified as capital contributions.

**Reclassifications**

Certain prior year amounts have been reclassified to conform to the current year's presentation.

**2. Deposits**

The carrying amount of deposits with financial institutions of the Authority consisted of the following (in thousands):

|  | June 30            |                 |                    |                 |
|--|--------------------|-----------------|--------------------|-----------------|
|  | 2011               |                 | 2010               |                 |
|  | Carrying<br>amount | Bank<br>balance | Carrying<br>amount | Bank<br>balance |
| Unrestricted deposits in commercial banks in Puerto Rico | \$ 62,630          | \$ 69,047       | \$ 12,713          | \$ 30,184       |
| Restricted deposits in commercial banks in Puerto Rico   | 166,930            | 166,930         | 144,825            | 144,825         |
| Restricted deposits in governmental banks:               |                    |                 |                    |                 |
| GDB  | 41,208             | 41,208          | 39,351             | 39,351          |
| EDB  | 1,714              | 1,714           | 1,249              | 1,249           |
| Total  | \$ 272,482         | \$ 278,899      | \$ 198,138         | \$ 215,609      |

Cash and cash equivalents consist of demand deposits, interest-bearing accounts, certificates of deposit, and mutual funds, as described in Note 1.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**2. Deposits (continued)**

**Custodial Credit Risks Related to Deposits**

Pursuant to the laws of the Commonwealth, the Authority's cash is required to be held only in banks designated as depository institutions of public funds by the Commonwealth's Secretary of the Treasury. The Commonwealth requires that public funds deposited in commercial banks in Puerto Rico must be fully collateralized for the amount deposited in excess of federal depository insurance. All securities pledged as collateral are held by the Secretary of the Treasury of the Commonwealth.

Custodial credit risk is the risk that, in the event of a bank failure, the Authority's deposits might not be recovered. Deposits maintained at Government Development Bank for Puerto Rico (GDB) and Economic Development Bank for Puerto Rico (EDB) are exempt from the collateral requirements established by the Commonwealth and thus represent a custodial credit risk that in the event of GDBs or EDBs failure, the Authority may not be able to recover these deposits. GDB and EDB are component units of the Commonwealth.

The Authority was exposed to the following custodial credit risk arising from the balance of deposits maintained in governmental and commercial banks as follows (in thousands):

|                                 | <b>June 30</b>   |                  |
|---------------------------------|------------------|------------------|
|                                 | <b>2011</b>      | <b>2010</b>      |
| Uninsured and uncollateralized: |                  |                  |
| GDB                             | \$ 41,208        | \$ 39,351        |
| EDB                             | 1,714            | 1,249            |
|                                 | <b>\$ 42,922</b> | <b>\$ 40,600</b> |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**3. Accounts Receivable**

Accounts receivable are primarily for water and sewer services provided to residential, industrial, commercial and government customers, and consisted of the following (in thousands):

|   | <b>June 30</b>    |             |
|---|-------------------|-------------|
|   | <b>2011</b>       | <b>2010</b> |
| Water and sewer services:                 |                   |             |
| Residential, industrial, and commercial   | \$ 468,443        | \$ 458,079  |
| Government agencies and municipalities    | 70,537            | 88,886      |
|   | <b>538,980</b>    | 546,965     |
| Other receivables:                        |                   |             |
| Government agencies and municipalities    | 3,401             | 3,374       |
| Private entities                          | 26,195            | 19,986      |
|   | <b>29,596</b>     | 23,360      |
|   | <b>568,576</b>    | 570,325     |
| Less allowance for uncollectible accounts | <b>(404,987)</b>  | (377,622)   |
| Total                                     | <b>\$ 163,589</b> | \$ 192,703  |

**4. Receivables from Federal Agencies**

The receivables from federal agencies of approximately \$3.3 million and \$3.4 million as of June 30, 2011 and 2010, respectively, consisted primarily of amounts pending to be received from the U.S. Department of Homeland Security (USDHS) as reimbursement for expenses incurred by the Authority's disaster recovery activities.

**5. Materials and Supplies Inventory**

As of June 30, 2011 and 2010, material and supplies inventory consisted of the basic materials needed for the operation and maintenance of the water and sewer system and for the replacement of water meters.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**6. Capital Assets**

Utility plant and other capital assets as of June 30, 2011 and 2010 and the changes therein for the years then ended are as follows (in thousands):

|  | June 30, 2011        |                   |                     | Ending<br>Balance   |
|--|----------------------|-------------------|---------------------|---------------------|
|  | Beginning<br>Balance | Increases         | Decreases           |                     |
| Capital assets not being depreciated:              |                      |                   |                     |                     |
| Land   | \$ 53,897            | \$ 4,497          | \$ -                | \$ 58,394           |
| Easement   | 7,868                | 589               | -                   | 8,457               |
| Construction in progress                           | <u>1,616,269</u>     | <u>322,439</u>    | <u>(226,812)</u>    | <u>1,711,896</u>    |
| Total capital assets<br>not being depreciated      | <u>1,678,034</u>     | <u>327,525</u>    | <u>(226,812)</u>    | <u>1,778,747</u>    |
| Capital assets being depreciated:                  |                      |                   |                     |                     |
| Infrastructure (water and<br>sewer facilities)     | 7,392,677            | 187,537           | -                   | 7,580,214           |
| Wells, tanks and meters                            | 388,896              | 25,628            | -                   | 414,524             |
| Buildings and improvements                         | 70,078               | 439               | -                   | 70,517              |
| Equipment, furniture,<br>fixtures and vehicles     | <u>197,362</u>       | <u>13,746</u>     | <u>-</u>            | <u>211,108</u>      |
| Total capital assets being<br>depreciated          | <u>8,049,013</u>     | <u>227,350</u>    | <u>-</u>            | <u>8,276,363</u>    |
| Less accumulated depreciation<br>and amortization: |                      |                   |                     |                     |
| Infrastructure (water and<br>sewer facilities)     | (2,328,335)          | (173,946)         | -                   | (2,502,281)         |
| Wells, tanks and meters                            | (128,842)            | (12,596)          | -                   | (141,438)           |
| Buildings and improvements                         | (28,338)             | (1,576)           | -                   | (29,914)            |
| Equipment, furniture,<br>fixtures and vehicles     | <u>(156,538)</u>     | <u>(12,919)</u>   | <u>-</u>            | <u>(169,457)</u>    |
| Total accumulated depreciation<br>and amortization | <u>(2,642,053)</u>   | <u>(201,037)</u>  | <u>-</u>            | <u>(2,843,090)</u>  |
| Total capital assets being<br>depreciated, net     | <u>5,406,960</u>     | <u>26,313</u>     | <u>-</u>            | <u>5,433,273</u>    |
| Total capital assets, net                          | <u>\$ 7,084,994</u>  | <u>\$ 353,838</u> | <u>\$ (226,812)</u> | <u>\$ 7,212,020</u> |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**6. Capital Assets (continued)**

|  | June 30, 2010        |                     |                       | Ending<br>Balance   |
|--|----------------------|---------------------|-----------------------|---------------------|
|  | Beginning<br>Balance | Increases           | Decreases             |                     |
| Capital assets not being depreciated:              |                      |                     |                       |                     |
| Land   | \$ 52,944            | \$ 953              | \$ –                  | \$ 53,897           |
| Easement   | 7,379                | 489                 | –                     | 7,868               |
| Construction in progress                           | 1,591,978            | 1,243,851           | (1,219,560)           | 1,616,269           |
| Total capital assets<br>not being depreciated      | <u>1,652,301</u>     | <u>1,245,293</u>    | <u>(1,219,560)</u>    | <u>1,678,034</u>    |
| Capital assets being depreciated:                  |                      |                     |                       |                     |
| Infrastructure (water and<br>sewer facilities)     | 6,236,119            | 1,157,324           | (766)                 | 7,392,677           |
| Wells, tanks and meters                            | 345,899              | 43,168              | (171)                 | 388,896             |
| Buildings and improvements                         | 67,645               | 2,433               | –                     | 70,078              |
| Equipment, furniture,<br>fixtures and vehicles     | 182,172              | 15,190              | –                     | 197,362             |
| Total capital assets being<br>depreciated          | <u>6,831,835</u>     | <u>1,218,115</u>    | <u>(937)</u>          | <u>8,049,013</u>    |
| Less accumulated depreciation<br>and amortization: |                      |                     |                       |                     |
| Infrastructure (water and<br>sewer facilities)     | (2,198,535)          | (130,566)           | 766                   | (2,328,335)         |
| Wells, tanks and meters                            | (121,460)            | (7,408)             | 26                    | (128,842)           |
| Buildings and improvements                         | (26,111)             | (2,227)             | –                     | (28,338)            |
| Equipment, furniture,<br>fixtures and vehicles     | (145,283)            | (11,255)            | –                     | (156,538)           |
| Total accumulated depreciation<br>and amortization | <u>(2,491,389)</u>   | <u>(151,456)</u>    | <u>792</u>            | <u>(2,642,053)</u>  |
| Total capital assets being<br>depreciated, net     | <u>4,340,446</u>     | <u>1,066,659</u>    | <u>(145)</u>          | <u>5,406,960</u>    |
| Total capital assets, net                          | <u>\$ 5,992,747</u>  | <u>\$ 2,311,952</u> | <u>\$ (1,219,705)</u> | <u>\$ 7,084,994</u> |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**7. Restricted Assets**

Restricted assets at June 30, 2011 and 2010 consisted of the following:

**Construction Funds** – Amounts in construction funds represent unspent bond proceeds, which will be used to pay the cost of construction of infrastructure projects. Construction funds are held by the Authority and deposited in GDB.

**Capital Activity Funds** – Amounts in capital activity funds represent amounts deposited as a result of agreements between commonwealth agencies and municipalities for construction of infrastructure projects. Also includes fines and penalties assessed by EPA that will be used for construction of infrastructure projects to provide water services and to comply with environmental regulations.

**Debt Service Funds** – Amounts in debt service funds represent amounts deposited for the payment of principal and interest on bonds and notes. Also includes deposits required by the Master Agreement of Trust.

Restricted assets by category consist of:

|                        | <b>June 30</b>    |                   |
|------------------------|-------------------|-------------------|
|                        | <b>2011</b>       | <b>2010</b>       |
| Construction funds     | \$ 21,455         | \$ 24,201         |
| Capital activity funds | 13,494            | 13,088            |
| Debt service funds     | 174,903           | 148,136           |
|                        | <b>\$ 209,852</b> | <b>\$ 185,425</b> |

**8. Accrued Liabilities**

Accrued liabilities consisted of the following (in thousands):

|  | <b>June 30</b>    |                   |
|--|-------------------|-------------------|
|  | <b>2011</b>       | <b>2010</b>       |
| Payroll and related accruals                         | \$ 43,511         | \$ 54,712         |
| Legal, labor related and environmental contingencies | 68,554            | 70,762            |
| Contract retentions                                  | 39,682            | 48,419            |
|  | <b>\$ 151,747</b> | <b>\$ 173,893</b> |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**9. Long-Term Liabilities**

Long-term debt activity for the years ended June 30, 2011 and 2010 was as follows (in thousands):

|   | June 30, 2011        |                            |                    |                     |                        |                     |
|---|----------------------|----------------------------|--------------------|---------------------|------------------------|---------------------|
|   | Beginning<br>Balance | Additions/<br>Amortization | Reductions         | Ending<br>Balance   | Due Within<br>One Year | Due<br>Thereafter   |
| Bonds payable:  |                      |                            |                    |                     |                        |                     |
| 2001 Series A Commonwealth<br>Appropriation Bonds                                     | \$ 17,600            | \$ -                       | \$ (8,615)         | \$ 8,985            | \$ 8,985               | \$ -                |
| Act 164 PFC Commonwealth<br>Appropriation Bonds                                       | 341,565              | -                          | -                  | 341,565             | -                      | 341,565             |
| 2004 Series A Commonwealth<br>Appropriation Bonds                                     | 326,785              | -                          | -                  | 326,785             | -                      | 326,785             |
| 2008 Series A Revenue Bonds   | 1,335,123            | 9,132                      | -                  | 1,344,255           | -                      | 1,344,255           |
| 2008 Series B Revenue Bonds   | 22,445               | -                          | -                  | 22,445              | -                      | 22,445              |
| 2008 Series A Revenue<br>Refunding Bonds  | 159,055              | -                          | -                  | 159,055             | -                      | 159,055             |
| 2008 Series B Revenue<br>Refunding Bonds  | 125,700              | -                          | -                  | 125,700             | -                      | 125,700             |
| Rural Development Serial Bonds  | 312,079              | -                          | (6,049)            | 306,030             | 3,123                  | 302,907             |
| Add bond premium  | 36,316               | -                          | (1,707)            | 34,609              | 1,707                  | 32,902              |
| Less bond discount  | (16,244)             | -                          | 439                | (15,805)            | (439)                  | (15,366)            |
| Less deferred loss on refunding   | (79,445)             | -                          | 5,561              | (73,884)            | (5,561)                | (68,323)            |
| Total bonds   | <u>2,580,979</u>     | <u>9,132</u>               | <u>(10,371)</u>    | <u>2,579,740</u>    | <u>7,815</u>           | <u>2,571,925</u>    |
| Notes payable:  |                      |                            |                    |                     |                        |                     |
| Water Pollution Control and Safe<br>Drinking Water Treatment<br>Revolving Funds Loans | 375,793              | 55,139                     | (17,483)           | 413,449             | 18,297                 | 395,152             |
| Notes with commercial banks   | 244,688              | -                          | (2,944)            | 241,744             | 241,744                | -                   |
| Total notes   | <u>620,481</u>       | <u>55,139</u>              | <u>(20,427)</u>    | <u>655,193</u>      | <u>260,041</u>         | <u>395,152</u>      |
| Lines of credit   | <u>751,283</u>       | <u>316,592</u>             | <u>(37,926)</u>    | <u>1,029,949</u>    | <u>27,770</u>          | <u>1,002,179</u>    |
| Other long-term liabilities:  |                      |                            |                    |                     |                        |                     |
| Accrued compensated absences  | 49,338               | 10,226                     | (13,122)           | 46,442              | 12,738                 | 33,704              |
| Net OPEB obligation   | 12,453               | 7,010                      | (2,315)            | 17,148              | 7,010                  | 10,138              |
| Early retirement obligation   | 3,639                | -                          | (1,331)            | 2,308               | 1,422                  | 886                 |
| Customers' deposits   | 79,840               | 8,683                      | (8,425)            | 80,098              | 6,146                  | 73,952              |
| Total other liabilities   | <u>145,270</u>       | <u>25,919</u>              | <u>(25,193)</u>    | <u>145,996</u>      | <u>27,316</u>          | <u>118,680</u>      |
| Total – long-term<br>obligations  | <u>\$ 4,098,013</u>  | <u>\$ 406,782</u>          | <u>\$ (93,917)</u> | <u>\$ 4,410,878</u> | <u>\$ 322,942</u>      | <u>\$ 4,087,936</u> |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**9. Long-Term Liabilities (continued)**

|   | June 30, 2010        |                            |                     |                     |                        |                     |
|---|----------------------|----------------------------|---------------------|---------------------|------------------------|---------------------|
|   | Beginning<br>Balance | Additions/<br>Amortization | Reductions          | Ending<br>Balance   | Due Within<br>One Year | Due<br>Thereafter   |
| Bonds payable:  |                      |                            |                     |                     |                        |                     |
| 2001 Series A Commonwealth<br>Appropriation Bonds                                     | \$ 25,875            | \$ —                       | \$ (8,275)          | \$ 17,600           | \$ 8,615               | \$ 8,985            |
| Act 164 PFC Commonwealth<br>Appropriation Bonds                                       | 341,565              | —                          | —                   | 341,565             | —                      | 341,565             |
| 2004 Series A Commonwealth<br>Appropriation Bonds                                     | 326,785              | —                          | —                   | 326,785             | —                      | 326,785             |
| 2008 Series A Revenue Bonds   | 1,326,525            | 8,598                      | —                   | 1,335,123           | —                      | 1,335,123           |
| 2008 Series B Revenue Bonds   | 22,445               | —                          | —                   | 22,445              | —                      | 22,445              |
| 2008 Series A Revenue<br>Refunding Bonds  | 159,055              | —                          | —                   | 159,055             | —                      | 159,055             |
| 2008 Series B Revenue<br>Refunding Bonds  | 125,700              | —                          | —                   | 125,700             | —                      | 125,700             |
| Rural Development Serial Bonds  | 302,742              | 15,047                     | (5,710)             | 312,079             | 2,992                  | 309,087             |
| Add bond premium  | 38,025               | —                          | (1,709)             | 36,316              | 1,709                  | 34,607              |
| Less bond discount  | (16,683)             | —                          | 439                 | (16,244)            | (439)                  | (15,805)            |
| Less deferred loss on refunding   | (85,006)             | —                          | 5,561               | (79,445)            | (5,561)                | (73,884)            |
| Total bonds   | <u>2,567,028</u>     | <u>23,645</u>              | <u>(9,694)</u>      | <u>2,580,979</u>    | <u>7,316</u>           | <u>2,573,663</u>    |
| Notes payable:  |                      |                            |                     |                     |                        |                     |
| Water Pollution Control and Safe<br>Drinking Water Treatment<br>Revolving Funds Loans | 321,215              | 69,452                     | (14,874)            | 375,793             | 16,504                 | 359,289             |
| Notes with commercial banks   | 247,436              | —                          | (2,748)             | 244,688             | 2,944                  | 241,744             |
| Total notes   | <u>568,651</u>       | <u>69,452</u>              | <u>(17,622)</u>     | <u>620,481</u>      | <u>19,448</u>          | <u>601,033</u>      |
| Lines of credit   | 458,387              | 459,156                    | (166,260)           | 751,283             | —                      | 751,283             |
| Other long-term liabilities:  |                      |                            |                     |                     |                        |                     |
| Accrued compensated absences  | 51,352               | 14,079                     | (16,093)            | 49,338              | 12,674                 | 36,664              |
| Net OPEB obligation   | 7,928                | 7,010                      | (2,485)             | 12,453              | 2,402                  | 10,051              |
| Early retirement obligation   | 3,960                | —                          | (321)               | 3,639               | 1,025                  | 2,614               |
| Customers' deposits   | 77,555               | 8,285                      | (6,000)             | 79,840              | 5,766                  | 74,074              |
| Total other liabilities   | <u>140,795</u>       | <u>29,374</u>              | <u>(24,899)</u>     | <u>145,270</u>      | <u>21,867</u>          | <u>123,403</u>      |
| Total – long-term<br>obligations  | <u>\$ 3,734,861</u>  | <u>\$ 581,627</u>          | <u>\$ (218,475)</u> | <u>\$ 4,098,013</u> | <u>\$ 48,631</u>       | <u>\$ 4,049,382</u> |



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Notes to Financial Statements (continued)

**10. Bonds Payable**

Bonds payable consisted of the following (in thousands):

|   | June 30      |              |
|---|--------------|--------------|
|   | 2011         | 2010         |
| Commonwealth Appropriation Bonds:   |              |              |
| Series 2001:  |              |              |
| Series A, 4.00% – 5.50% due in semiannual interest payments through 2011 and annual principal installments from August 1, 2007 through 2011   | \$ 8,985     | \$ 17,600    |
| Act 164 PFC, 4.00% – 6.15% due in semiannual interest and annual principal payments from July 15, 2004 through 2030   | 341,565      | 341,565      |
| Series 2004:  |              |              |
| Series A, 1.25% – 5.75% due in semiannual interest payments through August 1, 2031 and annual principal installments from July 15, 2004 to 2031   | 326,785      | 326,785      |
| Revenue Refunding Bonds:  |              |              |
| Series 2008:  |              |              |
| Series A and B, Term Bonds, 5.80% – 6.10% due in monthly interest payments through July 1, 2034 and annual principal payments from July 1, 2021 to 2034   | 284,755      | 284,755      |
| Revenue bonds:  |              |              |
| Series 2008:  |              |              |
| Series A, Serial Bonds, 5.00%, due in semiannual interest payments through July 1, 2025 and annual principal payments from July 1, 2012 to July 1, 2025   | 93,155       | 93,155       |
| Series A, Convertible Capital Appreciation Bonds, 6.125%, due in semiannual interest payments from January 1, 2012 through July 1, 2024 and annual principal payments from July 1, 2017 to 2024 | 155,975      | 146,843      |
| Series A, Term Bonds, 5.00% – 6.00%, due semiannual interest payments through July 1, 2047 and annual principal payments from July 1, 2026 to 2047  | 1,095,125    | 1,095,125    |
| Series B, Serial Bonds, 6.15% due in monthly interest payments through July 1, 2038 and one principal payment on July 1, 2038   | 22,445       | 22,445       |
| Rural development serial bonds:   |              |              |
| Serial bonds, 4.25% – 5.00%, due semiannually through July 1, 2050  | 306,030      | 312,079      |
| Subtotal  | 2,634,820    | 2,640,352    |
| Bond premium  | 34,609       | 36,316       |
| Bond discount   | (15,805)     | (16,244)     |
| Deferred amount on refundings   | (73,884)     | (79,445)     |
| Total   | \$ 2,579,740 | \$ 2,580,979 |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**10. Bonds Payable (continued)**

**2001 Series A and B Bonds**

Joint Resolution No. 523 (J.R. 523) of the Commonwealth, approved on August 24, 2000, authorized the Authority to restructure and refinance a line of credit with GDB in a principal amount not to exceed approximately \$390 million. The funds from the line of credit were used to finance the construction of the north coast supraaqueduct project (Superaqueduct). The line of credit was restructured and refinanced through the issuance by Puerto Rico Public Finance Corporation (PFC), a component unit of GDB, on August 1, 2001, of approximately \$356.7 million of Series A Bonds at a premium of approximately \$2.3 million and approximately \$33.3 million of Series B Bonds. The net proceeds of the 2001 Series A and B Bonds of approximately \$381.1 million, after payment of the cost of issuance of approximately \$9.6 million and approximately \$1.6 million, set aside to cover capitalized interest, were used by PFC to purchase the outstanding promissory note of the Authority from GDB.

The Authority's 2001 Series A and B Bonds are secured by promissory note payments made by the Commonwealth to PFC pursuant to a Debt Restructuring and Assignment Agreement, dated August 1, 2001, between the Authority and PFC. In accordance with J.R. 523, such payments shall be funded by Commonwealth appropriations approved annually up to a maximum of approximately \$34.9 million per fiscal year for a term of 30 years ending in fiscal year 2031-2032. The Commonwealth is not legally bound to appropriate funds for such promissory payments. Payments of principal and interest on the bonds are due on or before July 15 of each fiscal year, commencing July 15, 2004.

**Act 164 PFC Bonds**

On December 17, 2001, Act No. 164 (Act 164) of the Commonwealth authorized departments, agencies, instrumentalities, and public corporations of the Commonwealth, including the Authority, to restructure their outstanding obligations with GDB, for which no repayment source existed, over a period not exceeding 30 years.

Pursuant to Act 164, on January 16, 2002, PFC issued approximately \$771.3 million of Series C Bonds, approximately \$40.7 million of Series D Bonds, and \$1,091.0 million of Series E Bonds, for the purpose of funding the purchase by PFC of certain promissory notes held by GDB. The Authority's then outstanding debt with GDB of approximately \$609.2 million was restructured with proceeds of approximately \$712.1 million from these issuances which included capitalized interest and issuance cost and its note evidencing this debt was purchased by PFC from GDB.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**10. Bonds Payable (continued)**

**Act 164 PFC Bonds (continued)**

The 2001 Series C and E Bonds are secured by promissory note payments made by the Commonwealth to PFC pursuant to a Debt Restructuring and Assignment Agreement dated July 1, 2001, between the debtors, including the Authority, and PFC. In accordance with Act 164, such payments shall be funded by Commonwealth appropriations approved annually up to a maximum of approximately \$225 million per fiscal year for a term of 30 years. The Commonwealth is not legally bound to appropriate funds for such promissory notes payments. Payments of principal and interest on bonds are due on or before July 15 of each fiscal year, commencing July 15, 2004.

On June 28, 2004, PFC issued approximately \$1,206.1 million of Series A Refunding Bonds at a premium of approximately \$89.4 million, and approximately \$146.9 million of Series B Refunding Bonds, for the purpose of refunding a portion of certain of its outstanding bonds.

The net proceeds from the 2004 Series A and B Refunding Bonds amounting to approximately \$1,395 million, after payment of the cost of issuance and bond premium of approximately \$47.4 million, were used to advance refund a portion of PFC's previously issued bonds in order to obtain lower interest rates. The Authority's allocable share of the total refunded debt was approximately \$734 million at the issuance date including the unrefunded original PFC debt and the refunded debt through 2004 Series A and B. This refunding resulted in the Authority's recognition of net debt issuance cost of approximately \$11.7 million, a net premium of approximately \$44.4 million, and deferred refunding loss of approximately \$67.2 million, all of which is being amortized over the term of the new debt, which is through 2031.

The 2004 Series A and B Bonds are secured by promissory notes payments made by the Commonwealth to PFC pursuant to Supplemental Debt Restructuring and Assignment Agreements, between the debtors, including the Authority, and PFC. In accordance with various Appropriation Acts, principal and interest payments on such notes shall be funded by Commonwealth appropriations approved annually for the number of fiscal years specified in such Appropriation Acts. The Commonwealth is not legally bound to appropriate funds for such repayments. Until the fiscal year beginning July 1, 2005, the Authority's promissory note payments were made by Commonwealth appropriations authorized by J.R. 523 and Act 164. Payments of principal and interest on bonds are due on or before July 15 of each fiscal year.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**10. Bonds Payable (continued)**

**Act 164 PFC Bonds (continued)**

On July 31, 2007, December 20, 2007 and June 26, 2008, the Puerto Rico Sales Tax Financing Corporation (known as COFINA for its Spanish acronym), a component unit of the Commonwealth, issued its Sales Tax Revenue Bonds Series 2007A and B, Series 2007C and Series 2009A, respectively, to refinance certain of the Act 164 PFC Bonds outstanding and the corresponding notes issued by PFC by certain of the Commonwealth's agencies and component units, (including the Authority). The Series 2009A and B proceeds were deposited in escrow with The Bank of New York/Mellon as master escrow agent. As a result, approximately \$180.2 million of the Authority's share of the Act 164 PFC Bonds were considered legally defeased. The proceeds of the Series 2007C Bonds were used, in part, to purchase and cancel approximately \$61.4 million of the Authority's share of the Act 164 PFC Bonds. The proceeds of the Series 2009A Bonds were used to purchase and cancel approximately \$127.4 million of the Authority's share of the Act 164 PFC Bonds.

As of June 30, 2007, the Authority's share of the Act 164 PFC Bonds was approximately \$721.3 million. After the COFINA debt refunding, the balance was reduced to approximately \$341.6 million.

**2004 Series A Refunding Bonds**

The 2004 Series A Refunding Bonds mentioned above, also refinanced outstanding debt related to the Superaqueduct. The 2004 Series A balance related to the Superaqueduct was approximately \$326.8 million as of the refunding date, with maturity dates ranging from August 1, 2013 to August 1, 2031.

**2008 Revenue Bonds Series A and B**

On March 18, 2008, the Authority issued approximately \$1,338.6 million of Revenue Bonds, Series A and B (the 2008 Revenue Bonds). The 2008 Revenue Bonds Series A consist of (1) \$93.2 million of serial bonds bearing interest at 5% per annum with maturity dates ranging from July 1, 2012 to July 1, 2025, (2) \$127.9 million of capital appreciation term bonds bearing interest at 6 1/8% per annum and with maturity dates ranging from July 1, 2017 to July 1, 2024, and (3) \$1,095.1 million of term bonds bearing interest at rates ranging from 5% to 6% per annum with maturity dates ranging from July 1, 2026 to July 1, 2047.

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Notes to Financial Statements (continued)

**10. Bonds Payable (continued)**

**2008 Revenue Bonds Series A and B (continued)**

As of June 30, 2011 and 2010, the outstanding balance for the 2008 Revenue Bonds Series A was approximately \$1,344.2 million and \$1,335.1 million, respectively, which included approximately \$28.0 million and \$18.9 million, respectively, of accreted value. The 2008 Revenue Bonds Series B consist of an approximately \$22.4 million term bond bearing interest at 6.15% per annum and maturing on July 1, 2038. The 2008 Revenue Bonds were issued, to raise funds to be used by the Authority to repay certain outstanding bond anticipation notes and lines of credit and to pay a portion of the cost of the Authority's capital improvement program. The 2008 Revenue Bonds are considered senior debt.

**2008 Revenue Refunding Bonds Series A and B**

On March 18, 2008, the Authority issued approximately \$284.8 million of Revenue Refunding Bonds, Series A and B (the 2008 Revenue Refunding Bonds), (guaranteed by the Commonwealth) to refund the Authority's outstanding Revenue Refunding Bonds, Series 1995 (guaranteed by the Commonwealth) in the amount of approximately \$262.8 million. The 2008 Revenue Refunding Bonds bear interest at rates ranging from 5.80% to 6.10% per annum with maturity dates ranging from July 1, 2021 to July 1, 2034. The Revenue Refunding Bonds, Series A and B net proceeds of approximately \$279.5 million (after payment of approximately \$5.3 million in underwriters' discount, insurance, and other issuance costs) and other funds made available from sinking funds and investment accounts from the refunded bonds, were deposited in an irrevocable trust with an escrow agent to pay all future principal and interest payments of the Series 1995 Bonds to their respective dates of redemption or maturity. As a result, the 1995 Series Bonds are considered to be legally defeased and the liability for those bonds has been removed from the Authority's balance sheets.

The defeasance of the 1995 Series Bonds increased the Authority's total debt service payments over the next 25 years by approximately \$292.8 million and resulted in an economic loss (difference between the present values of the old and new debt service payments) of approximately \$12.7 million. The advance refunding resulted in a difference between the reacquisition price and the net carrying amount of the old debt of approximately \$35.9 million. This difference, reported in the accompanying financial statements as a deduction from bonds payable, is being charged to operations through the year 2019 following a method substantially equivalent to the effective interest method.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**10. Bonds Payable (continued)**

**2008 Revenue Refunding Bonds Series A and B (continued)**

The 2008 Revenue Refunding Bonds are guaranteed by the Commonwealth and the Authority's net revenue, as defined in the corresponding trust indenture, is pledged toward the payment of debt service on these bonds. The 2008 Revenue Refunding Bonds are subordinated to all senior and senior subordinated debt.

**Rural Development Serial Bonds**

United States Department of Agriculture (USDA) Rural Development Program assists the Authority in the financing and construction of aqueduct and sewer facilities in rural areas by purchasing revenue bonds from the Authority, the proceeds of which are used by the Authority to finance such projects. GDB provides interim financing for these projects through short-term lines of credit. As of June 30, 2011 and 2010, the USDA Rural Development Program Serial Bonds consisted of twenty-four (24) separate series, issued from 1983 through 2009, bearing interest from 4.25% to 5% due in semiannual installments through 2050. The outstanding balance of the USDA Rural Development Program Serial Bonds as of June 30, 2011 and 2010 was approximately \$306.0 million and \$312.1 million, respectively.

The USDA Rural Development Program Serial Bonds are guaranteed by the Commonwealth, pursuant to Law No. 140 of 2000 as amended and the Authority's net revenue is pledged toward the payment of debt service on the USDA Rural Development Program Serial Bonds. The USDA Rural Development Program Serial Bonds are subordinate to all senior and senior subordinated.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**10. Bonds Payable (continued)**

**Debt Service Payments**

Future principal and interest payments on all bonds payable outstanding at June 30, 2011 are as follows (in thousands):

|                                 | <u>Principal</u>    | <u>Interest</u>     | <u>Total</u>        |
|---------------------------------|---------------------|---------------------|---------------------|
| Fiscal year:                    |                     |                     |                     |
| 2012                            | \$ 12,108           | \$ 134,783          | \$ 146,891          |
| 2013                            | 18,693              | 136,162             | 154,855             |
| 2014                            | 33,406              | 135,516             | 168,922             |
| 2015                            | 34,970              | 134,035             | 169,005             |
| 2016                            | 38,369              | 132,106             | 170,475             |
| 2017 – 2021                     | 224,773             | 627,203             | 851,976             |
| 2022 – 2026                     | 359,258             | 553,336             | 912,594             |
| 2027 – 2031                     | 650,802             | 437,740             | 1,088,542           |
| 2032 – 2036                     | 382,825             | 292,852             | 675,677             |
| 2037 – 2041                     | 311,945             | 201,343             | 513,288             |
| 2042 – 2046                     | 387,453             | 101,459             | 488,912             |
| 2047 – 2051                     | 180,218             | 9,398               | 189,616             |
| Total                           | 2,634,820           | <u>\$ 2,895,933</u> | <u>\$ 5,530,753</u> |
| Plus unamortized premium        | 34,609              |                     |                     |
| Less:                           |                     |                     |                     |
| Unamortized discount            | (15,805)            |                     |                     |
| Deferred loss on debt refunding | <u>(73,884)</u>     |                     |                     |
| Bonds payable, net              | <u>\$ 2,579,740</u> |                     |                     |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**11. Notes Payable**

Notes payable consisted of the following (in thousands):

|   | <b>June 30</b>    |                   |
|---|-------------------|-------------------|
|   | <b>2011</b>       | <b>2010</b>       |
| Puerto Rico Water Pollution Control Revolving Fund            | \$ 266,964        | \$ 249,687        |
| Puerto Rico Safe Drinking Water Treatment Revolving Loan Fund | 146,485           | 126,106           |
| Notes with commercial banks                                   | 241,744           | 244,688           |
|   | <b>\$ 655,193</b> | <b>\$ 620,481</b> |

The Puerto Rico Water Pollution Control Revolving Fund and Puerto Rico Safe Drinking Water Treatment Revolving Loan Fund (the Revolving Funds) were created by Act. No. 44 of June 21, 1988 and Act No. 32 of July 7, 1997, respectively, of the Commonwealth. The Puerto Rico Water Pollution Control Revolving Fund is administered, pursuant to Act No. 44 and Act No. 9 of June 21, 1988 and June 18, 1970, respectively, as amended, by Puerto Rico Environmental Quality Board (EQB). The Puerto Rico Safe Drinking Water Treatment Revolving Loan Fund is administered, pursuant to Act No. 5 of July 21, 1977, as amended, by Puerto Rico Department of Health (DOH).

Pursuant to these laws, EQB and DOH, on behalf of the Commonwealth, are authorized to enter into operating agreements and capitalization grant agreements with the U.S. Environmental Protection Agency (EPA). Puerto Rico Infrastructure Financing Authority (PRIFA), a component unit of the Commonwealth, the Authority, and GDB entered into a memorandum of understanding under which each party has agreed to assume specific responsibilities in connection with the operations of the Revolving Funds.

The Authority has entered into revolving loan agreements with PRIFA to finance certain capital improvements to the system. As of June 30, 2011 and 2010, the Authority had outstanding approximately \$413.4 million and \$375.8 million, respectively, under these loan agreements.

The PRIFA loan agreements are evidenced by promissory notes, which bear interest at a 2% annual rate payable semiannually. Construction loans are required to be paid in full within 20 years of the project completion date. The Authority has pledged its net revenues on a basis subordinate in all respects to the Authority's bonds outstanding. If the Authority's pledged revenues are not sufficient for the payment of principal and interest, the payments are guaranteed by the Commonwealth under the Act No. 45 of July 28, 1994, as amended, which obligates the Commonwealth to pay principal and interest on the notes.



Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**11. Notes Payable (continued)**

On September 8, 2006, the Authority entered into a \$250 million term loan agreement with various commercial banks. The proceeds were used to repay various lines of credit with GDB and pay costs and fees associated with the term loan. During fiscal year 2011 and 2010, the loan bore interest at 3.25%. The loan is payable in quarterly installments commencing on September 1, 2008 and due on September 1, 2011. The outstanding balance as of June 30, 2011 and 2010 was approximately \$241.7 million and \$244.7 million respectively. The net revenue of the Authority, as defined in the Term Loan Agreement, is pledged toward payment of debt service on this term loan. The notes are considered senior subordinated debt and are subordinated to the senior debt.

The combined future aggregate amount of debt service for these loans as of June 30, 2011 was as follows (in thousands):

|  | <u>Principal</u>  | <u>Interest</u>  | <u>Total</u>      |
|--|-------------------|------------------|-------------------|
| 2012   | \$ 260,041        | \$ 7,694         | \$ 267,735        |
| 2013   | 18,081            | 5,322            | 23,403            |
| 2014   | 18,444            | 4,958            | 23,402            |
| 2015   | 18,757            | 4,588            | 23,345            |
| 2016   | 18,292            | 4,213            | 22,505            |
| 2017 – 2021  | 82,808            | 15,838           | 98,646            |
| 2022 – 2026  | 73,722            | 8,097            | 81,819            |
| 2027 – 2031  | 40,485            | 1,587            | 42,072            |
|  | <u>530,630</u>    | <u>\$ 52,297</u> | <u>\$ 582,927</u> |
| Interim construction loans:                                      |                   |                  |                   |
| Puerto Rico Water Pollution Control<br>Revolving Fund            | 73,632            |                  |                   |
| Puerto Rico Safe Drinking Water<br>Treatment Revolving Loan Fund | 50,931            |                  |                   |
| Total  | <u>\$ 655,193</u> |                  |                   |

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**12. Lines of Credit**

On October 19, 2000, the Authority entered into a line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of approximately \$103.9 million. On October 29, 2004, the maximum available amount was increased to approximately \$276 million to assist the Authority in financing the construction of aqueduct and sewer facilities in rural areas. As of June 30, 2009, the Authority had an outstanding balance of approximately \$14.6 million. During fiscal year 2010 the line of credit was repaid and a new line of credit of \$37.6 million was established for construction of rural projects.

On November 13, 2006, the Authority entered into a line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$190 million to be used to provide funding for the capital improvement program of the Authority. On February, 2010, an increase of \$60 million for a maximum amount of \$250 million was approved. On November, 2010 the line was increased by \$19.5 million to \$269.5 million to capitalize unpaid accrued interest payable. As of June 30, 2011 and 2010, the Authority had an outstanding balance of \$269.5 million and \$250 million, respectively.

On March 18, 2008, the Authority entered into a revolving line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$150 million to be used to satisfy the Operating Reserve Requirement pursuant to the Master Agreement of Trust dated as of March 1, 2008 between the Authority and the bond trustee related to the 2009 Revenue Bonds. This line of credit is due on June 30, 2013. There was no outstanding balance as of June 30, 2011 and 2010.

On May 4, 2009, the Authority entered into a revolving line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$87.6 million to be used to provide funding for the capital improvement program of the Authority. As of June 30, 2011 and 2010, the Authority had an outstanding balance of approximately \$87.6 million.

On November 12, 2009, the Authority entered into a revolving line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$125 million to be used to provide funding for the capital improvement program of the Authority. As of June 2011 and 2010, the Authority had an outstanding balance of \$125 million.

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Notes to Financial Statements (continued)

**12. Lines of Credit (continued)**

On December 8, 2009, the Authority entered into a line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of approximately \$37.6 million for the purpose of providing interim financing for the construction of aqueduct and sewer facilities in rural areas. As of June 30, 2011 and 2010, the Authority had an outstanding balance of approximately \$13.4 million and \$8.5 million respectively.

On December 30, 2009, the Authority entered into a line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$150 million to be used to provide funding for the capital improvement program of the Authority. As of June, 2011 and 2010, the Authority had an outstanding balance of \$150 million, respectively.

On March 10, 2010, the Authority entered into a revolving line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$70 million to be used to provide funding for the capital improvement program of the Authority. The proceeds will be applied only to projects approved and to be funded by the State Revolving Funds pursuant to federal regulations under the Clean Water Act, the Safe Drinking Water Act, and the American Recovery Act ("ARRA"). The Authority will pay this interim financing with moneys received from State Revolving Funds, as reimbursements on payments done by the Authority for the projects. As of June 30, 2011 and 2010, the Authority had an outstanding balance of approximately \$48.3 million and \$16.8 million on this line of credit, respectively.

On April 16, 2010, the Authority entered into a revolving line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$50 million to be used to provide funding for the capital improvement program of the Authority. On June 7, 2010, the maximum available amount was increased to approximately \$113.9 million. On August 3, 2010 the maximum available amount was increased to approximately \$200 million. As of June, 2011 and 2010, the Authority had an outstanding balance of \$200 million and \$113.9 million, respectively.

On November 30, 2010, the Authority entered into a line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of approximately \$21.7 million for the purpose of providing interim financing for the construction of aqueduct and sewer facilities in rural areas. As of June 30, 2011, the Authority had an outstanding balance of approximately \$10.5 million under this line of credit agreement.

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Notes to Financial Statements (continued)

**12. Lines of Credit (continued)**

On March 8, 2011, the Authority entered into a line of credit agreement with GDB. This agreement provides the Authority with an available maximum amount of \$250 million to be used to provide funding for the capital improvement program of the Authority. As of June, 2011, the Authority had an outstanding balance of approximately \$125.5 million.

Future amounts required to pay principal balances at June 30, 2011 are as follows (in thousands):

|              |                            |
|--------------|----------------------------|
| Fiscal year: |                            |
| 2012         | \$ 27,770                  |
| 2013         | <u>1,002,179</u>           |
|              | <u><u>\$ 1,029,949</u></u> |

**13. Financial Covenants**

The Master Agreement of Trust (the MAT) governing the 2008 Revenue Bonds and the Term Loan Agreement governing the notes with commercial banks, each contain distinct financial covenants requiring the maintenance of certain financial ratios.

The MAT contains a rate covenant requiring the Authority to fix, charge, collect and revises rates, fees and other charges for the use of and the services furnished by its systems so as to meet in each fiscal year, the following annual debt service requirements: (i) net revenues shall be at least equal to 120% of the annual debt service with respect to the senior indebtedness for such fiscal year; (ii) net revenues shall be at least equal to 110% of the annual debt service with respect to senior indebtedness and senior subordinated indebtedness for such fiscal year; and (iii) net revenues shall be sufficient to pay annual debt service on its indebtedness and to fund other amounts that may be due under the MAT. Indebtedness, as defined in the MAT, includes Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations.

As of June 30, 2011 and 2010, the Authority was in compliance with the senior indebtedness and the senior and senior subordinated indebtedness annual debt service coverage requirements.

The Term Loan Agreement requires the Authority to maintain, for each fiscal year, a senior and senior subordinated debt service coverage ratio equal to at least 1.20. As of June 30, 2011 and 2010, the Authority was in compliance with the senior and senior subordinated debt service coverage ratio under the Term Loan Agreement.

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Notes to Financial Statements (continued)

**14. Capital Contributions**

Capital contributions for the fiscal years ended June 30, 2011 and 2010 were as follow (in thousands):

|   | <b>June 30</b>   |                   |
|---|------------------|-------------------|
|   | <b>2011</b>      | <b>2010</b>       |
| Appropriations from Commonwealth                            | \$ 212           | \$ 560            |
| Other contributions from Commonwealth                       | 2,265            | 942,280           |
| Contributions from governmental agencies and municipalities | 3,947            | 3,841             |
| Federal grants:   |                  |                   |
| USDA Rural Development Program                              | 3,235            | 8,044             |
| Federal Emergency Management Agency                         | 1,247            | 4,325             |
| American Recovery and Reinvestment Act Funds                | 19,698           | 3,066             |
| Developer contributions                                     | 2,477            | 1,976             |
| Other contributions   | 1,194            | 5,285             |
|   | <b>\$ 34,275</b> | <b>\$ 969,377</b> |

**15. Related Party Transactions**

Operating revenues for services provided to the Commonwealth and its component units amounted to approximately \$79.7 million and \$84.5 million during the years ended June 30, 2011 and 2010, respectively. Further, operating, administrative, and general expenses during the fiscal years ended June 30, 2011 and 2010 included approximately \$156.6 million and \$140.1 million, respectively, of charges from Puerto Rico Electric Power Authority (PREPA), a component unit of the Commonwealth.

As of June 30, 2011 and 2010, the Authority had approximately \$46.6 million and \$65 million, respectively, of receivables from the Commonwealth and its component units, which were reported in accounts receivable in the accompanying basic financial statements.

The Authority had approximately \$1.6 million and \$1.1 million of excess of collections over billings from the Commonwealth, recorded as unearned revenue in the basic financial statements as of June 30, 2011 and 2010, respectively.

Over the years, GDB, as fiscal agent and bank of the Commonwealth, had extended lines of credit to the Authority in order to finance capital improvement projects and operational deficits. As of June 30, 2011 and 2010, the Authority had an outstanding balance of approximately \$1,029.9 million and \$751.3 million, respectively, under these lines of credit.

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Notes to Financial Statements (continued)

**15. Related Party Transactions (continued)**

On July 2, 2010, Joint Resolution No. 68 was approved by the Puerto Rico Legislature. This Resolution assigned to the Authority the amount of \$85 million to subsidize operating expenses and payment of debt service, as needed.

**16. Pension Plan**

The Government of Puerto Rico Employees Retirement System (ERS) is a cost-sharing multiple-employer defined benefit pension plan sponsored by, and reported as a component unit of, the Commonwealth. All regular employees of the Authority under the age of 55 at the date of employment become members of the ERS as a consequence of their employment.

The ERS provides retirement, death, and disability benefits pursuant to Act 447, approved on May 15, 1951, as amended, which became effective on January 1, 1952. Disability retirement benefits for occupational and nonoccupational disabilities are available to members enrolled in the plan before January 1, 2000. Benefits vest after ten years of plan participation.

The amount of the annuity shall be one and one half percent (1.5%) of the average compensation multiplied by the number of years of creditable service up to twenty (20) years, plus two percent (2%) of the average compensation multiplied by the number of years of creditable service in excess of twenty years. In no case shall the annuity be less than \$200 per month.

Participants who have completed at least thirty years of creditable service are entitled to receive a Merit Annuity. Such participants who have not attained fifty-five years of age will receive 65% of the average compensation or if they have attained fifty-five years of age will receive 75% of the average compensation. Disability retirement benefits are available to members for occupational and nonoccupational disability. However, for nonoccupational disability a member must have at least ten years of service. No benefits are payable if participants receive a refund of their accumulated contributions.

Commonwealth legislation requires that employees hired before April 1, 1990 contribute 5.775% of the first \$550 of their monthly gross salary and 8.275% of their gross monthly salary in excess of \$550. Employees hired after April 1, 1990 contribute 8.275% of their gross monthly salary. The Authority's contributions are 9.275% of the gross monthly salary.

Total employer contributions during years ended June 30, 2011, 2010, and 2009 amounted to approximately \$8.5 million, \$10 million, and \$10.7 million, respectively, which represented 100% of required contributions.

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Notes to Financial Statements (continued)

**16. Pension Plan (continued)**

On September 24, 1999, an amendment to Act No. 447 of May 15, 1951, which created the ERS, was enacted for the purpose of establishing a new pension program (System 2000). System 2000 became effective on January 1, 2000. Employees participating in the ERS as of December 31, 1999 had the option to stay in the defined benefit plan or transfer to System 2000. Employees joining the Authority on or after January 1, 2000 are only allowed to become members of System 2000.

System 2000 is a defined contribution plan, also known as a cash balance plan. Under this new plan, there is a pool of pension assets, which are invested by the ERS, together with those of the current defined benefit plan. Benefits at retirement age are not guaranteed by the Commonwealth. The annuity is based on a formula that assumes that each year the employee's contribution (with a minimum of 8.275% of the employee's salary up to a maximum of 10%) is invested in an account, which will either: (1) earn a fixed rate based on the two-year Constant Maturity Treasury Note or (2) earn a rate equal to 75% of the return of the ERS' investment portfolio (net of management fees), or (3) earn a combination of both alternatives. Participants receive periodic account statements similar to those of defined contribution plans showing their accrued balances.

System 2000 reduces the retirement age from 65 years to 60 for those employees who joined the ERS on or after April 1, 1990. Disability pensions are not granted under System 2000. The employers' contributions (9.275% of the employee's salary) are used to fund the defined benefit plan.

Total employer contributions during the fiscal years ended June 30, 2011, 2010 and 2009, amounted to approximately \$3.9 million, \$4 million, and \$4 million, respectively, which represented 100% of required contributions.

Additional information on the ERS is provided in its financial statements for the years ended June 30, 2011 and 2010, a copy of which can be obtained from the Administrator of the Retirement System: P.O. Box 42003, San Juan, Puerto Rico 00940.

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Notes to Financial Statements (continued)

**17. Other Postemployment Benefits**

**Plan Description**

The Authority provides retirement healthcare benefits under the Healthcare Benefit Plan to Retirees (the Plan) pursuant to collective bargain agreements. The Plan is administered by the Authority. Benefits consist of a fixed maximum monthly payment (annuity) to cover medical expenses. Based on the Plan's features and functionality, and for the purpose of the actuarial valuation, it has been identified as a single-employer defined benefit healthcare plan. Participants groups covered are employees under Collective Labor Agreement with "Union Independiente Autentica" (UIA), employees under Collective Labor Agreement with "Hermandad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados" (HIEPAAA) and employees under Managers' Regulation, all of which are Authority employees. All employees with more than 20 years of rendered service within the Authority are eligible for the healthcare benefit upon retirement age. Normal retirement age is as follows:

- ▶ For those employees employed by the Authority before March 30, 1990, normal retirement age would be at:
  - 30 years of service;
  - 10 to 24 years of service and 58 years old; or
  - 25 years of service and 55 years old.
- ▶ For employees employed by the Authority after March 30, 1990, normal retirement age would be at:
  - 10 years of service and 65 years old; or
  - 25 years of service and 55 years old.

The obligation ends in case of death before retirement and in case of total or permanent disability before retirement. The obligation also ends in case of death after retirement.

**Funding Policy**

The contribution requirements of the Authority are established and may be amended, by each collective bargain agreement. The benefits are paid directly by the Authority to the retirees at a rate of a maximum of \$125 per month per retiree. The Plan is financed on a pay-as-you-go basis and the amount contributed during the year ended June 30, 2011 and 2010 was approximately \$2.5 million, which is in accordance with the funding policy. There is no contribution requirement for plan members.



Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**17. Other Postemployment Benefits (continued)**

**Annual OPEB costs and Net OPEB obligation**

The Annual Pension Cost (APC) and the Annual Required Contribution (ARC) were computed as part of an actuarial valuation performed as of June 30, 2011, in accordance with parameters of GASB Statement No. 45 based on current years' demographic data. The ARC represents a level of funding that, if paid on an ongoing basis, is projected to cover normal cost each year and amortize any unfunded actuarial accrued liabilities (UAAL) over a period of 12 years.

The annual required contribution estimated for the years ended June 30, 2011 and 2010 amounted to (in thousands):

|  | <b>2011</b>     | <b>2010</b>     |
|--|-----------------|-----------------|
| Annual Required Contribution (ARC):                |                 |                 |
| Normal costs                                       | \$ 1,715        | \$ 1,715        |
| Amortization of initial UAAL                       | 4,100           | 4,100           |
| Amortization of loss                               | 1,738           | 1,738           |
| GASB Statement No. 45 Annual Required Contribution | <b>\$ 7,553</b> | <b>\$ 7,553</b> |

OPEB costs components for the years ended June 30, 2011 and 2010 are as follows (in thousands):

|                                 | <b>2011</b>     | <b>2010</b>     |
|---------------------------------|-----------------|-----------------|
| Annual OPEB Costs               |                 |                 |
| ARC for fiscal year             | \$ 7,553        | \$ 7,553        |
| Interest on Net OPEB Obligation | 278             | 278             |
| ARC Amortization Adjustment     | (821)           | (821)           |
| Total Annual OPEB Costs         | <b>\$ 7,010</b> | <b>\$ 7,010</b> |

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**17. Other Postemployment Benefits (continued)**

**Annual OPEB costs and Net OPEB obligation (continued)**

The net OPEB obligation change for the years ended June 30, 2011 and 2010 is as follows (in thousands):

|                               | <b>2011</b> | <b>2010</b> |
|-------------------------------|-------------|-------------|
| Change in net OPEB obligation |             |             |
| Net OPEB obligation           | \$ 12,453   | \$ 7,928    |
| Total annual OPEB costs       | 7,010       | 7,010       |
| Actual benefit payments       | (2,315)     | (2,485)     |
| Net OPEB obligation           | \$ 17,148   | \$ 12,453   |

The net OPEB obligation is recorded as a component of compensated absences and postemployment benefits in the accompanying balance sheet as of June 30, 2011 and 2010.

**Funded Status**

Funded status of the plan as of July 1, 2009, the most recent actuarial valuation date, is as follows (in thousands):

|  | <b>2011</b> | <b>2010</b> |
|--|-------------|-------------|
| Unfunded Actuarial Accrued Liability (UAAL): |             |             |
| Active employees                             | \$ 23,721   | \$ 23,721   |
| Retirees                                     | 32,693      | 32,693      |
| Actuarial accrued liability                  | 56,414      | 56,414      |
| Actuarial value of assets                    | —           | —           |
| UAAL   | \$ 56,414   | \$ 56,414   |

The schedule of funding progress included as required supplementary information presents multiyear trend information about whether the actuarial value of plan assets is increasing or decreasing over time relative to the actuarial accrued liability for benefits.

Puerto Rico Aqueduct and Sewer Authority  
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Notes to Financial Statements (continued)

**17. Other Postemployment Benefits (continued)**

**Actuarial Assumptions**

Actuarial valuations of an ongoing plan involve estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and the healthcare cost trend. Amounts determined regarding the funded status of the plan and the ARC of the employer are subject to continuous revision as actual results are compared with past expectations and new estimates are made about the future.

**Economic Assumptions**

*Discount Rate*

The discount rate considered for years ended June 30, 2011 and 2010 was 3.5%. For fiscal year 2010, U.S. Treasury Bond 10-year term investments represents the Authority's expected long-term return on internal assets used to finance the payment of plan benefits.

*Medical Increase Rate*

As the retirement healthcare benefit is fixed, such that it will not increase the obligation under the plan (regardless of the claim experience) without negotiation of a new contract with the unions or an express Board of Directors' approval, the medical increase rate was zero for the years ended June 30, 2011 and 2010. If the fixed benefit level does indeed increase sometime in the future (by negotiation or plan amendment), the higher obligation will be recognized when the new contract or amendment is adopted.

**Turnover**

For the years ended June 30, 2011 and 2010, the turnover table used for the valuation was the Standard Hewitt Withdrawal Table for Hourly Union Employees – 5 years of service select period.

**Healthy Mortality**

The RP-2000 Combined Healthy Mortality Table projected to 2009 by Scale AA was used for the valuation of the benefit granted by the plan.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**17. Other Postemployment Benefits (continued)**

**Disability Table**

The Hunter disability table was used for the valuation.

**Actuarial Cost Method**

The actuarial cost method used for by the Authority is Projected Unit Credit (Attribution from date of hire to expected retirement ages).

**Amortization of Initial UAAL**

*Period*

The initial UAAL will be amortized in a 12-year period based on the average future years of service of the active population, starting on fiscal year ended June 30, 2008. The years of service projection considers multiple decrement tables and the latest age of retirement, considered to be 65 years. The open amortization criteria were used for the valuation.

*Method*

The amortization of the UAAL is calculated under the level dollar method based on the fact that there is no payroll component on the benefit.

**18. Labor Union Contracts**

The collective bargaining agreement with the HIEPAAA union, which covers approximately 170 professional employees, was signed effective June 1, 2005 until May 31, 2009. After that date, the agreement has been renewed on a yearly basis for certain clauses. As of June 30, 2011, the labor agreement is under negotiation for economic clauses.

The collective bargaining agreement with the UIA union, which covers approximately 3,800 blue-collar and clerical employees, expired on June 30, 2003. During the year ended June 30, 2005, the UIA employees went on strike for eighty-four (84) days. At the conclusion of the strike, the UIA and the Authority reached an agreement as to a new labor contract. As of June 30, 2011, the contract was in process of being formalized and signed by the parties.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**19. Agreement for Operation, and Management, of the Water and Sewer System**

During fiscal year 2001, Thames-Dick Superaqueduct Partners and the Authority signed a contract for the operation and maintenance of the water intakes and the interconnections tanks with the Authority distribution system, along the PR North Coast route, from Arecibo to Bayamon (Superaqueduct). The contract also includes the operation of a filter plant. Thames-Dick is responsible for the operation, maintenance, security, and for the environmental and regulatory compliance (water quality) for all the operations under the contract. All costs associated with the contract (\$28.5 million and \$22.8 million for the years ended June 30, 2011 and 2010, respectively) are reported under the caption of *Service contract – Superaqueduct* in the accompanying statements of revenues, expenses, and changes in net assets.

**20. Commitments and Contingencies**

**Environmental Matters**

Facilities and operations of the Authority's water and sewer system are subject to regulations under numerous federal and Commonwealth environmental laws. Under agreements with the United States government, acting on behalf of EPA, the Authority and the Commonwealth are subject to consent decrees to enforce compliance with environmental laws. Accordingly, the Authority could be assessed stipulated noncompliance penalties.

- On July 1, 2003, the Authority entered into an agreement (Civil Action No. 01-1709) with EPA to attain compliance with the Clean Water Act in relation to the Authority's wastewater pump stations (WWPSs) in response to a significant number of sanitary sewer bypasses from these locations. The Clean Water Act prohibits discharges of sewage from any point in the collection and treatment system other than the authorized point at the treatment facility. The Authority completed all improvement projects required by EPA for these WWPSs on or before the established completion dates in the Agreement. This agreement also required the Authority to invest \$1 million in the development and implementation of a Supplemental Environmental Project (SEP). This project consisted of the connection of three NON-PRASA communities to the Authority's drinking water system. The connection has been completed and is awaiting completion of adjacent systems to fully integrate these systems to PRASA's service. The agreement also required the implementation of the Preventive Maintenance Program (PMP) for all of PRASA's WWPSs. This was fully completed in December of 2010, after a three phase, EPA-approved implementation schedule.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Environmental Matters (continued)**

As part of the agreement, PRASA pays stipulated penalties for pump station bypass events on a quarterly basis. The penalty calculations are based on the pumping capacity of the pump station and the time taken to correct the deficiency causing the bypass event. The amount paid during fiscal year 2010 and 2011 was approximately \$.4 million.

- On June 22, 2006, the Authority entered into a consent decree (Civil Action No. 06-1624) with EPA that requires the Authority to implement system-wide remedial measures at all of the wastewater treatment plants operated by the Authority. The decree establishes deadlines for the compliance with the conditions set forth in the agreement and stipulates penalties for violation of any of those deadlines. The Authority was assessed a stipulated civil penalty of \$1 million which was paid during fiscal year 2008. This penalty was assessed by the Court as payment for the discharge permit violations of several treatment facilities to the Clean Water Act.

The agreement also required the Authority to deposit in an escrow account with the GDB an additional civil penalty in the amount of \$3 million. These funds are to be used for providing sewer service to a community that has not been connected to the Authority's sanitary sewer system. PRASA is currently engaged in discussion with EPA as to the specific community that will benefit from this project.

As part of the agreement, PRASA pays stipulated penalties on a yearly basis for exceedances to each of PRASA's facilities to their individual discharge permits. The penalty calculations are based on frequency of the exceedances as well as the percentage of the exceedances with its respective limit. The amount paid during fiscal years 2010 and 2011 was approximately \$.5 million. These penalty payments are deposited into an escrow account from which a fraction of the deposited amount can be reimbursed to PRASA based on completion of specific projects and initiatives.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Environmental Matters (continued)**

- On May 25, 2006, the Authority entered into a plea agreement with the U. S. Department of Justice related to violations of the Clean Water Act, as amended, Title 33, USC, Sections 11311(a) and 1319(c)(2)(A). As part of the agreement (Criminal Case No. 06-CR-00202-001), the Authority paid a \$9 million fine. This penalty was assessed by the Court as payment for the discharge permit violations of several treatment facilities to the Clean Water Act. In addition, the agreement required the Authority to comply with several special conditions, such as: (i) upgrade the collection and wastewater treatment system in the Ponce de León Avenue area of San Juan for a cost of not less than \$10 million to prevent direct discharges to the Martin Peña Channel, (ii) upgrade nine waste water treatment plants for a cost not less than \$109 million, and (iii) comply with the consent decree signed by the Authority with the U.S. Government on June 22, 2006. The plea agreement also established stipulated penalties for violation of any of the deadlines or performance standards set forth in the agreement. As of today, the Authority is in compliance with the deadlines and requirements of this Consent Order and no penalties have been paid.
  
- On December 15, 2006, an agreement (Civil Case No. KPE 2006-0858) was signed between the Authority and the Department of Health of the Commonwealth related to violations of the Safe Drinking Water Act (SDWA), as amended. The agreement was preliminarily approved by the supervising court on March 15, 2007 and it was amended and finally approved by that court on June 20, 2008. The Authority agreed to implement a work plan to remediate the violations, establish a preventive and mitigation measures, and execute a preventive maintenance program for the purpose of meeting the requirements of the SDWA. This Act requires the compliance with parameters of water quality and treatment techniques in the Authority's water systems. As part of the agreement, the Authority paid a penalty of \$1 million during fiscal year ended June 30, 2007. The civil penalty was stipulated by the court for alleged non-compliance issues to the Safe Drinking Water Act attended in this decree. In this Consent Decree, the Authority shall pay stipulated penalties for failing to comply with remedial measures deadlines, fail to submit deliverables or exceedances to maximum contaminant levels.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Environmental Matters (continued)**

During fiscal year ended June 30, 2008 and based on the amendment and final approval of the agreement, the Authority accrued approximately \$2.7 million for penalties for noncompliance as stipulated by the final agreement, which were paid during fiscal year 2009. Also, as part of the penalties for noncompliance with the remedial measures of the agreement with the Department of Health during fiscal year 2009, \$1.3 million were deposited in a GDB escrow account to be used for a SEP. This SEP included three projects: (1) a chemical monitoring of 67 Non-PRASA systems, (2) the installation of a disinfection system in six Non- PRASA systems, and (3) the connection of schools that have their own deficient water systems, to the Authority's water system.

During fiscal year ended June 30, 2010, the Authority paid the amount of \$.1 million, part paid in penalties and part deposited in an escrow account. The penalties deposited in the escrow account, for parameters exceedances, will be used for compliance project of the Authority with the approval of the Department of Health. In fiscal year ended June 30, 2011 the amount paid by this consent decree was approximately \$.2 million.

- On November 2007, the Authority entered into negotiation of a consent decree (Civil Action No. 10-1365) with EPA that requires the Authority to implement system wide remedial measures at all of the sludge treatment systems at the water treatment plants owned and operated by the Authority. The consent decree was lodged on May 3, 2010 and its entry date was August 24, 2010. This consent order closed previous Consent Orders known as PRASA II (Civil Action No. 92-1511) and PRASA III (Civil Action No. 00-2554). This consent order establishes deadlines for the compliance with the conditions set forth in the proposed agreement and stipulates penalties for violation of any of those deadlines.



Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Environmental Matters (continued)**

The Authority was assessed a penalty of approximately \$3.2 million which was paid during fiscal year 2011. In accordance with this consent decree, from the amount of \$3.2 million, the Authority paid a civil penalty of approximately \$1 million to the Treasurer of the United States of America. The civil penalty was established by EPA and US Department of Justice for the alleged non-compliance issues attended in this consent decree associated with the Clean Water Act. The other amount of approximately \$2.2 million was deposited in an escrow account with GDB for the design and construction of a SEP. As part of this consent decree, the SEP Project that will be executed by the Authority is the installation of an aeration system in the Toa Vaca Lake. The aeration system is under construction.

The total amount of penalties paid under this agreement during the fiscal year 2011 was approximately \$.1 million. Stipulated penalties must be paid by the Authority for failing to comply with remedial measures deadlines, fail to submit deliverables or DMR's monthly reports or permit limit exceedances.

The Authority is a defendant in other environmental minor lawsuits, pending trial or final judgment. The Authority intends to vigorously defend itself against all of the allegations. Management, based on the advice of legal counsel, is of the opinion that any liability that may result from such lawsuits would not have a material adverse effect on the Authority's financial position as of June 30, 2011.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Risk Management**

The Authority has acquired commercial insurance to mitigate its exposure to certain losses involving real and personal property (including windstorm, flood and earthquake damages) and comprehensive general and automobile claims. Each commercial insurance policy maintained by the Authority contains specific policy limits and deductibles. A summary of the commercial insurance maintained by the Authority is as follows:

| <u>Coverage</u>                  | <u>Deductible</u>  | <u>Policy Limit</u>                          |
|----------------------------------|--|--|
| Real and personal property:      |  |  |
| Windstorm                        | \$25 million plus a 2% additional deductible up to a maximum of \$7.5 million per location | \$150 million                                |
| Flood                            | \$25 million plus a 2% additional deductible up to a maximum of \$3 million per location   | \$300 million                                |
| Earthquake                       | \$25 million plus a 5% additional deductible up to a maximum of \$7.5 million per location | \$300 million                                |
| All other                        | \$25 million plus \$150 thousand occurrence  | \$150 million                                |
| Comprehensive general liability: |  |  |
| General liability                | \$100 thousand per occurrence  | \$2 million                                  |
| First excess liability           | —  | In excess of \$2 million up to \$20 million  |
| Second excess liability          | —  | In excess of \$20 million up to \$40 million |
| Automobile                       | —  | \$1 million                                  |

Settled claims resulting from these risks have not exceeded commercial insurance coverage in any of the past three fiscal years.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Construction Projects**

The Authority enters in construction projects for the replacements or expansion of its facilities. As of June 30, 2011 and 2010, there were outstanding commitments for projects in process for approximately \$50.9 million and \$155 million, respectively.

**Operating Leases**

Certain commercial offices and warehouse facilities of the Authority are leased under operating lease agreements. During the years ended June 30, 2011 and 2010, the Authority incurred approximately \$5 million and \$3.8 million, respectively, in rent expense.

Future minimum noncancelable lease payments on existing operating leases at June 30, 2011, which have an initial term of one year or more, are as follows (in thousands):

|             |           |               |
|-------------|-----------|---------------|
| 2012        | \$        | 2,184         |
| 2013        |           | 1,986         |
| 2014        |           | 1,113         |
| 2015        |           | 812           |
| 2016        |           | 761           |
| 2017 – 2021 |           | 2,734         |
| 2022 – 2026 |           | 687           |
| 2027 – 2031 |           | 601           |
| 2032 – 2036 |           | 60            |
|             | <u>\$</u> | <u>10,938</u> |

**Litigation**

The Authority is the defendant in various lawsuits filed by customers alleging that the Authority has over billed them due to the methodology used to estimate consumption. There are two cases in which plaintiffs requested a certification of the suit as a class action and seek recovery of damages in the total amount of approximately \$386 million, plus legal costs of around \$100 million (25%) and interests and an injunction enjoining the Authority from continuing to bill using the current methodology. Those cases are: (1) Fernando Toro, et als v. Autoridad de Acueductos y Alcantarillados and (2) Joaquín Gautier, et als v. Autoridad de Acueductos y Alcantarillados.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**20. Commitments and Contingencies (continued)**

**Litigation (continued)**

In Toro, the Class Certification Hearings took place in the month of June 2011. The parties presented their evidence and the case is currently submitted for the consideration of the Judge for a determination of certification the class. At the present time, a Judgment has not been entered by the Court. However, after evaluating the evidence presented in the Class Certification Hearings, the Authority's potential exposure from this lawsuit is unlikely and, as such, no liability is being reported on the financial statements.

In Gautier, because the parties are involved in the discovery process, the Authority's potential exposure from this lawsuit cannot be presently determined and, as such, no liability is being reported on the financial statements.

The Authority is the defendant or codefendant in various other lawsuits. The ultimate outcome of the lawsuits cannot presently be determined. However, management, based on the advice of legal counsels, is of the opinion that these lawsuits will not have a material impact on the basic financial statements.

**21. Subsequent Events**

**Issuance of Debt**

On September 14, 2011, the Authority issued approximately \$70.2 million of Series HH of USDA Rural Development Program Bonds, at a maximum interest of 4.25% of interest, payable semiannually and maturing in semiannual installments through July 1, 2051. The funds raised by this issuance were used to partially repay the outstanding balance of USDA Rural Development Program lines of credit for construction projects from GDB. The payment of principal and interest on these bonds is guaranteed by the Commonwealth.

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Notes to Financial Statements (continued)

**21. Subsequent Events (continued)**

**Thames Dick Corporation – Master Agreement Termination**

On January 31, 1996, the Authority and Thames Dick Superaqueduct Partners, Inc (TDSP) executed an agreement entitled Master Agreement for the North Coast Superaqueduct Project to plan, design, construct, operate and maintain North Coast Superaqueduct Project (NCSP). The Authority and TDSP have agreed to cancel the Master Agreement and transfer responsibility to the Authority for the operation and administration of the NCSP as of July 19, 2011. The amount of \$2.1 million was deposited in an Escrow account to guarantee the Authority claims that may arise after cut-off date. TDSP is not responsible for retained liabilities exceeding the amount in escrow. Retained liabilities are claims by or against the Authority arising out of 1996 Master Agreement through the cut-off date. The Authority requested certain remedial maintenance services to be paid by TSDP and completed by the Authority after cut-off date for the amount of \$1.8 million. This remedial maintenance services included (a) reservoir cleaning and (2) the repairing of three main pumps. TDSP transferred to the Authority the control of NCSP and ownership of vehicles, laboratory equipment, office equipment, and others.

**Assets Transfer**

On August 16, 2011, the Authority entered into an Asset Purchase Agreement (the Agreement) with the Puerto Rico Industrial, Tourism, Educational, Medical and Environmental Facilities Financing Authority (AFICA), a public corporation of the Commonwealth of Puerto Rico to purchase certain assets that were being used to develop the Southern Gas Pipeline Project for the total purchase price of approximately \$23.5 million and assumed the rights and obligations of PREPA under a Subordinated Loan Agreement between AFICA and PREPA and a Subordinated Note and Loan Agreement of approximately \$31 million.

**Extension of Maturity Date – Term Loan Agreement**

On September 8, 2006, the Authority entered into a \$250 million term loan agreement with Banco Popular de Puerto Rico, as Administrative Agent, and a syndicate of banks. On August 17, 2011, the maturity date of this term loan was extended from September 1, 2011 to January 16, 2012. The Authority will be required to make quarterly principal payments of \$736,000 on September 1, 2011 and December 1, 2011.

# Required Supplementary Information

Puerto Rico Aqueduct and Sewer Authority  
(A Component Unit of the Commonwealth of Puerto Rico)

Required Supplementary Information  
Schedule of Funding Progress for Postemployment Healthcare Benefits

*(In thousands)*

| <b>Valuation<br/>Date</b> | <b>Actuarial<br/>Value of<br/>Assets</b> | <b>Actuarial<br/>Accrued<br/>Liability</b> | <b>Unfunded<br/>Actuarial<br/>Liability</b> | <b>Funded<br/>Ratio</b> | <b>Annual<br/>Covered<br/>Payroll</b> | <b>Percentage<br/>of Covered<br/>Payroll</b> |
|---------------------------|--|--|---|-------------------------|---------------------------------------|--|
| July 1, 2009              | \$ —                                     | \$ 56,414                                  | \$ 56,414                                   | —%                      | \$ 147,432                            | 35%  |

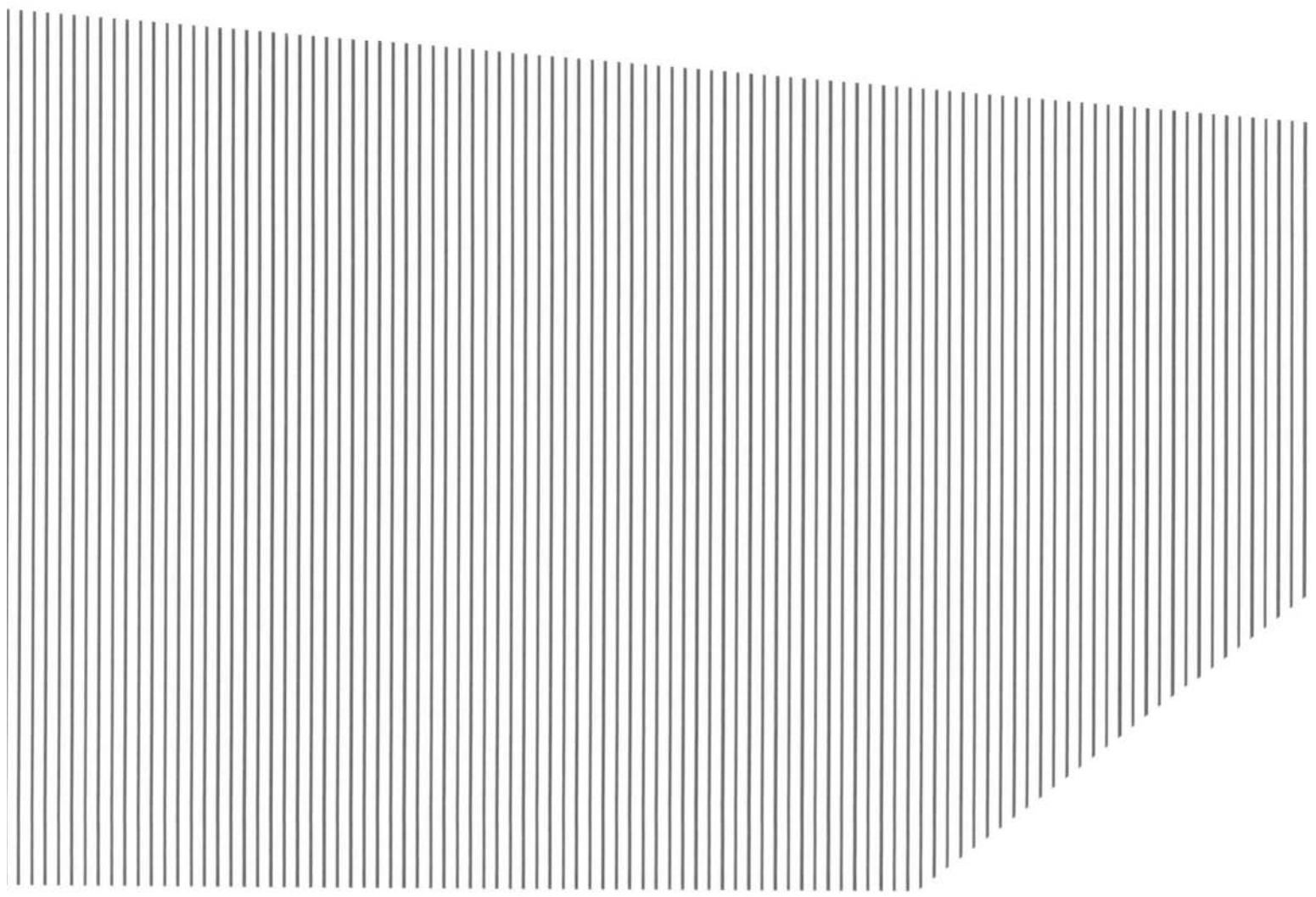
*See accompanying independent auditors' report.*

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Puerto Rico Aqueduct and Sewer Authority

Final Report

# Fiscal Year 2010 Consulting Engineer's Report for the Puerto Rico Aqueduct and Sewer Authority



February 2011

**MP** ENGINEERS  
of PUERTO RICO

and its subcontractor

**MALCOLM  
PIRNIE**



Puerto Rico Aqueduct and  
Sewer Authority  
GOVERNMENT OF PUERTO RICO

## **Puerto Rico Aqueduct and Sewer Authority**

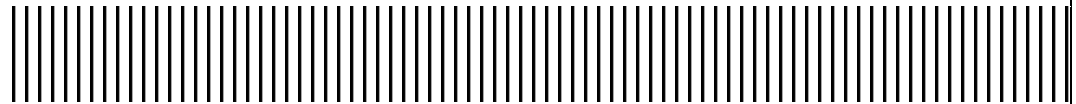
#618 Barbosa Ave. • Hato Rey, Puerto Rico 00918

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### **FINAL REPORT**

# **Fiscal Year 2010 Consulting Engineer's Report for the Puerto Rico Aqueduct and Sewer Authority**

February 2011



Report Prepared By:

**MP Engineers of Puerto Rico, PSC  
and its subcontractor  
Malcolm Pirnie, Inc.**

**MALCOLM  
PIRNIE** **MP** **ENGINEERS**  
of PUERTO RICO

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## Acronyms

Capitalized and abbreviated terms contained in this report are defined below. The terms listed below appear in multiple sections of this report, and are thus defined here for reference.

| <b>Acronym</b> | <b>Definition</b>   |
|----------------|---|
| ABT            | Additional Bonds Test   |
| AON            | AON Risk Services   |
| AOP            | Advanced Oxidation Processes  |
| APU            | Alternate Power Unit  |
| AWWA           | American Water Works Association  |
| B              | Billion   |
| CAA            | Coefficient of Annual Adjustment  |
| CAB            | Annual Base Coefficient   |
| CD             | Coefficient of Deficiency   |
| CER            | Consulting Engineer's Report  |
| CGL            | Commercial General Liability  |
| CIP            | Capital Improvement Program   |
| CMMS           | Computerized Maintenance Management System  |
| CPA            | Certified Public Accounting   |
| CWA            | Clean Water Act   |
| CWS            | Community Water System  |
| DBP            | Disinfection Byproduct  |
| DBPR           | Disinfection Byproduct Rule   |
| DMR            | Discharge Monitoring Report   |
| DNER           | Department of Natural and Environmental Resources   |
| DSC            | Debt Service Coverage   |
| EDC            | Endocrine Disrupting Compounds  |
| EPC            | Energy Performance Contract   |
| EQB            | Puerto Rico Environmental Quality Board   |
| FY             | Fiscal Year   |
| GDB            | Government Development Bank   |
| GIS            | Geographic Information System   |
| gpm            | Gallons per minute  |
| GWR            | Groundwater Rule  |
| HAA            | Haloacetic Acid   |
| HIEPAAA        | Hermanidad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados |

| <b>Acronym</b> | <b>Definition</b>                                   |
|----------------|---|
| IPMP           | Integrated Preventive Maintenance Program           |
| LOC            | Line of Credit                                      |
| LRAA           | Locational Running Annual Average                   |
| LT2 ESWTR      | Long Term 2 – Enhanced Surface Water Treatment Rule |
| M              | Million   |
| MAT            | Master Agreement of Trust                           |
| MCL            | Maximum Contaminant Level                           |
| M-DBP          | Microbial and Disinfection Byproducts Rules         |
| MW             | Megawatts   |
| MG             | Millions of Gallons                                 |
| MGD            | Million Gallons per Day                             |
| MPPR           | MP Engineers of Puerto Rico, PSC                    |
| NDMA           | N-nitrosodimethylamine                              |
| NF             | Nano Filtration                                     |
| NPDES          | National Pollutant Discharge Elimination System     |
| NRW            | Non-Revenue Water                                   |
| NRWRP          | Non-Revenue Water Reduction Program                 |
| NTU            | Nephelometric Turbidity Units                       |
| OCI            | Puerto Rico Office of the Commissioner of Insurance |
| OCIP           | Owner Controlled Insurance Program                  |
| O&M            | Operations and Maintenance                          |
| OSHA           | Occupational Safety and Health Administration       |
| PAN            | Programa de Asistencia Nutricional                  |
| PAP            | Proyectos Apremiantes (“Urgent Projects”)           |
| PM             | Preventive Maintenance                              |
| PMC            | Program Management Consultant                       |
| PML            | Probable Maximum Loss                               |
| PPA            | Power Purchase Agreement                            |
| ppb            | Parts per Billion                                   |
| PPCP           | Pharmaceuticals and Personal Care Products          |
| PRASA          | Puerto Rico Aqueduct and Sewer Authority            |
| PRDOH          | Puerto Rico Department of Health                    |
| PREPA          | Puerto Rico Electric Power Authority                |
| PRIFA          | Puerto Rico Infrastructure Financing Authority      |
| PSSSEP         | Preliminary Sanitary Sewer System Evaluation Plan   |
| PWS            | Public Water Systems                                |
| RAA            | Running Annual Average                              |

| <b>Acronym</b> | <b>Definition</b>   |
|----------------|---|
| RFP            | Request for Proposals   |
| RO             | Reverse Osmosis   |
| R&R            | Renewal and Replacement   |
| SAP            | Systems, Applications, and Products in Data Processing  |
| SAP-ISU        | Systems, Applications, and Products in Data Processing Industry Specific Solution for Utilities |
| SDWA           | Safe Drinking Water Act   |
| SEP            | Supplemental Environmental Project  |
| SOP            | Standard Operating Procedure  |
| SOW            | Scope of Work   |
| SRCP           | Spill Response and Cleanup Plan   |
| SSSEP          | Sanitary Sewer System Evaluation Plan   |
| SSSRP          | Sanitary Sewer System Repair Plan   |
| STS            | Solids Treatment System   |
| SRF            | State Revolving Fund  |
| SWTR           | Surface Water Treatment Rule  |
| TANF           | Programa de Asistencia Temporal para Familias Necesitadas                                       |
| TOC            | Total Organic Carbon  |
| TTHM           | Total Trihalomethane  |
| UIA-AAA        | Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados                   |
| U.S.           | United States   |
| USACE          | United States Army Corps of Engineers   |
| USEPA          | United State Environmental Protection Agency  |
| USGS           | United States Geological Survey   |
| UV             | Ultra Violet  |
| WPS            | Water Pump Station  |
| WTP            | Water Treatment Plant   |
| WWPS           | Wastewater Pump Station   |
| WWTP           | Wastewater Treatment Plant  |

# Executive Summary

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## E.1. Introduction

MP Engineers of Puerto Rico, PSC and its subcontractor Malcolm Pirnie, Inc (MPPR/Malcolm Pirnie) have been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in satisfying several requirements of the Master Agreement of Trust (MAT) between PRASA and the Trustee with bondholders. MPPR/Malcolm Pirnie understands that PRASA entered into a MAT on March 2008 to enable it to issue revenue bonds and incur other indebtedness to partially finance its Capital Improvement Program (CIP) and to repay and refinance existing debt.

This 2010 Consulting Engineer's Report (CER) documents changes in the System and PRASA as they relate to the requirements of the MAT, through June 30, 2010. The primary purpose of this CER is to meet the requirements of Section 7.07 of the MAT by providing an independent opinion regarding the condition of PRASA's water and wastewater (sewer) systems (collectively, the System), its organization, the operations and management (O&M) of the System, the planned capital improvements, its current insurance program, and financial forecast that includes fiscal year (FY) 2010 results and projections for FY2011 through FY2014<sup>1</sup>.

## E.2. Organization Updates and Changes Evaluation

In general, the overall PRASA organizational structure has changed little since 2008. PRASA is managed by an Executive staff that provides the day to day management oversight and coordination for all institutional activities. The current decentralized approach of having front-line management execute certain activities enables PRASA to provide more agile services to its customers. Also, the selected functional disciplines that have been centralized help PRASA standardize and develop common initiatives and policies to be executed across all Regions while providing significant synergies in management cost.

PRASA's overall staff levels continue to be high when compared to industry standards. However, from FY2008 through FY2010, PRASA has reduced its staffing levels by 15%, which represents a reduction of approximately 840 employees. PRASA continues to assess administrative and operational performance with the purpose of improving System performance and customer service. PRASA continues to engage with numerous internationally recognized consultants to assist with several aspects of its operation. PRASA's organizational and management changes have been smoothly implemented to ensure continuance of policy and program implementation and System O&M.

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<sup>1</sup> In both the 2008 and 2009 CERs a five-year forecast period projection was included. At the time of preparation of this CER, PRASA was in the process of updating its financial projections past FY2014; hence, only a four-year projection has been reviewed and presented in this CER.

### E.3. Condition of System

PRASA owns a large variety of assets, including land, buildings, dams, wells, water and wastewater treatment facilities and pump stations, ocean outfalls, buried infrastructure, vehicles, equipment, and water meters. MPPR/Malcolm Pirnie has assessed the condition of PRASA's System by inspecting major elements of the System. The purpose of these inspections was to identify the overall condition of the facilities and to determine if they are being operated and maintained in a manner consistent with their operating goals. The assessment also provided an opportunity to verify PRASA's CIP alignment with System needs.

The criteria used in the facility inspections were: compliance, operations / process control, equipment / maintenance, and staffing / training. An overall facility rating was then determined based on the calculation of a weighted average of the ratings for each criterion. Table ES-1 presents the general condition assessment of PRASA's assets that were inspected as part of the preparation of this CER.

**Table ES-1:  
Condition of System by Asset Category**

| Asset Category              | Total PRASA Facilities | Inspections Performed |         | General Condition |
|-----------------------------|------------------------|-----------------------|---------|-------------------|
|                             |                        | Quantity              | Percent |                   |
| Regulated Dams              | 8                      | 8                     | 100%    | Adequate          |
| Wells                       | 299                    | 39                    | 13%     | Adequate          |
| Water Treatment Plants      | 127                    | 67                    | 53%     | Adequate          |
| Water Pump Stations         | 1,182                  | 52                    | 4%      | Adequate          |
| Water Storage Tanks         | 1,723                  | 54                    | 3%      | Adequate          |
| Wastewater Treatment Plants | 60                     | 30                    | 50%     | Adequate          |
| Wastewater Pump Stations    | 1,004                  | 51                    | 5%      | Adequate          |
| Total                       | 4,403                  | 301                   |         |                   |

The condition of the facilities visited varied from new to those requiring significant capital upgrades. Compliance with discharge permit limits and drinking water standards varied depending on the plant age, condition and experience of operators. Facility conditions averaged an adequate rating overall.

Despite some operational compliance issues, the treatment facilities are generally producing and delivering potable water and conveying and treating wastewater adequately. PRASA has shown that with the implementation of several initiatives that include O&M improvements and the establishment of a planned CIP, among others, the overall conditions rating for these facilities continues to improve as shown in Table ES-2.

**Table ES-2:  
Asset Condition Ratings by Category**

| Asset Category              | Overall Condition Ratings |             |             | Change<br>2008 vs. 2010 |         | Change<br>2009 vs. 2010 |         |
|-----------------------------|---------------------------|-------------|-------------|-------------------------|---------|-------------------------|---------|
|                             | 2008<br>CER               | 2009<br>CER | 2010<br>CER | Overall<br>Score        | Percent | Overall<br>Score        | Percent |
| Regulated Dams              | Adequate                  | Adequate    | Adequate    | 0.0                     | 0%      | 0.2                     | 10%     |
| Water Treatment Plants      | Adequate                  | Adequate    | Adequate    | 0.1                     | 5%      | -0.1                    | -4%     |
| Wastewater Treatment Plants | Adequate                  | Adequate    | Adequate    | 0.1                     | 5%      | 0.0                     | 0%      |
| Wells                       | Adequate                  | Adequate    | Adequate    | 0.1                     | 5%      | 0.2                     | 11%     |
| Water Pump Stations         | Adequate                  | Adequate    | Adequate    | 0.1                     | 5%      | 0.1                     | 5%      |
| Water Storage Tanks         | Adequate                  | Adequate    | Adequate    | -0.3                    | -16%    | 0.0                     | 0%      |
| Wastewater Pump Stations    | Adequate                  | Adequate    | Adequate    | 0.3                     | 18%     | 0.0                     | 0%      |

Although buried infrastructure was not inspected, MPPR/Malcolm Pirnie analyzed the data collected by PRASA on water leaks and sewer overflows. Reported active leaks and sewer overflows remain at very high levels when compared to other utilities in the United States (U.S.) and Canada. Also, PRASA's unaccounted-for water, or non-revenue water (NRW), percentage continues at 64% in FY2010. Based on a comparison to other utilities in the U.S. and Canada, PRASA's NRW is extremely high. In a recent utility survey, the median unaccounted for water for all survey participants ranged from 8.5% to 9.9%<sup>2</sup>.

#### **E.4. Operations and Maintenance Practices Evaluation**

PRASA's O&M practices are adequate. One recurring finding in the facility inspections is the need for facility-specific O&M plans or manuals for treatment plants. Also, there is an identified need of standardized processes for prioritizing and scheduling preventive, corrective and routine maintenance activities.

The American Water Works Association (AWWA) has collected benchmarking data from water and wastewater utilities throughout the U.S. and Canada. Table ES-3 provides a comparison of PRASA's metrics to several key benchmark performance indicators.

PRASA currently has some staffing needs at individual facilities or within its executive and management teams. Also, given the recent reductions in staff, in FY2010 PRASA decreased its number of field personnel, which include meter readers and buried infrastructure repair crews. As a result, certain PRASA metrics (i.e., percent meters read and effectiveness in repairing leaks and overflows) have fallen.

<sup>2</sup>Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, published by the AWWA (2008).

**Table ES-3:  
PRASA Metrics vs. Water/Wastewater Utilities Benchmarks**

| Benchmark Category                           | Utility Category | Top Quartile | Median | Bottom Quartile | PRASA   |
|--|------------------|--------------|--------|-----------------|---|
| Training Hours per Employee                  | Serve > 500,000  | 31.8         | 16.8   | 12.3            | FY2005: 3<br>FY2006: 13<br>FY2007: 16<br>FY2008: 14<br>FY2009: 29<br>FY2010: 21 |
|  | Combined W & WW  | 34.9         | 22.5   | 12.7            |   |
|  | All Utilities    | 31.7         | 20.0   | 11.8            |   |
| Water O&M Cost per Account <sup>1</sup>      | Serve > 500,000  | \$163        | \$233  | \$319           | FY2007: \$329<br>FY2009: \$294<br>FY2010: \$292                                 |
|  | Combined W & WW  | \$134        | \$247  | \$411           |   |
|  | All Utilities    | \$148        | \$258  | \$374           |   |
| Wastewater O&M Cost per Account <sup>1</sup> | Serve > 500,000  | \$120        | \$209  | \$303           | FY2007: \$242<br>FY2009: \$216<br>FY2010: \$214                                 |
|  | Combined W & WW  | \$114        | \$209  | \$291           |   |
|  | All Utilities    | \$127        | \$213  | \$306           |   |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008)

<sup>(1)</sup>Includes total operation and maintenance costs (less depreciation). PRASA reported values include payroll and related, power, chemicals, Superaqueduct service contract, insurance and other expenses, less capitalized operating expenses.

In order to monitor the progress of its initiatives, PRASA has developed its own set of operational metrics. Table ES-4 presents a summary of these operational metrics. As illustrated in the table, PRASA's metrics show that significant improvements have been achieved in the reduction of the clients without water service. However, the percent actual meter readings has been reduced, approximately 23%, from FY2009 to FY2010, mainly due to a reduction in temporary employees. The remaining areas have remained near the same results as of the 2008 and 2009 CER.

**Table ES-4:  
Operational Metrics**

| Area                          | Metric  | June 2005 | June 2007 | June 2009 | June 2010 |
|-------------------------------|---|-----------|-----------|-----------|-----------|
| Clients without water service | No. of clients without service/ week                        | 14,483    | 9,459     | 5,189     | 4,632     |
| Generators                    | % Operational   | 66%       | 98%       | 98%       | 98%       |
| Purchase/ Logistics           | -Days to process purchase order                             | 30        | 14        | 10-15     | 10        |
|                               | -Days to process warehouse reserve                          | 25        | 9         | 7-10      | 10        |
|                               | -Inventory turns  | N/A       | 1.8       | 1.7       | 1.9       |
|                               | -Value of excess/obsolete inventory                         | \$3.5M    | \$3.5M    | \$3.6M    | \$3.6M    |
| Actual meter readings         | % Actual meter readings                                     | 73%       | 87%       | 82.5%     | 59.0%     |
| Customer service              | Average telephone call wait time for customers (<5 minutes) | >4 min    | 52 sec.   | 1:34 min. | 2:08 min. |

## E.5. Capital Improvement Program and Regulatory Compliance Status

PRASA's CIP has a comprehensive listing of projects and budgets for the ten years ending on June 30, 2020<sup>3</sup>. In FY2010, PRASA's capital expenditures were approximately \$299 million (M). Additionally, as of June 2010, PRASA's CIP includes \$1.44 billion (B) in capital expenditures over fiscal years 2011 through 2015, of which approximately \$502M correspond to capital expenditures for mandatory (compliance-driven) projects. PRASA has also preliminarily programmed \$2.30B in capital expenditures for the subsequent five-year period of the CIP that starts on FY2016 and ends on FY2020.

There are 681 projects currently included in the CIP for the period FY2010 – FY2020, with 387 projects that commenced project development activities during or prior to FY2010, 195 projects programmed to commence during FY2011 through FY2015 and 99 projects programmed to commence between FY2016 and FY2020. There are 33 additional projects programmed to commence beyond FY2020. Projects included in the CIP cover major capital improvements identified throughout all five PRASA Regions, as well as island-wide initiatives such as technological advancements, telemetry, preventive maintenance, meter replacement, and renewal and replacements (R&R) to the System.

Of the 681 projects included in the FY2010 – FY2020 CIP, 192 projects have been categorized by PRASA as mandatory, which includes projects required by consent decrees and agreements with regulatory agencies. These 192 projects represent an estimated \$1.71B of programmed capital expenditures, or approximately 42% of the total CIP over this time period.

PRASA's CIP addresses the requirements of the 2006 United States Environmental Protection Agency (USEPA) Wastewater Consent Decree (2006 Consent Decree, or the "Mega" Consent Decree) and the 2007 Puerto Rico Department of Health (PRDOH) Drinking Water Settlement Agreement<sup>4</sup> (PRDOH Agreement). Review of PRASA's CIP showed that all of the WTP and WWTP facilities that were considered unacceptable in terms of compliance currently have CIP projects identified to either rehabilitate or close the facility, thus addressing existing compliance problems.

PRASA's FY2010 record of compliance with the milestones of the 2006 Consent Decree and PRDOH Agreement supports PRASA's ongoing commitment to bring its System into compliance. Additionally, a new consent decree was signed on April 6, 2010 between PRASA and USEPA. This consent decree addresses non-compliance with National Pollutant Discharge

<sup>3</sup>CIP version used: "PMC & Cash Flow 2010-2014 All Inclusive 02262010 JD"

<sup>4</sup>In the 2008 CER the PRDOH Drinking Water Settlement Agreement was referred to as the PRDOH Consent Decree.



Elimination System (NPDES) of Sludge Treatment Systems (STSs) in WTPs and consolidates all related STS projects. As such, PRASA II and PRASA III consent decrees were closed.

PRASA is in the process of updating its long-term Master Plan. The 20-year (2010-2030) Master Plan is projected to be completed by FY2011 and will provide PRASA with a clear roadmap of its CIP as it will serve as a planning tool for the review of existing and future capital needs, as well as future capital investment.

With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are generally in alignment with the System needs. No additional CIP needs at plant facilities were identified for this CER, although improvements to ancillary facilities are needed. Those improvements could be addressed out of the existing R&R budget within the CIP. Based on the condition assessment and CIP review completed by MPPR/Malcolm Pirnie, PRASA has an adequate CIP implementation program that, if well managed, it is expected to meet PRASA's needs.

## **E.6. Insurance Program**

In order to meet the requirements of the MAT as it regards to PRASA's insurance program, MPPR/Malcolm Pirnie subcontracted AON Risk Services (AON) to review PRASA's current insurance coverage and determine its adequacy considering the type and value of PRASA's fixed assets. AON also provided a professional opinion on the appropriateness of such coverage and recommendations related to PRASA's insurance coverage.

AON concluded that the insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. AON has provided several recommendations to PRASA's insurance program. Particularly, PRASA should address the following key recommendations:

1. Review of the adequacy of the property insurance limit.
2. Complete a Probable Maximum Loss study to assist in the evaluation of the property insurance limit.
3. Review the downstream liability exposure for PRASA's dams.
4. Consider adding underground storage tank coverage to the pollution liability policy.

The OCIP covering PRASA's exposures to risks of accidental property and liability losses arising from construction activities provides reasonable coverage. AON has provided several recommendations to PRASA's OCIP. Particularly, PRASA should address the following key recommendations:

1. Revise Endorsement 1 on the builder's risk policy to include coverage for underground property.

2. Remove the Wrap Up exclusion in the Contractor's Limitation Endorsement contained in the excess liability policy.

## E.7. System Assets and Financial Analysis

Table ES-5 shows that, as of June 30, 2010, PRASA reported an estimated book value of fixed assets of approximately \$5,469M, which represents an increase of \$1,069M (24%) over the FY2009's reported value of fixed assets. Additionally, PRASA reported approximately \$1,616M of assets that are currently under construction or as "Work in Process", which represents an increase of approximately \$24M (2%) over that reported in FY2009. As such, total fixed assets increased by approximately \$1,092M (18%) over FY2009's reported value. This increase is primarily attributable to a \$933.4M capital assets transfer from the Puerto Rico Infrastructure Financing Authority (PRIFA).

**Table ES-5:  
Fixed Assets through June 30, 2010 (Preliminary)  
(in Thousands)**

|                    | Original Cost | Accumulated Depreciation | Book Value |
|--------------------|---------------|--------------------------|------------|
| Fixed Assets       | \$8,111       | (\$2,642)                | \$5,469    |
| Work in Process    | \$1,616       | -                        | \$1,616    |
| Total Fixed Assets | \$9,727       | (\$2,642)                | \$7,085    |

In the preparation of this CER, MPPR/Malcolm Pirnie reviewed the PRASA-prepared FY2011 through FY2014 financial forecast (the Forecast or PRASA's Base Case or Base Case) shown in Exhibit 1 (enclosed at the end of this section) and results for FY2010. MPPR/Malcolm Pirnie opined on the reasonableness of this forecast and included recommendations for select revenue and expense categories, included as the Alternate Case in Exhibit 2.

The purpose of MPPR/Malcolm Pirnie's review was to assess the adequacy of the current and proposed rates to provide the revenues necessary to support the projected costs shown in Exhibit 1, including capital expenditures, management, and O&M expenses. Additionally, the Forecast (presented on a modified accrual basis) illustrates the anticipated debt service coverage (DSC) for the four fiscal years from July 1, 2010 through June 30, 2014 (the forecast period).

The Forecast presents PRASA's estimate of the expected results of operations and DSC for the forecast period. Thus, the Forecast reflects PRASA's judgment, based upon present circumstances, as to the most likely set of conditions and course of action. However, there will usually be differences between forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. MPPR/Malcolm Pirnie has no responsibility for updating this CER for changes that occur beyond June 30, 2010.

Although PRASA experienced a reduction in service revenues of approximately \$19M from FY2009 to FY2010, in FY2010 it was able to collect \$73M of prior years from customers and reimbursements from entities such as the State Revolving Fund. Also, PRASA has continued to successfully implement its operational initiatives which to date have generated approximately \$80M<sup>5</sup> in additional revenue for PRASA. In terms of expenses, PRASA has continued to reduce some of its operational costs, achieving reductions in several expense categories, with significant recorded reductions in the payroll and benefits expense category. However, electricity costs continue to be high.

Given the current economic conditions in Puerto Rico, PRASA was not able to implement the rate adjustments projected in its 2008 Official Statement (OS). In FY2010, PRASA received a special assignment of \$27M from the Central Government Funds through the Government Development Bank of Puerto Rico (GDB). For FY2011, PRASA will again receive a special assignment of \$105M from the Central Government General Fund. For FY2012 through FY2014, PRASA has projected approximately \$150M to \$160M in additional revenues in each fiscal year from Other Sources of Funds which are yet to be identified. These other sources may include, but are not limited to, additional General Fund Special Contributions.

PRASA is looking into alternate sources of financing, and continues to implement operational initiatives to help improve its financial situation. While PRASA is committed to the initiatives, there is a possibility that the projected results, and more specifically, the timing of those results, will not be achieved. In the event that PRASA is unable to secure future special assignments from the Central Government General Fund or generate sufficient revenues to meet its operational and debt service obligations, a rate increase of at least 32% in FY2012 would be necessary, as shown in Exhibit 2.

## **E.8. Conclusions and Recommendations**

Set forth below are the principal opinions which MPPR/Malcolm Pirnie has reached regarding the review of PRASA's water and wastewater system. For a complete understanding of the assumptions upon which these opinions are based, this report should be read in its entirety.

1. PRASA's overall staff levels have been historically high compared to industry standards, although some individual facilities and PRASA departments have staffing shortages. Also, as a result of recent staff reductions, PRASA's performance regarding meter readings and effectiveness in repairing leaks and overflows in a timely manner have fallen. As such, PRASA could benefit from a utility-wide organizational assessment to identify staffing needs, and opportunities for staff reductions and position consolidations where surplus staff is identified.

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<sup>5</sup> Based on the total results for FY2009 (\$11.8M) and FY2010 (\$67.3M).

2. Although PRASA's training record since FY2006 has improved considerably, the staff needs additional training to improve effectiveness and increase safe work practices. PRASA recognizes this need and has continued providing a comprehensive training program which provided an average of 21 hours of training per employee in FY2010 compared to an average of 13 hours per employee in FY2006, 16 hours in FY2007, and 14 hours in FY2008. Between FY2009 and FY2010 the training hours were reduced from 29 to 21 hours. With the new facilities automation process and chemical reduction efforts, it is recommended to PRASA to increase or at least maintain the training hours for the next fiscal year. As this program continues, the capabilities and performance of staff working at PRASA is expected to improve over time.
3. The condition of the facilities visited varied from new to those requiring capital upgrades. The condition of most facilities with implemented CIP projects improved from FY2009 to FY2010. However, certain facilities are operating out of compliance with discharge permit limits and drinking water standards. Despite these compliance problems, the facilities are generally producing and delivering potable water and conveying and treating wastewater to a level of competency. PRASA demonstrates a thorough understanding of the System shortcomings and continues to work towards correcting them.
4. PRASA must continue to maintain its commitment for the implementation of the Integrated Preventive Maintenance Plan (IPMP). In addition, PRASA must continue a focused corrective maintenance and R&R program in order to improve fallen metrics, to maintain and improve the condition of the System, and to provide a program for the long-term preservation of the System assets. PRASA has included in its CIP provisions for the continuous implementation of the IPMP. Additionally, PRASA has budgeted, on average, approximately \$47M annually from FY2011 through FY2015 for R&R. However, PRASA should evaluate and adjust its R&R budget to improve its performance metrics.
5. PRASA should review its performance metrics and standardize the way these metrics are calculated to facilitate their interpretation and application including, but not limited to, how the data is collected, how it is reported, and how it is used by PRASA management.
6. A review of PRASA's commercial services showed that PRASA has significant opportunities to reduce its current volume of NRW and commercial losses, and to improve its billing procedures and collections. In MPPR/Malcolm Pirnie's opinion, PRASA is losing significant amounts of revenue due to:
  - Water theft
  - Non-optimal collection practices
  - Poor customer billing database management
  - High levels of estimation
  - Reading bi-monthly instead of monthly
  - Malfunctioning and obsolete customer meters

PRASA should review its current collections efforts in order to establish effective and proactive procedures that can lead to a reduction in its uncollectibles. An analysis of key accounts should be completed so that collection efforts target higher value customers.

7. With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are generally in alignment with the System needs. No additional CIP needs at plant facilities were identified for this CER, although improvements to ancillary facilities are required. Those improvements could be addressed through PRASA's R&R program, included within the CIP. Hence, an analysis of PRASA's R&R needs and budget is recommended to develop a sound R&R program that will allow PRASA to improve and extend the useful life of its System. Because PRASA has not budgeted contributions to the Capital Improvement Fund, the planned capital improvements for FY2010 (\$299M) were paid from the proceeds of Federal funding and Interim Financing Loans. Facilities that underwent upgrades or improvements through the CIP showed overall improvement. Review of PRASA's CIP showed that most of the WTPs and WWTPs that were considered unacceptable in terms of compliance currently have CIP projects identified to either rehabilitate or close the facility, thus addressing existing compliance problems. Once implemented as planned, these initiatives are expected to result in significant improvements in the performance of the System, including substantial advances towards complying with existing regulatory requirements.
8. The full impact of future regulations on the water treatment and supply system are not known at this time. In some cases, future regulations are expected to require minor process changes (such as moving the point of chlorination within a facility) and in other cases major capital improvements, such as construction of new treatment plants. Although, the existing CIP does not include projects specifically to address future regulations, PRASA is making allowances in its new designs to improve capabilities to meet certain future regulations. As the impact of future regulations becomes more defined, PRASA may need to modify its CIP to accommodate resulting needs.
9. PRASA's insurance program has reasonable insurance policies to meet PRASA's insurable risks and exposures. Insured amounts and values are reasonable to meet or exceed industry standards. PRASA has in place a risk management and loss prevention regime that reasonably addresses the pro-active process of avoiding losses and accidents in all its operations in accordance with modern industry standards.
10. Although PRASA's financial Forecast is, for the most part, reasonable, it depends on revenue sources that for FY2012 through FY2014 are yet to be identified. Currently, PRASA's Forecast does not include rate adjustments or rate increases. However, PRASA continues to implement operational initiatives to help improve its financial situation. While PRASA is committed to the initiatives, there is a possibility that the results projected to be achieved and more specifically, the timing of those results, will not be achieved. This possibility is

reflected in the adjustments and recommendations made by MPPR/Malcolm Pirnie in select revenue and expense categories and conclusions presented herein. In the event that PRASA is unable to secure future special assignments from the Central Government General Fund or generate sufficient revenues to meet their operational and debt service obligation in FY2012 through FY2014, in FY2012 PRASA would have to increase its rates by as much as 32%.

EXHIBIT 1

| PRASA BASE CASE<br>(\$, Thousands)                                    | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>1 REVENUES</b>   |                                  |                            |                      |                      |                      |
| 2 Base Fee and Service Charges  | \$740,993                        | \$754,000                  | \$754,000            | \$754,000            | \$754,000            |
| 3 Average Annual Growth/(Decrease)                                    | -                                | -                          | -                    | -                    | -                    |
| 4 Rate Increases  | -                                | -                          | -                    | -                    | -                    |
| 5 Rate Adjustments  | -                                | -                          | -                    | -                    | -                    |
| 6 General Fund Special Contribution / Other Sources of Funds          | 27,240                           | 105,000                    | 150,000              | 160,000              | 150,000              |
| 7 Operational Initiatives (Includes NRWPR & Commercial Contracting)   | 67,330                           | 65,000                     | 68,654               | 85,113               | 119,456              |
| 8 Collections Lag and Uncollectibles Reserve                          | (100,147)                        | (98,280)                   | (98,719)             | (100,694)            | (104,815)            |
| 9 Reimbursements from Prior Years                                     | 72,543                           | -                          | -                    | -                    | -                    |
| 10 Subsidy  | (3,533)                          | (3,630)                    | (3,993)              | (4,392)              | (4,832)              |
| 11 Subsidy to Public Housing (Includes recommended subsidy reduction) | (7,000)                          | (12,000)                   | (12,360)             | (12,731)             | (13,113)             |
| 12 Other Income   | 7,692                            | 10,000                     | 8,000                | 8,000                | 8,000                |
| 13 Special Assessments  | 6,502                            | 7,000                      | 7,500                | 8,000                | 8,500                |
| 14 Interest Income  | -                                | -                          | -                    | -                    | -                    |
| <b>15 Total Operating Revenues, Net</b>                               | <b>\$811,620</b>                 | <b>\$827,090</b>           | <b>\$873,082</b>     | <b>\$897,296</b>     | <b>\$917,196</b>     |
| <b>17 OPERATING EXPENSES</b>  |                                  |                            |                      |                      |                      |
| 18 Payroll and Benefits (Includes staff reductions through attrition) | \$299,948                        | \$270,584                  | \$200,364            | \$194,302            | \$186,458            |
| 19 Electric Power   | 140,131                          | 138,000                    | 132,000              | 128,600              | 123,030              |
| 20 Chemicals  | 26,264                           | 27,703                     | 27,980               | 28,260               | 28,542               |
| 21 Superaqueduct Service Contract                                     | 22,800                           | 24,000                     | 24,240               | 24,482               | 24,727               |
| 22 Insurance  | 9,443                            | 12,280                     | 12,648               | 13,028               | 13,419               |
| 23 Other Expenses   | 152,801                          | 150,616                    | 142,609              | 136,587              | 140,685              |
| 24 Operational Initiatives (PPP Project)                              | -                                | -                          | 80,802               | 84,332               | 89,199               |
| 25 Capitalized Operating Expenses                                     | (42,340)                         | (37,391)                   | (31,032)             | (30,480)             | (30,303)             |
| <b>26 Total Operating Expenses, Net</b>                               | <b>\$609,047</b>                 | <b>\$585,792</b>           | <b>\$589,611</b>     | <b>\$579,111</b>     | <b>\$575,757</b>     |
| <b>28 OTHER FINANCING SOURCES</b>                                     |                                  |                            |                      |                      |                      |
| 29 Surplus Funds & Non-Cash Adjustments                               | -                                | -                          | -                    | -                    | -                    |
| 30 Other Sources of Fund (\$150M Facility)                            | -                                | -                          | -                    | -                    | -                    |
| <b>32 TOTAL NET REVENUES AVAILABLE FOR DEBT SERVICE</b>               | <b>\$202,573</b>                 | <b>\$241,298</b>           | <b>\$283,471</b>     | <b>\$318,185</b>     | <b>\$341,439</b>     |
| <b>34 TOTAL DEBT SERVICE (Includes CSO)</b>                           | <b>\$192,307</b>                 | <b>\$239,572</b>           | <b>\$281,025</b>     | <b>\$312,977</b>     | <b>\$335,276</b>     |
| <b>36 TOTAL (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>            | <b>\$10,266</b>                  | <b>\$1,726</b>             | <b>\$2,446</b>       | <b>\$5,208</b>       | <b>\$6,163</b>       |
| <b>37 CUMULATIVE (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>       | <b>\$10,266</b>                  | <b>\$11,992</b>            | <b>\$14,438</b>      | <b>\$19,646</b>      | <b>\$25,809</b>      |

| <b>DEBT SERVICE COVERAGE</b>                |                  |                  |                  |                  |                  |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Senior</b>                               | \$68,756         | \$132,158        | \$149,310        | \$223,683        | \$236,121        |
| Coverage Required = 1.20                    | 2.95             | 1.83             | 1.90             | 1.42             | 1.45             |
| <b>Senior Subordinated</b>                  | \$10,751         | \$10,853         | \$1,309          | -                | -                |
| Coverage Required = 1.10                    | 2.55             | 1.69             | 1.88             | 1.42             | 1.45             |
| <b>Subordinated</b>                         | -                | -                | -                | -                | -                |
| Coverage Required = 1.00                    | 2.55             | 1.69             | 1.88             | 1.42             | 1.45             |
| <b>Commonwealth Guaranteed Indebtedness</b> | \$85,561         | \$69,324         | \$102,692        | \$75,854         | \$78,882         |
| Coverage Required = 1.00                    | 1.23             | 1.14             | 1.12             | 1.06             | 1.08             |
| <b>Commonwealth Supported Obligations</b>   | \$27,240         | \$27,237         | \$27,714         | \$13,441         | \$20,273         |
| Coverage Required = 1.00                    | 1.05             | 1.01             | 1.01             | 1.02             | 1.02             |
| <b>Total Debt Service</b>                   | <b>\$192,307</b> | <b>\$239,572</b> | <b>\$281,025</b> | <b>\$312,977</b> | <b>\$335,276</b> |

\*Numbers may not add up due to rounding

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## EXHIBIT 1

| (\$, Thousands)                               | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>USES OF FUNDS</b>                          |                                  |                            |                      |                      |                      |
| Repair & Replacement of Fixed Assets          | \$9,403                          | \$30,094                   | \$38,491             | \$51,738             | \$56,444             |
| CIP Infrastructure Projects                   | 289,841                          | 331,231                    | 343,497              | 156,217              | 143,012              |
| <b>Total Uses</b>                             | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |
| <b>SOURCES OF FUNDS</b>                       |                                  |                            |                      |                      |                      |
| Federal Funds – Rural Development Bonds / LOC | \$20,190                         | \$12,810                   | \$12,000             | \$12,000             | \$12,000             |
| Federal Funds – State Revolving Funds         | 34,320                           | 35,000                     | 35,000               | 35,000               | 35,000               |
| Federal Economic Stimulus – Grants            | 14,381                           | 30,409                     | 16,825               | 0                    | 0                    |
| Federal Economic Stimulus – Loans             | 2,701                            | 6,705                      | 10,446               | 2,100                | 0                    |
| Local Stimulus                                | 2,147                            | 4,271                      | 5,016                | 1,002                | 0                    |
| Interim Financing                             | 225,504                          | 272,130                    | 0                    | 0                    | 0                    |
| Bond Proceeds (Subsequent Issues)             | 0                                | 0                          | 302,701              | 157,854              | 152,456              |
| <b>Total Sources</b>                          | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |

II-24



EXHIBIT 2

| ALTERNATE CASE<br>(\$, Thousands)                                     | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>1 REVENUES</b>   |                                  |                            |                      |                      |                      |
| 2 Base Fee and Service Charges  | \$740,993                        | \$741,000                  | \$741,000            | \$974,415            | \$1,018,264          |
| 3 Average Annual Growth/(Decrease)                                    | -                                | -                          | -                    | -                    | -                    |
| 4 Rate Increases  | -                                | -                          | 200,070              | -                    | -                    |
| 5 Rate Adjustments  | -                                | -                          | 33,345               | 43,849               | -                    |
| 6 General Fund Special Contribution / Other Sources of Funds          | 27,240                           | 105,000                    | -                    | -                    | -                    |
| 7 Operational Initiatives (Includes NRWPR & Commercial Contracting)   | 67,330                           | 65,000                     | 68,654               | 85,113               | 119,456              |
| 8 Collections Lag and Uncollectibles Reserve                          | (100,147)                        | (104,780)                  | (103,740)            | (136,418)            | (142,557)            |
| 9 Reimbursements from Prior Years                                     | 72,543                           | 19,000                     | -                    | -                    | -                    |
| 10 Subsidy  | (3,533)                          | (3,630)                    | (3,993)              | (4,392)              | (4,832)              |
| 11 Subsidy to Public Housing (Includes recommended subsidy reduction) | (7,000)                          | (12,000)                   | (12,360)             | (12,731)             | (13,113)             |
| 12 Other Income   | 7,692                            | 10,000                     | 8,000                | 8,000                | 8,000                |
| 13 Special Assessments  | 6,502                            | 7,000                      | 7,500                | 8,000                | 8,500                |
| 14 Interest Income  | -                                | -                          | -                    | -                    | -                    |
| <b>15 Total Operating Revenues, Net</b>                               | <b>\$811,620</b>                 | <b>\$826,590</b>           | <b>\$938,476</b>     | <b>\$965,835</b>     | <b>\$993,718</b>     |
| <b>17 OPERATING EXPENSES</b>  |                                  |                            |                      |                      |                      |
| 18 Payroll and Benefits (Includes staff reductions through attrition) | \$299,948                        | \$275,084                  | \$251,444            | \$246,347            | \$222,537            |
| 19 Electric Power   | 140,131                          | 145,000                    | 146,250              | 149,863              | 154,856              |
| 20 Chemicals  | 26,264                           | 27,703                     | 28,534               | 29,390               | 30,272               |
| 21 Superaqueduct Service Contract                                     | 22,800                           | 24,000                     | 24,720               | 25,462               | 26,225               |
| 22 Insurance  | 9,443                            | 12,280                     | 12,648               | 13,028               | 13,419               |
| 23 Other Expenses   | 152,801                          | 150,616                    | 142,609              | 136,587              | 140,685              |
| 24 Operational Initiatives (PPP Project)                              | -                                | -                          | 80,802               | 84,332               | 89,199               |
| 25 Capitalized Operating Expenses                                     | (42,340)                         | (38,081)                   | (34,350)             | (34,250)             | (33,860)             |
| <b>26 Total Operating Expenses, Net</b>                               | <b>\$609,047</b>                 | <b>\$596,602</b>           | <b>\$652,657</b>     | <b>\$650,757</b>     | <b>\$643,333</b>     |
| <b>28 OTHER FINANCING SOURCES</b>                                     |                                  |                            |                      |                      |                      |
| 29 Surplus Funds & Non-Cash Adjustments                               | -                                | -                          | -                    | -                    | -                    |
| 30 Other Sources of Fund (\$150M Facility)                            | -                                | -                          | -                    | -                    | -                    |
| <b>32 TOTAL NET REVENUES AVAILABLE FOR DEBT SERVICE</b>               | <b>\$202,573</b>                 | <b>\$229,988</b>           | <b>\$285,819</b>     | <b>\$315,078</b>     | <b>\$350,385</b>     |
| <b>34 TOTAL DEBT SERVICE (Includes CSO)</b>                           | <b>\$192,307</b>                 | <b>\$239,572</b>           | <b>\$281,025</b>     | <b>\$312,977</b>     | <b>\$335,276</b>     |
| <b>36 TOTAL (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>            | <b>\$10,266</b>                  | <b>(\$9,584)</b>           | <b>\$4,794</b>       | <b>\$2,101</b>       | <b>\$15,109</b>      |
| <b>37 CUMULATIVE (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>       | <b>\$10,266</b>                  | <b>\$682</b>               | <b>\$5,476</b>       | <b>\$7,577</b>       | <b>\$22,686</b>      |

| <b>DEBT SERVICE COVERAGE</b>                |                  |                  |                  |                  |                  |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Senior</b>                               | \$68,756         | \$132,158        | \$149,310        | \$223,683        | \$236,121        |
| Coverage Required = 1.20                    | 2.95             | 1.74             | 1.91             | 1.41             | 1.48             |
| <b>Senior Subordinated</b>                  | \$10,751         | \$10,853         | \$1,309          | -                | -                |
| Coverage Required = 1.10                    | 2.55             | 1.61             | 1.90             | 1.41             | 1.48             |
| <b>Subordinated</b>                         | -                | -                | -                | -                | -                |
| Coverage Required = 1.00                    | 2.55             | 1.61             | 1.90             | 1.41             | 1.48             |
| <b>Commonwealth Guaranteed Indebtedness</b> | \$85,561         | \$69,324         | \$102,692        | \$75,854         | \$78,882         |
| Coverage Required = 1.00                    | 1.23             | 1.08             | 1.13             | 1.05             | 1.11             |
| <b>Commonwealth Supported Obligations</b>   | \$27,240         | \$27,237         | \$27,714         | \$13,441         | \$20,273         |
| Coverage Required = 1.00                    | 1.05             | 0.96             | 1.02             | 1.01             | 1.05             |
| <b>Total Debt Service</b>                   | <b>\$192,307</b> | <b>\$239,572</b> | <b>\$281,025</b> | <b>\$312,977</b> | <b>\$335,276</b> |

\*Numbers may not add up due to rounding

## EXHIBIT 2

| (\$, Thousands)                               | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>USES OF FUNDS</b>                          |                                  |                            |                      |                      |                      |
| Repair & Replacement of Fixed Assets          | \$9,403                          | \$30,094                   | \$38,491             | \$51,738             | \$56,444             |
| CIP Infrastructure Projects                   | 289,841                          | 331,231                    | 343,497              | 156,217              | 143,012              |
| <b>Total Uses</b>                             | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |
| <b>SOURCES OF FUNDS</b>                       |                                  |                            |                      |                      |                      |
| Federal Funds – Rural Development Bonds / LOC | \$20,190                         | \$12,810                   | \$12,000             | \$12,000             | \$12,000             |
| Federal Funds – State Revolving Funds         | 34,320                           | 35,000                     | 35,000               | 35,000               | 35,000               |
| Federal Economic Stimulus – Grants            | 14,381                           | 30,409                     | 16,825               | 0                    | 0                    |
| Federal Economic Stimulus – Loans             | 2,701                            | 6,705                      | 10,446               | 2,100                | 0                    |
| Local Stimulus                                | 2,147                            | 4,271                      | 5,016                | 1,002                | 0                    |
| Interim Financing                             | 225,504                          | 272,130                    | 0                    | 0                    | 0                    |
| Bond Proceeds (Subsequent Issues)             | 0                                | 0                          | 302,701              | 157,854              | 152,456              |
| <b>Total Sources</b>                          | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |

# 1 Introduction

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## 1.1 Introduction

MP Engineers of Puerto Rico, PSC and its subcontractor Malcolm Pirnie, Inc. (MPPR/Malcolm Pirnie) have been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in satisfying several requirements of the Master Agreement of Trust (MAT) between PRASA and the Trustee with bondholders. MPPR/Malcolm Pirnie understands that PRASA entered into a MAT on March 2008 to enable it to issue revenue bonds and incur other indebtedness to partially finance its Capital Improvement Program (CIP) and to repay and refinance existing debt. MPPR/Malcolm Pirnie prepared a Consulting Engineer's Report (CER) on January 2008 (2008 CER) to document and assess technical, operational and financial issues and related matters of PRASA's water and wastewater systems (the System). The 2008 CER was included in PRASA's Official Statement (OS) related to its March 2008 bond issuance.

As required by Section 7.07 of the MAT, for as long as the Senior Bonds have been rated investment grade by at least two Rating Agencies, the Consulting Engineer shall prepare a CER for two consecutive years to document the current condition and changes, if any, in PRASA's operation and the performance of the System. In March of 2010, MPPR/Malcolm Pirnie issued the 2009 CER, which covered the period from July 1, 2008 to June 30, 2009. The information presented in this 2010 CER covers the period from July 1, 2009 to June 30, 2010.

Since March 2008, PRASA has incurred additional subordinated indebtedness to continue to fund its CIP, which currently consists of 681 projects that address upgrades to existing treatment plants, consolidation of some smaller plants, addition of new treatment plants, and improvements to the sanitary sewer collection system and water supply and distribution system. It also includes vehicle fleet replacements, implementation of preventive maintenance programs, technology improvements in telemetry, renewals and replacements (R&R), and various other projects related to the System.

## 1.2 PRASA Overview

PRASA is a public utility responsible for the production and distribution of potable water and collection, treatment, and disposal of a large portion of domestic and industrial pretreated wastewaters in Puerto Rico. PRASA serves a population of approximately four million residents plus approximately five million visitors annually<sup>6</sup>. PRASA can be considered a monopoly since it is the only water and wastewater utility in Puerto Rico, providing water and wastewater service to about 97% and 58% of Puerto Rico's population, respectively. While this is positive in terms of sales of services it also makes PRASA a critical entity for the wellbeing of Puerto Rico. The

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<sup>6</sup> Source: Puerto Rico Tourism Company statistics for fiscal years 2004 through 2009.

effective operation of this vital public service is essential to the health and economic prosperity of Puerto Rico and its citizens.

PRASA provides water and wastewater service throughout the island, which has an approximate area of 3,535 square miles. Due to the fact that Puerto Rico is an island with varied topography, isolated demographic distributions, and a diverse mix of users, PRASA has a somewhat fragmented and localized system of water sources, treatment systems and delivery systems. As a result, PRASA has many more treatment facilities than most utilities serving a similar number of customers. This results in a higher degree of diversity in PRASA's assets in terms of size, treatment technologies, and age when compared to systems in the United States (U.S.) and Canada, which tend to have more centralized systems with larger regional facilities. These facts add complexity to the management of the System and contribute to higher operation and maintenance (O&M) costs compared to other utilities serving similar populations. At the time of this assessment and based on PRASA's updated Geographic Information System (GIS) database, as of FY2010 PRASA operates eight regulated dams, 127 water treatment plants (WTPs), 60 wastewater treatment plants (WWTPs), 1,182 water pump stations (WPSs), 1,004 wastewater pumping stations (WWPSs), 299 wells, and 1,723 water storage tanks.

### 1.3 Purpose

As stated in Section 7.07(a)-(g) of the MAT, it shall be the duty of the Consulting Engineer to prepare and file reports with [PRASA] and the Trustee...setting forth the following:

- the recommendations of the Consulting Engineer as to the proper maintenance, repair and operation of the Systems during the ensuing fiscal year, and an estimate of the amounts of money necessary for such purposes;
- the recommendations of the Consulting Engineer as to the amount that should be deposited in each month during the ensuing fiscal year to the credit of the Capital Improvement Fund;
- the recommendations of the Consulting Engineer as to the Improvements which should be made during the ensuing fiscal year, and an estimate of the amounts of money necessary for such purposes, showing separately (i) the amount to be expended during such fiscal year from moneys to the credit of the Capital Improvement Fund and the Surplus Fund and (ii) the amount to be expended during such fiscal year from the proceeds of Bonds and other Indebtedness;
- the recommendations of other Consultants retained by or relied upon by the Consulting Engineer as to the insurance to be carried under the provisions of Section 7.08 of this Article;
- a statement by the Consulting Engineer of the cost of all additions made to the Systems and of the cost (if the cost cannot be accurately determined, the estimated cost) of all retirements of property made in such fiscal year;

- a report of the Consulting Engineer (which may retain other Consultants as necessary) as to the adequacy of existing rates and charges for purposes of the Rate Covenant contained in Section 7.01 hereof for the then current Fiscal Year to date and recommendations as to any necessary or advisable revisions of rates and charges and such other advices and recommendations as they may deem desirable; and
- the findings of the Consulting Engineer whether the properties of the Systems have been maintained in good repair and sound operating condition, and their estimate of the amount, if any, required to be expended to place such properties in such condition and the details of such expenditures and the approximate time required therefore.

This CER presents MPPR/Malcolm Pirnie's opinion with respect to the technical, operational and financial issues and related matters of the System through June 30, 2010. Any statements in this CER involving estimates or matters of opinion, whether or not so specifically designated, are intended as such, and not as representations of fact. Changed conditions occurring or becoming known after the issuance of or beyond the period covered by this CER could affect the material presented to the extent of such changes. MPPR/Malcolm Pirnie has no responsibility for updating this CER for changes that occur beyond June 30, 2010.

MPPR/Malcolm Pirnie has performed inspections of a sampling of the major and minor assets that comprise the System. MPPR/Malcolm Pirnie has also evaluated the CIP, the regulatory compliance situation, the organizational structure, the insurance program and PRASA's financial situation and projections. MPPR/Malcolm Pirnie has not independently verified the accuracy of the reports and other information provided by PRASA for the conduct of this assignment. To the extent that the information provided to MPPR/Malcolm Pirnie by PRASA is not accurate, the conclusions and recommendations contained in this CER may vary and are subject to change.

## 1.4 Conventions

PRASA's fiscal year begins on July 1<sup>st</sup> and ends June 30<sup>th</sup>. Throughout this CER, fiscal year is identified as "FY" followed by the calendar year in which the fiscal year ends, i.e., FY2010 is the fiscal year from July 1, 2009 through June 30, 2010.

## 1.5 Acronyms

A listing of acronyms or abbreviations of terms used in this report is included in the Table of Contents.

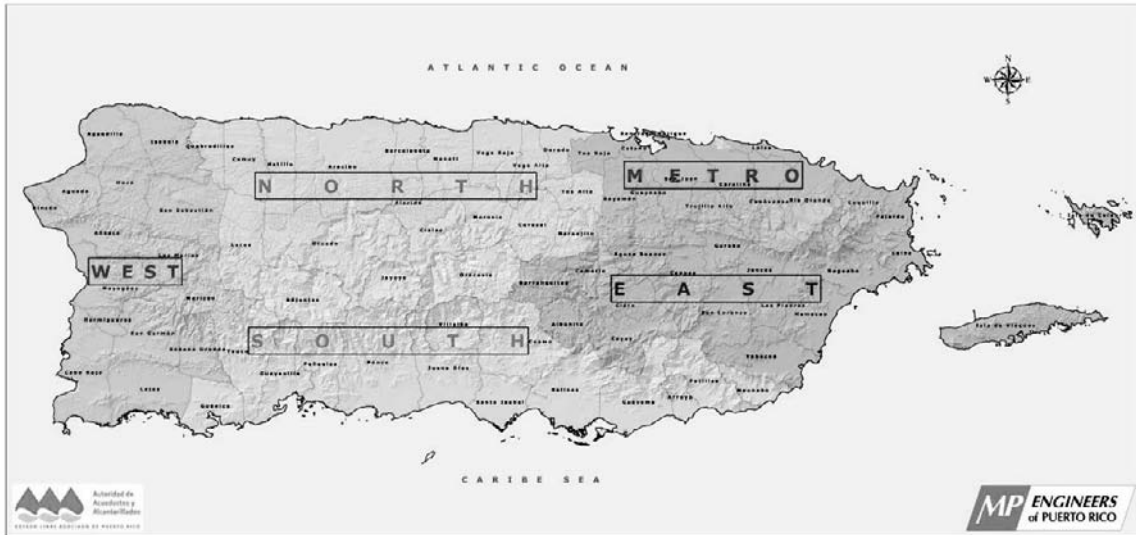
# 2 Organizational Updates and Changes

## 2.1 Introduction

This section describes changes within PRASA’s organization since the issuance of the 2008 and 2009 CERs and provides opinions regarding the adequacy of PRASA’s organizational structure and initiatives.

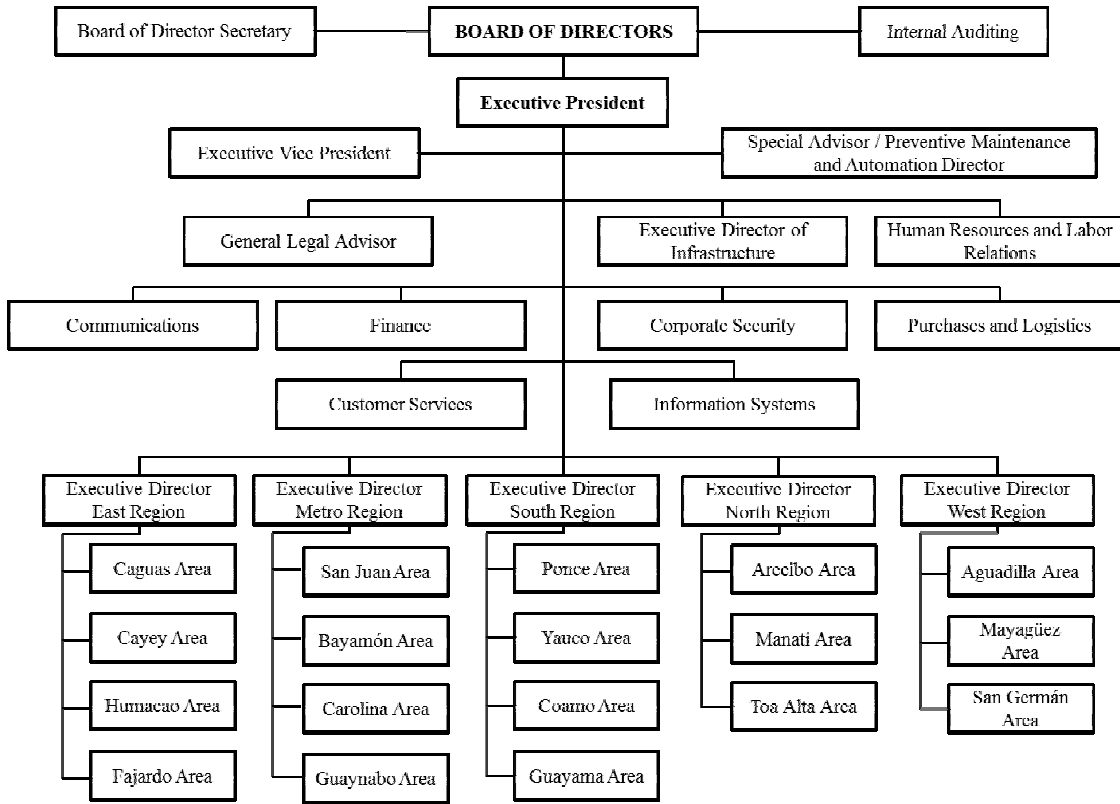
As shown in Figure 2-1, PRASA is organized into five operational Regions (North, South, East, West and Metro), as a result of the enactment of Act No. 92 on March 31, 2004.

**Figure 2-1: PRASA Regions**



In general, the overall PRASA organizational structure has not significantly changed since 2008. PRASA is managed by an Executive staff that provides the day to day management oversight and coordination for all institutional activities. The Executive Staff is supported by various departments in the organization including, but not limited to, finance, customer services, and information systems. Figure 2-2 provides a chart of PRASA’s organization.

**Figure 2-2: PRASA Legislated and Executive Management Structure**



## 2.2 Updates and Changes in PRASA’s Organization and Management

### 2.2.1 Board of Directors

There have been several changes in the makeup of PRASA’s nine-member Board of Directors (the Board) since the 2008 CER. These changes are due either to expiration of appointment terms of previous members or personnel changes in government entity directors. Table 2-1 shows the Board members list. The term of each Board member varies according to Act No. 92.

**Table 2-1:  
PRASA Nine-Member Board of Directors as of June 30, 2010**

| Name                              | Board Position        | Government Position  | Term Ends     |
|-----------------------------------|-----------------------|--|---------------|
| 1. Mr. Edgardo Fábregas Castro    | Interim President     | Not Applicable   | June 30, 2013 |
| 2. Eng. Bernardino Feliciano Ruiz | Independent Director  | Not Applicable   | June 30, 2014 |
| 3. Mrs. Aura González Ríos, Esq.  | Independent Director  | Not Applicable   | June 30, 2013 |
| 4. CPA Carlos Dávila Torres       | Independent Director  | Not Applicable   | June 30, 2014 |
| 5. Eng. Héctor Morales Vargas     | Governmental Director | President,<br>Puerto Rico Planning Board                               | Ex-Oficio     |
| 6. Mr. Jaime García García        | Governmental Director | Executive Director,<br>Mayors Association                              | Ex-Oficio     |
| 7. Mr. Reinaldo Paniagua Látimer  | Governmental Director | Executive Director,<br>Mayors Federation                               | Ex-Oficio     |
| 8. Eng. Miguel Cordero López      | Governmental Director | Executive Director,<br>Puerto Rico Electric Power<br>Authority (PREPA) | Ex-Oficio     |
| 9. Mrs. Carmen Ana Culpeper       | Independent Director  | Not Applicable   | June 30, 2015 |

### 2.2.2 Executive Staff

Since Act No. 92 was implemented in 2004, PRASA has gone through several management changes at many levels of its organization including the executive level. In general, these changes and their resulting successions and transitions have been smooth and have not affected the stability of the organization or the continuity of the operations. For example, on January 2007, the first Executive President appointed under Act. No. 92 was appointed as Executive Director of PREPA and was replaced by PRASA's Executive Director for Infrastructure at the time. This event resulted in a series of changes within PRASA's management that included the replacement of the Executive Director for Infrastructure with the Engineering Director. These successions were well managed and continuity was maintained for all the initiatives that had begun in the prior three years.

In FY2010, PRASA named Eng. Francisco Martínez as the new Executive Director of the West Region, and new Operational Area Directors were named for the Manatí, Toa Alta, San Juan, Carolina, San Germán, Aguadilla, Yauco, Coamo and Guayama Operational Areas. These transitions, in similar fashion to those of FY2008 and FY2009, were executed smoothly and with close to no impact on the Regions' normal operations.

### 2.2.3 Customer Services Department

PRASA's customer services are performed by the Customer Service Department, which consists of a central administration office located at PRASA's central administration building in San Juan, a Regional management team that includes a Deputy Director in each Region, and the island-wide customer service offices. During FY2010, the island-wide customer offices were reduced from 28 to 26, consolidating the Levittown office with the Canton Mall office, and the San Juan office with the 65 Infantería office. Additionally, there are two satellite customer service offices, which



offer limited services to PRASA customers, located in the municipalities of Culebra and Lares. The Customer Service Department handles issues such as:

- Customer Billings
- Customer Payments
- Meter Reading
- Meter Installation
- Complaints Management
- Investigations

In FY2010, the management and supervision of personnel that perform meter reading, meter installation, and other field related activities was transferred from the Customer Service Department to PRASA's Operations Department in each Region. Additionally, Regional Executive Directors began to directly oversee certain activities including, but not limited to, service connections and disconnections and meter readings, to help PRASA reduce its rate of uncollectible accounts and amount of unauthorized water consumption and theft.

#### **2.2.4 Staffing Profile and Size**

Historically, PRASA's ratio of number of customers to staff has been low in comparison to industry standards. At the end of FY2010, PRASA had a total staff of 5,001 with 1,279,757 total accounts: 1,279,298 water customer accounts and 746,680 wastewater customer accounts; resulting in a ratio of about 405 customer accounts per employee (up from 340 at end of FY2008 and 360 at the end of FY2009). Current industry averages typically range from 390 to 780, with a median of approximately 550 customer accounts per employee<sup>7</sup>. Given the large number of PRASA facilities and wide geographic distribution of facilities, PRASA's comparatively low ratio of accounts to employees is not surprising; however, PRASA's organization could be optimized and reduced to a more lean structure.

PRASA's existing staff is categorized into five primary categories described below:

- **Appointed Employees:** This category includes: the executive staff, deputy directors, area directors and administrative assistants that provide support to key management personnel of the utility.
- **Management Employees:** These employees manage the day-to-day operations of the utility. They hold management positions both in the central and regional offices.
- **HIEPAAA Employees (Hermandad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados):** These employees are the unionized professional staff that includes accountants, engineers, insurance specialists, project inspections, and surveyors.

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<sup>7</sup> Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, American Water Works Association (2008). Note that a customer with water and sewer service is counted as two accounts for the purpose of this benchmark. Benchmarks reported for "all utilities" category.

- **UIA-AAA Employees (Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados):** These employees are the unionized plant and system operators, maintenance and support staff, meter readers, customer service specialists, and administrative assistants.
- **Temporary Employees:** These employees are those that are hired and classified as temporary until formally assigned to a position. New hires are placed in a 90-day probationary period. They do not have full benefits during the probationary period. If still employed after probationary period, they either become full-time employees or remain temporary employees pending position confirmation, but mostly with the same benefits as full-time employees.

Table 2-2 shows the staff levels by staff category over the last eight fiscal years. Since FY2009, PRASA is utilizing methods for reductions of staff, such as early retirement, re-training existing staff from overstaffed positions to reduce the need for new hires, and using staff attrition as a means to reduce staff levels.

**Table 2-2:  
Staff Levels**

| End of FY         | Appointed Employees | Management Employees | HIEPAAA Employees | UIA-AAA Employees | Temporary Employees | Total Employees |
|-------------------|---------------------|----------------------|-------------------|-------------------|---------------------|-----------------|
| 2003 <sup>1</sup> | 36                  | 942                  | 204               | 4,428             | 181                 | 5,791           |
| 2004 <sup>1</sup> | 56                  | 920                  | 200               | 4,383             | 115                 | 5,674           |
| 2005              | 127                 | 872                  | 196               | 4,323             | 196                 | 5,714           |
| 2006              | 146                 | 882                  | 194               | 4,205             | 154                 | 5,581           |
| 2007              | 156                 | 940                  | 190               | 4,046             | 509                 | 5,841           |
| 2008              | 167                 | 991                  | 178               | 3,814             | 690                 | 5,840           |
| 2009              | 165                 | 1029                 | 182               | 3,663             | 536                 | 5,575           |
| 2010              | 161                 | 960                  | 171               | 3,391             | 318                 | 5,001           |

<sup>(1)</sup> Includes some employees categorized as "contract" employees, and does not include ONDEO (contract) employees. PRASA is not categorizing any employees as "contract" employees for FY2006 through FY2010.

During FY2010, PRASA reduced their staff from 5,575 to 5,001 (a 10% reduction); 574 employees less than the previous fiscal year. Of those 574 employees, 272 (47%) were UIA-AAA employees, 218 (38%) were temporary employees, 69 (12%) were management employees, 11 (2%) were HIEPAA employees and four (less than 1%) were appointed employees.

### 2.3 Organizational Challenges and Accomplishments

PRASA continues to work to achieve the objectives set forth by its Executive Management Team. These are:

- Re-establish the confidence in PRASA's ability to provide water and wastewater services consistent with the highest standards in the industry for the people of Puerto Rico.
- Transform the culture of PRASA and modernize the organizational structure.
- Revitalize PRASA so that it becomes a financially stable and self-sufficient entity.

To achieve these objectives, PRASA embarked on a series of strategies to transform the entire utility. These strategies include:

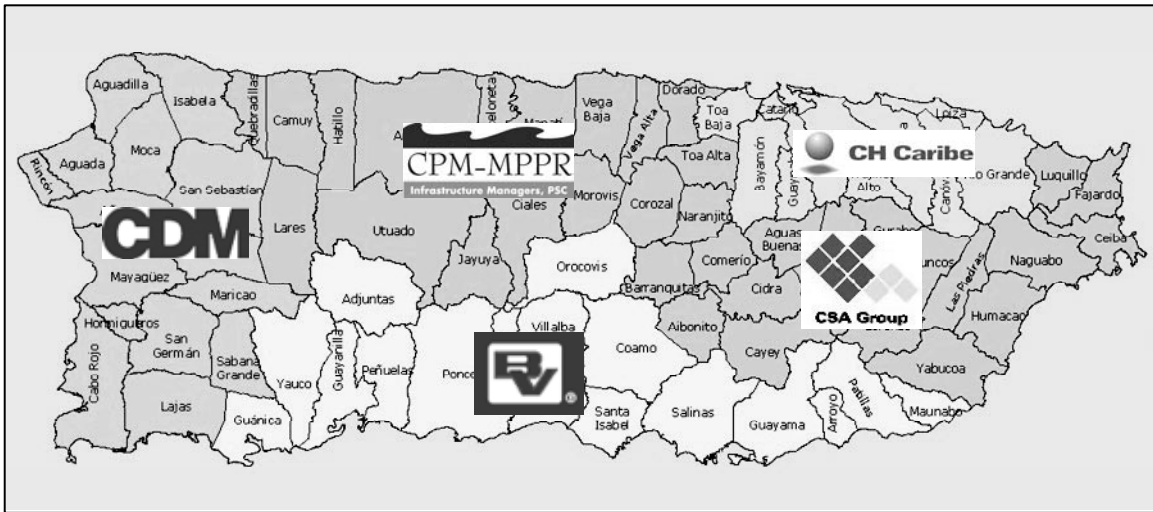
- Compliance with local and Federal regulatory requirements.
- Development of needed projects within a comprehensive CIP.
- Optimization of the system efficiency and use of available reservoirs.
- Reduction of non-revenue water (NRW).
- Protection of watersheds and management of aquifers.
- Implementation of a water conservation plan.
- Pipeline replacement to decrease water main breaks and sewer overflows.
- Improvement of the preventive maintenance program.
- Development of a comprehensive training and education program.
- Modernization of the System and use of advanced technologies.
- Cost reductions and revenue increases.

Some of the specific programs to implement the identified strategies, as developed and implemented by PRASA in the last few fiscal years, are addressed below and in following sections.

### **2.3.1 Infrastructure and Capital Improvements Program**

Prior to 2004, many of the projects required to improve the System were not being delivered due to insufficient funding and internal execution resources. Recognizing the need to successfully implement an aggressive and robust infrastructure program, PRASA contracted the services of five major firms or program management consultants (the PMCs) to plan, design, and manage the CIP in each of the five Regions. These firms, which began managing the CIP in FY2005, are listed below and their respective geographic areas of responsibility are shown in Figure 2-3.

**Figure 2-3: Program Management Consultants and their Respective Regions through June 30, 2009**

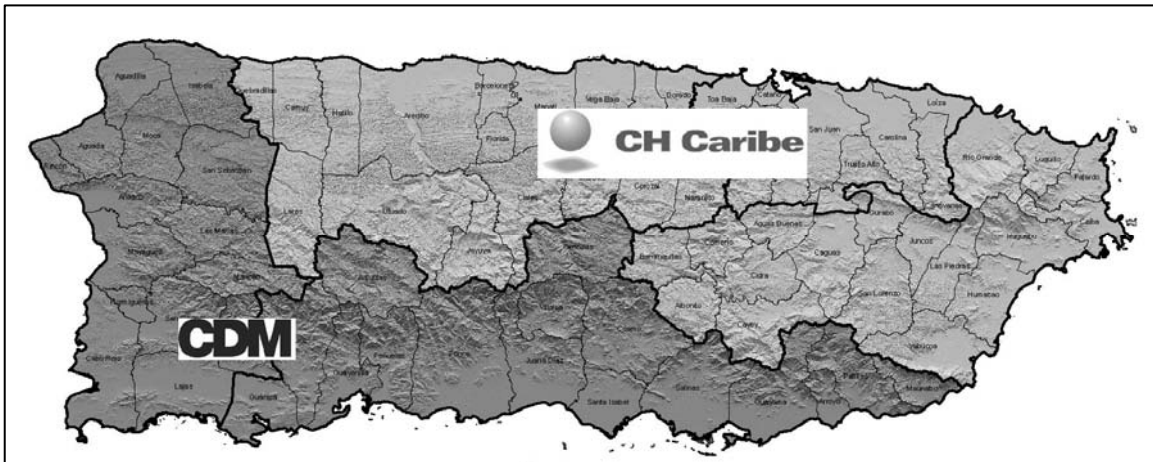


- A. CDM: A local affiliate (known as CDM Caribe) of Camp, Dresser, and McKee (CDM) has managed the CIP in the West Region since August 2005. CDM is a large stateside consulting firm that provides technical support services and serves as the financial guarantor.
- B. CH Caribe: A local affiliate (known as CH Caribe) of CH2M Hill has managed the CIP in the Metro Region since August 2005. CH2M Hill is a large stateside environmental consulting firm that provides technical support and serves as the financial guarantor.
- C. CPM-MPPR: CPM-MPPR Infrastructure Managers, PSC managed the CIP in the North Region since August 2005. CPM-MPPR is a professional services corporation created by Caribbean Project Management (CPM) and MPPR. Malcolm Pirnie, a large stateside environmental consulting firm, provides technical support services and serves as the financial guarantor.
- C. Black & Veatch of Puerto Rico: A local affiliate (known as Black & Veatch of Puerto Rico) of Black & Veatch (B&V) managed the CIP in the South Region since August 2005. B&V is a large stateside environmental consulting firm that provides technical support and serves as the financial guarantor.
- D CSA: The CSA Group headquartered in San Juan is the largest Puerto Rican environmental engineering firm and the largest Hispanic engineering firm in the U.S. CSA managed the CIP in the East Region since August 2005. CSA serves as its own financial guarantor.

As a result of PRASA’s CIP implementation plan and the economic situation currently affecting Puerto Rico, the number of CIP projects being implemented has been reduced over recent years. Therefore, effective July 1, 2009, PRASA decided to reduce the number of PMCs from five to

two. As a result, the associated program overhead costs yielded cost savings to PRASA of approximately \$7M. Nonetheless, PRASA continue working with the firms not selected to continue as PMCs in areas such as planning, design, land acquisition and other special projects. PMC changes are listed below and shown on Figure 2-4.

**Figure 2-4: Program Management Consultants and their Respective Regions through June 30, 2010**



- A. CDM: CDM is responsible for the CIP management in the West and South regions.
- B. CH Caribe: CH Caribe is responsible for the CIP management of the Metro, North and East regions.
- C. CPM-MPPR: This Company no longer manages the CIP of the North Region, effective on July 1, 2009. As separated consultants of CH Caribe and PRASA, CPM continues to provide construction inspection services in the North Region; whereas MPPR/Malcolm Pirnie, in addition to serving as Consulting Engineer to PRASA, it continues to provide planning and design services, and is responsible for the development and/or management of other special projects such as the Master Plan.
- C. Black & Veatch of Puerto Rico: This Company no longer manages the CIP of the South Region. As a consultant of CDM, Black & Veatch of Puerto Rico continues to provide services in the South region.
- E. CSA: CSA no longer manages the CIP of the East region. As a consultant to PRASA, CSA continues to provide land acquisition support services and is responsible of other special projects.

Further discussion of the CIP status is provided in Section 5 of this CER.

### 2.3.2 Human Resources

Over the years, PRASA has had numerous human resource management challenges ranging from inefficient work rules to insufficient training of its personnel. The collective bargaining agreements of the past did not sufficiently align the union's practices with management's goals and programs. Additionally, personnel lacked fundamental training in areas such as compliance, operations, client services, information technologies, and health and safety.

As of June 30, 2010, a new collective bargaining agreement between PRASA and the UIA-AAA was not yet signed. In 2009, the Central Government's Board of Labor Relations ruled in favor of the UIA-AAA, and ratified the existence of an active collective bargaining agreement through December 2008, even though the collective bargaining agreement between the UIA-AAA and PRASA expired in 2003. PRASA and the UIA-AAA continue to maintain open channels of communication to resolve this matter. In April 2010, the UIA-AAA performed internal elections and changed their administration, which triggered negotiations to start over. New negotiations for a collective bargaining agreement are scheduled to begin in September of 2010.

With respect to the HIEPAAA, their collective bargaining agreement with PRASA was signed on July 5, 2005 and was to remain in effect until 2009. However, the validity period of the agreement, including an automatic extension clause and excluding economic terms, was extended until the end of FY2010. A new collective bargaining agreement is currently being negotiated between PRASA and the HIEPAAA.

PRASA continues its commitment to its employees and customers, and continues to offer training programs to its employees. Training topics range from technical-oriented seminars to excellence, conflict resolution and team building sessions. In FY2010, PRASA offered over 102,000 training hours to its employees. Additional information on training is presented in Section 4.

### 2.3.3 Information Technology

PRASA continues to make information technology one of the key areas for management improvement. Information technology currently supports the development of technological advancements in PRASA, such as telemetry and several client service initiatives, including but not limited to:

- Up-keeping of PRASA's website (includes e-payment option).
- Installation of electronic payment machines.
- Continuance of a remote/automatic meter reading pilot project.
- Implementation of a new commercial system (SAP-ISU<sup>8</sup>).

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<sup>8</sup> In 2008 CER the new commercial system platform was referred to as SAP PM.

Implementation of effective computerized maintenance management systems (CMMS) throughout all Regions was an initiative of PRASA's Integrated Preventive Maintenance Program (IPMP). During FY2010, PRASA's telemetry and CMMS initiatives were integrated into the Plants Automation Program (later described in Section 4) with the objectives of combining and aligning the goals and efforts of these existing PRASA initiatives into a single program.

## 2.4 Conclusions

PRASA continues to be diligent about addressing the organizational shortcomings identified in 2004 after the enactment of Act No. 92. The current organization is sufficient for the operation, management and maintenance of the System. PRASA has been able to perform executive management transitions smoothly ensuring a continuance of policy and program implementation, and System O&M. Although PRASA currently has some staffing needs at individual facilities or within its executive and management teams, PRASA's overall staff levels continue to be high when compared to industry standards.

PRASA continues to assess administrative and operational performance with the purpose of emphasizing System performance and customer service. PRASA continues to engage with numerous internationally recognized consultants to assist with several aspects of the operation and improvement of the System. The engagement of experienced PMCs for the implementation of its infrastructure program, and the engagement of well-qualified consultants for the improvement of its O&M programs demonstrates PRASA's commitment to the transformation of the utility to raise it to world-class standards.

## 3 Condition of System

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### 3.1 Introduction

PRASA owns a large variety of assets, including land, buildings, dams, wells, water and wastewater treatment facilities and pump stations, ocean outfalls, buried infrastructure, vehicles, and water meters. MPPR/Malcolm Pirnie has assessed the condition of PRASA’s System through an inspection program of major portions of the System. The purpose of these inspections is to identify the overall condition of the facilities to determine if they are being operated and maintained in a manner to achieve their operating goals and to evaluate if PRASA’s CIP is aligned with identified needs. These inspections were performed from January 28, 2010 through March 16, 2010.

Tables 3-1 and 3-2 present the categories of PRASA’s assets that were inspected as part of this CER, along with the total quantity of PRASA assets, number of facilities inspected, and percent of total facilities inspected. The quantity of PRASA assets included in Tables 3-1 and 3-2 are based on the latest data obtained from PRASA’s GIS database. These numbers vary from those reported in previous years given that PRASA continues to digitize and incorporate both existing and new infrastructure data. As it is expected from any GIS, this information will fluctuate from year to year as a result of its further development and expansion, and the deletions and additions of assets to the System.

As shown in Table 3-1, all regulated dams were inspected, due to the value of these individual assets. Approximately 50% of the WTPs and WWTPs were inspected. Those inspected were facilities that served a considerable amount of clients and/or that had a lower rating in previous inspections. The remaining 50% was not inspected since in the two previous inspections they had good or adequate ratings. As shown in Table 3-2, only a portion of the wells, pump stations and storage tanks (minor facilities) were inspected because of their lower individual facility value.

**Table 3-1:  
Large Value Assets (Major Facilities) Inspected by Asset Category**

| Asset Category              | Total PRASA Facilities | Inspections Performed |         |
|-----------------------------|------------------------|-----------------------|---------|
|                             |                        | Quantity              | Percent |
| Regulated Dams              | 8                      | 8                     | 100%    |
| Water Treatment Plants      | 127                    | 67                    | 53%     |
| Wastewater Treatment Plants | 60                     | 30                    | 50%     |
| Total                       | 195                    | 105                   | 54%     |



**Table 3-2:  
Lower Value Assets (Minor Facilities) Inspected by Asset Category**

| Asset Category           | Total PRASA Facilities | Inspections Performed |           |
|--------------------------|------------------------|-----------------------|-----------|
|                          |                        | Quantity              | Percent   |
| Wells                    | 299                    | 39                    | 13%       |
| Water Pump Stations      | 1,182                  | 52                    | 4%        |
| Water Storage Tanks      | 1,723                  | 54                    | 3%        |
| Wastewater Pump Stations | 1,004                  | 51                    | 5%        |
| <b>Total</b>             | <b>4,208</b>           | <b>196</b>            | <b>5%</b> |

In total, 301 inspections were performed out of a total of 4,403 facilities. Furthermore, it should be noted that no inspections were performed on the following assets: small dams and weirs, buried infrastructure, meters, ocean outfalls, buildings, land, and other ancillary facilities. To ensure consistency between inspections performed in 2008, 2009 and 2010, MPPR/Malcolm Pirnie utilized the same inspection forms used for the 2008 and 2009 CERs with some minor modifications. To standardize documentation and ratings, new inspectors were trained by MPPR/Malcolm Pirnie’s water and wastewater experts who also participated in the 2009 CER.

Inspections were performed throughout PRASA’s five operational Regions. An attempt was made to obtain a representative sampling of the minor facilities by inspecting a large number of facilities within several focused Operational Areas across the island. The Operational Areas selected were those with a greater number of clients (Caguas, Ponce, Arecibo, Mayagüez, and San Juan). As the specific assets to be inspected were not pre-determined, this approach provided some assurance that MPPR/Malcolm Pirnie would not be inspecting only the best assets in an Operational Area. Upon arrival to a specific Operational Area, PRASA representatives guided inspectors to a selection of the minor facilities within their Operational Area.

Table 3-3 shows the number of facilities inspected within each Region. Because the Metro Region has fewer, but larger, WTPs and WWTPs (100% of which were inspected) compared to the other Regions, the total number of inspections in the Metro Region is less than in the other Regions. However, the Metro Region was inspected to an overall level consistent with the other Regions.

**Table 3-3:  
Summary of Inspections by Region**

| <i>Higher Value/Major Facilities</i>    |           |           |           |           |           |            |
|---|-----------|-----------|-----------|-----------|-----------|------------|
| Asset Category                          | East      | Metro     | North     | South     | West      | Total      |
| Regulated Dams                          | 3         | 2         | 1         | 1         | 1         | <b>8</b>   |
| Water Treatment Plants                  | 15        | 5         | 16        | 16        | 15        | <b>67</b>  |
| Wastewater Treatment Plants             | 7         | 3         | 6         | 7         | 7         | <b>30</b>  |
| <b>Subtotal Higher Value Facilities</b> | <b>25</b> | <b>10</b> | <b>23</b> | <b>24</b> | <b>23</b> | <b>105</b> |

| <i>Lower Value/Minor Facilities</i>    |           |           |           |           |           |            |
|--|-----------|-----------|-----------|-----------|-----------|------------|
| Asset Category                         | East      | Metro     | North     | South     | West      | Total      |
| Wells                                  | 1         | 0         | 17        | 11        | 10        | 39         |
| Water Pump Stations                    | 11        | 10        | 12        | 10        | 9         | 52         |
| Water Storage Tanks                    | 10        | 11        | 13        | 11        | 9         | 54         |
| Wastewater Pump Stations               | 11        | 9         | 11        | 10        | 10        | 51         |
| <b>Subtotal Lower Value Facilities</b> | <b>33</b> | <b>30</b> | <b>53</b> | <b>42</b> | <b>38</b> | <b>196</b> |
|  |           |           |           |           |           |            |
| <b>Total Inspected Facilities</b>      | <b>58</b> | <b>40</b> | <b>76</b> | <b>66</b> | <b>61</b> | <b>301</b> |

As in previous CERs, each category of asset was inspected using an inspection form, criteria, and criteria weighting customized to that specific asset category. The evaluation criteria were chosen from the following list for each asset inspection.

- Compliance– degree to which the performance of the asset is in compliance with its permit limits and regulatory requirements.
- Equipment / Maintenance – assessment of the adequacy of the maintenance practices and the condition of the facility.
- Operations / Process Control – degree to which asset condition and features allow it to be operated and controlled to meet its performance objectives.
- Staffing / Training – assessment of the adequacy of facility staffing coverage and training.

Within each of the evaluation criteria, the asset inspected was assigned a numerical rating between zero and three (“0-3”). An overall facility rating was then determined based on the calculation of a weighted average of the ratings for each criterion. The numerical ratings are described below:

| <u>Rating</u>  | <u>Range</u> |
|--|--------------|
| ■ Good (Most of the criteria are adequately addressed)             | 2.5 – 3.0    |
| ■ Adequate (Many of the criteria are adequately addressed)         | 1.5 – 2.4    |
| ■ Poor (Many of the criteria are not adequately addressed)         | 0.5 – 1.4    |
| ■ Unacceptable (Most of the criteria are not adequately addressed) | 0.0 – 0.4    |

A summary of the inspection results for each asset category is discussed separately below. Digital copies of the inspection forms for each visited facility were provided to PRASA for its information and use along with this CER.

## 3.2 Dams

PRASA operates approximately 163 water supply systems that can be divided into two primary categories. The first type is large regulated dams that impound reservoirs of greater than 50 acre-

feet or have a measured height of greater than 25 feet. Currently only eight of PRASA's water supply systems are classified as regulated dams. This includes a large regulated dam (Río Blanco), located in the East Region, that is preparing for first filling and was included in the inspections performed for this report. The second type is weirs that create minor impoundments on active streams or rivers, but do not meet the regulatory criteria to be classified as dams. Regulated dam structures are operated under the jurisdiction of the Dam Safety Unit of PREPA. PREPA administers the Dam Safety Program in association with the Department of Natural and Environmental Resources (DNER), Puerto Rico Planning Board, PRASA, and public sector appointees by the Governor. A Dam Safety Committee, of which PRASA is a member as required by law, oversees the Dam Safety Program.

In addition to size classification, the regulated dams in Puerto Rico are also assigned a Hazard Classification, which is based upon the downstream impacts that would result from failure of the dam where the impounded reservoir is released into the lower watershed. The failure of a low hazard dam would result in the loss of the structure itself, but little to no additional damage to other property. The failure of an intermediate hazard dam would result in very little loss of life and significant damage to property and project operation. The failure of a high hazard dam would cause more than very little loss of life and serious damage to communities, industry, and agriculture.

PREPA's Dam Safety Unit performed inspections from 2006 to 2009 of the seven PRASA regulated dams that are in operation, creating summary reports addressing the dam structure, appurtenant works, operations and safety for each facility. MPPR/Malcolm Pirnie utilized these reports as a baseline from which to perform independent visual inspections and evaluations of the dam structures. PRASA's newest dam facility, Río Blanco, (considered as a large, regulated dam), was completed in spring FY2010. It is not included in the inspections performed by PREPA; however, MPPR/Malcolm Pirnie performed a visual inspection and evaluation of the dam structure for this assessment.

According to Puerto Rico's Dam Safety regulations, regulated dam facilities are to be inspected every three years. Timely and ample inspection of these dams is essential for permitting or approval required for construction, modification, repair, or removal of the dam or the appurtenant works. Aside from the daily observation and operations of the fully-staffed dam facilities, all of these structures are given a cursory safety inspection annually by PREPA prior to hurricane season. Each recommendation based on an inspection, is rated indicating the priority for action. The ratings are defined as follows:

- Priority A – Immediate corrective actions are needed when item affects immediately the safety of the dam; can potentially lead to unsafe condition of the dam or endangers public safety.
- Priority B – Corrective actions is needed within one to five years.

- Priority C – Involves routine maintenance or surveillance activity.

Table 3-4 summarizes the evaluation categories and assigned weighting factors used in the evaluation of regulated dams.

**Table 3-4:  
Regulated Dams – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Regulatory Compliance      | 25%              |
| Equipment/Maintenance      | 45%              |
| Operations/Process Control | 15%              |
| Staffing/Training          | 15%              |

### 3.2.1 Inspection Results

#### 3.2.1.1 Regulated Dams

All of PRASA’s regulated dams, a total of eight, were inspected for this 2010 CER, including one nearing completion of construction to be filled this year. Table 3-5 provides a summary of the facility ratings by each of the evaluation criteria, as well as the overall facility rating. Of the eight regulated dams inspected, one dam (Las Curías) rated as poor in 2009 has been raised to an adequate rating based on a closer evaluation of seepage along the downstream toe of the dam and a walk through the outlet structure which showed the outlet structure was in good condition. The Las Curías dam is the same facility that received the unacceptable rating in Regulatory Compliance. The Las Curías dam is no longer used for drinking water storage and PRASA is in negotiations with the DNER to transfer the property for DNER management, inspection and operation. In addition to Las Curías dam, four other dams were rated as adequate. The remaining three dams received a good rating.

**Table 3-5:  
Regulated Dams  
(Number and Percentage of Ratings by Category)**

| Rating Range          | Regulatory Compliance |         | Ops/Process Control |         | Equipment/Maintenance |         | Staffing/ Training |         | Overall Rating |         |
|-----------------------|-----------------------|---------|---------------------|---------|-----------------------|---------|--------------------|---------|----------------|---------|
|                       | Number                | Percent | Number              | Percent | Number                | Percent | Number             | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 0                     | 0%      | 0                   | 0%      | 0                     | 0%      | 0                  | 0%      | 0              | 0%      |
| Poor (0.5-1.4)        | 1                     | 13%     | 0                   | 0%      | 0                     | 0%      | 1                  | 13%     | 0              | 0%      |
| Adequate (1.5-2.4)    | 3                     | 37%     | 6                   | 75%     | 5                     | 63%     | 3                  | 37%     | 5              | 63%     |
| Good (2.5-3.0)        | 4                     | 50%     | 2                   | 25%     | 3                     | 37%     | 4                  | 50%     | 3              | 37%     |
| <b>Average Rating</b> | <b>2.2</b>            |         | <b>2.1</b>          |         | <b>2.3</b>            |         | <b>2.3</b>         |         | <b>2.3</b>     |         |

The inspection results of the seven dam facilities obtained as part of the 2008 CER and the eight facilities obtained as part of the 2009 and 2010 CERs were compared to analyze facilities' performance since the initial inspection. As mentioned, the Río Blanco Dam has just been completed this spring and was not evaluated in 2008 and therefore, there is no entry for 2008 in our comparison. Table 3-6 presents the comparison of the average rating of the facilities by each category evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for facilities inspected in each year are also presented. In general, there is little change in rating of the four categories evaluated. However, the average rating has benefited from the improved score for the Las Curías dam which was raised by a value of 1.0 from poor to adequate based on the conclusion that the embankment seepage and outlet structure represent more stable and sound conditions than previously assessed.

**Table 3-6:  
Comparison of Average Results for Dam Facilities for Inspection Years  
2008, 2009 and 2010**

| Criteria                   | 2008 <sup>1</sup> | 2009       | 2010       | Change<br>2008 vs. 2010 | Change<br>2009 vs. 2010 |
|----------------------------|-------------------|------------|------------|-------------------------|-------------------------|
| Regulatory Compliance      | 2.2               | 2.2        | 2.2        | 0.0                     | 0.0                     |
| Equipment/Maintenance      | 2.3               | 2.2        | 2.3        | 0.0                     | 0.1                     |
| Operations/Process Control | 2.2               | 2.1        | 2.1        | -0.1                    | 0.0                     |
| Staffing/Training          | 2.1               | 2.1        | 2.3        | 0.2                     | 0.2                     |
| <b>Overall</b>             | <b>2.3</b>        | <b>2.1</b> | <b>2.3</b> | <b>0.0</b>              | <b>0.2</b>              |

<sup>(1)</sup>Based on seven facilities.

### 3.2.2 Conclusions

PRASA's regulated dams are in adequate to good condition. These facilities have been inspected at the appropriate intervals by PREPA. It is important to note that the Las Curías (Río Piedras) Dam condition rating would likely improve significantly with completion of the Priority A, B and C action items detailed in the March 2009 PREPA inspection report. This dam is no longer utilized for drinking water storage but still represent a high hazard in the event of an uncontrolled release of impounded water. Similarly, the condition ratings of Isabela and Cidra could be improved by addressing the PREPA Priority action items. Isabela Regulator Lake requires maintenance of the geomembrane liner to avoid a potential reduced lifespan for this facility. Sloughing of cover geomembrane soils will continue to expose the liner to rodents and puncture. Lastly, with the exception of Fajardo Dam, all the facilities need to address the common outstanding Priority A action item requiring an Emergency Action Plan be in place at the facilities. With attention to these items, the large dams will have a greater level of safety and can be expected to continue to play their vital role in the water supply system.

### 3.3 Water Treatment Plants

PRASA operates 127 WTPs to provide potable water to the citizens and industries of Puerto Rico. The facilities range in size from several hundred gallons per day up to 100 million gallons per day (MGD). Approximately 53% of all PRASA's WTPs in operation were inspected as part of this evaluation. Each visit consisted of a site walkthrough and an interview with the operator, plant supervisor or designated personnel. Thus, information was at least in part based on the understanding of the person that was being interviewed. Table 3-7 summarizes the evaluation categories and assigned weighting factors used in the evaluation of WTPs.

**Table 3-7:  
WTPs – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Regulatory Compliance      | 35%              |
| Equipment/Maintenance      | 20%              |
| Operations/Process Control | 30%              |
| Staffing/Training          | 15%              |

#### 3.3.1 Inspection Results

Table 3-8 provides a summary of the WTP ratings by each of the four evaluation categories, as well as the overall facility rating. The average WTP overall rating was in the adequate range with an overall rating of 2.3. This is indicative of the fact that approximately 84% of the WTPs are able to produce water which has a disinfectant residual and meets standards for turbidity and disinfection byproducts (DBPs) at least most of the time. The WTPs that were rated as poor (Caguas Norte, Cedro Arriba and San Germán) need prompt attention to ensure their continued ability to produce potable water.

**Table 3-8:  
Water Treatment Plants  
(Number and Percentage of Ratings by Category)**

| Rating Range          | Regulatory Compliance |         | Ops/Process Control |         | Equipment/Maintenance |         | Staffing/Training |         | Overall Rating |         |
|-----------------------|-----------------------|---------|---------------------|---------|-----------------------|---------|-------------------|---------|----------------|---------|
|                       | Number                | Percent | Number              | Percent | Number                | Percent | Number            | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 3                     | 4%      | 0                   | 0%      | 0                     | 0%      | 0                 | 0%      | 0              | 0%      |
| Poor (0.5-1.4)        | 8                     | 12%     | 2                   | 3%      | 0                     | 0%      | 1                 | 1%      | 3              | 4%      |
| Adequate (1.5-2.4)    | 32                    | 48%     | 14                  | 21%     | 44                    | 66%     | 18                | 27%     | 37             | 55%     |
| Good (2.5-3.0)        | 24                    | 36%     | 51                  | 76%     | 23                    | 34%     | 48                | 72%     | 27             | 40%     |
| <b>Average Rating</b> | <b>2.1</b>            |         | <b>2.6</b>          |         | <b>2.3</b>            |         | <b>2.4</b>        |         | <b>2.3</b>     |         |

The inspection results obtained as part of the 2008 and 2009 CERs were compared with the results from 2010 CER to analyze performance changes since the previous inspections. Table 3-9 illustrates the comparison of the average rating of all facilities by each category evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for the three years are also presented.

**Table 3-9:  
Comparison of Average Results for WTPs for Inspection Years  
2008, 2009 and 2010**

| Criteria                   | 2008       | 2009       | 2010       | Change<br>2008 vs. 2010 | Change<br>2009 vs. 2010 |
|----------------------------|------------|------------|------------|-------------------------|-------------------------|
| Regulatory Compliance      | 2.2        | 2.3        | 2.1        | -0.1                    | -0.2                    |
| Equipment/Maintenance      | 2.1        | 2.3        | 2.3        | 0.2                     | 0.0                     |
| Operations/Process Control | 2.2        | 2.5        | 2.6        | 0.4                     | 0.1                     |
| Staffing/Training          | 2.2        | 2.6        | 2.4        | 0.2                     | -0.2                    |
| <b>Overall</b>             | <b>2.2</b> | <b>2.4</b> | <b>2.3</b> | <b>0.1</b>              | <b>-0.1</b>             |

In comparison with the 2009 CER a slight reduction in rating was observed in the Regulatory Compliance, Staff/Training, and overall ratings. The Equipment/Maintenance and Operation/Process Control ratings remain similar to the previous CER. In comparison with the 2008 CER, all categories show an improvement, with the exception of Regulatory Compliance that experienced a reduction in score. It is important to note that the results show an adequate standing of PRASA's WTPs and demonstrates a positive result of the CIP and other programs related to the improvement, maintenance and operations of the WTPs.

### 3.3.2 Conclusions

The WTPs are generally in adequate condition and are expected to continue to serve their intended function of providing potable water supply. Eleven of the WTPs inspected (approximately 16%), however, are considered poor or unacceptable in terms of compliance, typically due to multiple violations of combined filter effluent turbidity limits. Nine of 11 WTPs rated as poor or unacceptable from a compliance perspective are being addressed by measures identified in PRASA's 2007 Drinking Water Settlement Agreement with the Puerto Rico Department of Health (PRDOH)<sup>9</sup> or are otherwise being addressed in the CIP or by the operational Region. The performance of these WTPs will be expected to increase in the future. Although PRASA intends to close several of the worst performing WTPs, such closures are typically several years or more in the future and have been included in the 2007 PRDOH Drinking Water Settlement Agreement (PRDOH Agreement). In February of 2010, PRASA began planning efforts for improvements at the Caguas Norte WTP, one of the two facilities rated as poor or unacceptable and currently not included in the CIP or addressed by the consent decrees

<sup>9</sup> In the 2008 CER the PRDOH Water Settlement Agreement was referred to as the PRDOH Consent Decree.

or agreements. PRASA indicates that this project will be included in the next version of the CIP that will be submitted to its Board for approval. The remaining facility, Ponce Vieja WTP, does not have a programmed project to address the issues identified during the inspections.

Many of the WTPs have inadequate sludge treatment systems (STSs) and are out of compliance with their National Pollutant Discharge Elimination System (NPDES) effluent limits. On April 6, 2010, PRASA and the U.S. Environmental Protection Agency (USEPA) signed the new STS Consent Decree which addresses issues identified in the WTP STSs. The STS Consent Decree substitutes, and in turn closes, the existing WTP STS Consent Decrees known as PRASA II and PRASA III (defined in Section 5).

Future regulatory requirements (as discussed in Section 5.4) may require additional capital improvements to achieve higher levels of treatment at certain facilities depending on the characteristics of the source water and the distribution system. The effects of these future regulations will not be known until PRASA performs data collection and studies to determine what, if any, additional capital improvements will be needed to comply with these future regulations.

### 3.4 Wastewater Treatment Plants

PRASA operates 60 WWTPs. The facilities range in size from several hundred gallons per day up to 75 MGD. Approximately 50% of PRASA’s WWTPs in operation were inspected as part of this evaluation. Each visit consisted of a site walkthrough and an interview with the operator, plant supervisor or designated personnel. Thus, information was at least in part based on the understanding of the person that was being interviewed. Table 3-10 summarizes the evaluation categories and assigned weighting factors used in the evaluation of WWTPs.

**Table 3-10:  
WWTPs – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Regulatory Compliance      | 35%              |
| Equipment/Maintenance      | 20%              |
| Operations/Process Control | 30%              |
| Staffing/Training          | 15%              |

#### 3.4.1 Inspection Results

Table 3-11 provides a summary of the WWTP ratings by each of the four evaluation categories, as well as the overall facility rating. The average WWTPs overall rating was in the adequate range with an overall rating of 2.0.



**Table 3-11:  
Wastewater Treatment Plants  
(Number and Percentage of Ratings by Category)**

| Rating Range          | Regulatory Compliance <sup>1</sup> |         | Ops/Process Control |         | Equipment/Maintenance |         | Staffing/Training |         | Overall Rating |         |
|-----------------------|------------------------------------|---------|---------------------|---------|-----------------------|---------|-------------------|---------|----------------|---------|
|                       | Number                             | Percent | Number              | Percent | Number                | Percent | Number            | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 9                                  | 31%     | 0                   | 0%      | 0                     | 0%      | 0                 | 0%      | 0              | 0%      |
| Poor (0.5-1.4)        | 4                                  | 14%     | 1                   | 3%      | 0                     | 0%      | 6                 | 20%     | 5              | 17%     |
| Adequate (1.5-2.4)    | 7                                  | 24%     | 16                  | 53%     | 17                    | 57%     | 21                | 70%     | 19             | 63%     |
| Good (2.5-3.0)        | 9                                  | 31%     | 13                  | 43%     | 13                    | 43%     | 3                 | 10%     | 6              | 20%     |
| <b>Average Rating</b> | <b>1.5</b>                         |         | <b>2.3</b>          |         | <b>2.4</b>            |         | <b>1.8</b>        |         | <b>2.0</b>     |         |

<sup>(1)</sup>One WWTP (Playa Santa) that discharges to underground injection was not evaluated under this criterion because compliance information was not available.

The inspection results obtained as part of the 2008 and 2009 CERs were compared with the results from 2010 CER in order to analyze performance changes since the previous inspections. Table 3-12 illustrates the comparison of the average rating of all facilities by each category evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for the three years are also presented.

**Table 3-12:  
Comparison of Average Results for WWTPs for Inspection Years  
2008, 2009 and 2010**

| Criteria                   | 2008             | 2009             | 2010             | Change 2008 vs. 2010 | Change 2009 vs. 2010 |
|----------------------------|------------------|------------------|------------------|----------------------|----------------------|
| Regulatory Compliance      | 1.3 <sup>1</sup> | 1.5 <sup>1</sup> | 1.5 <sup>2</sup> | 0.2                  | 0.0                  |
| Equipment/Maintenance      | 2.2              | 2.2              | 2.4              | 0.2                  | 0.2                  |
| Operations/Process Control | 2.4              | 2.4              | 2.3              | -0.1                 | -0.1                 |
| Staffing/Training          | 1.8              | 2.0              | 1.8              | 0.0                  | -0.2                 |
| <b>Overall</b>             | <b>1.9</b>       | <b>2.0</b>       | <b>2.0</b>       | <b>0.1</b>           | <b>0.0</b>           |

<sup>(1)</sup> Two WWTPs (Playa Santa and La Parguera) that discharge to underground injection were not evaluated under this criterion because they do not have an approved NPDES Permit.

<sup>(2)</sup>One WWTP (Playa Santa) that discharges to underground injection was not evaluated under this criterion because it does not have an approved NPDES Permit.

As shown in Table 3-12, the overall condition of the facilities remained the same from 2009 to 2010. The Equipment/Maintenance conditions improved; a possible effect of the IPMP. The Operations/Process Control and Staffing/Training conditions experienced a minor reduction in rating. The Staffing/Training rating reduction could be related to the reduction in employees and training hours in this fiscal year. In comparison to the 2008 inspections results, the rating for all

categories improved or remained the same, with the exception of the Operations/Process Control that experienced a minor reduction in rating. These results indicate a constant trend and an adequate standing on PRASA's WWTPs, due to the CIP and others initiatives related to the improvements of maintenance and operations of the WWTPs.

### 3.4.2 Conclusions

The WWTPs generally range from adequate (63%) to good condition (20%). Those that are rated as poor (17%) have issues primarily associated with compliance and staffing/training. Compliance with NPDES effluent limits has been the greatest challenge for many of the WWTPs. Approximately 43% of the WWTPs received a poor or unacceptable compliance score (compared to 50% in the 2008 CER, and 38% in the 2009 CER), indicating a negative trend in performance in comparison with the 2009 CER, but an improvement in comparison with the 2008 CER. The most common compliance violations were related to the presence of total and fecal coliforms, and nitrite and nitrate removal. The total fecal coliforms violations could be related to the presence of suspended solids after the clarification tanks, or that adjustments to the chlorine doses are required. The nitrite and nitrate violations could be related to shortcomings, as these facilities may not be designed to achieve nitrogen removal. Nevertheless, PRASA has CIP projects planned that will improve process performance in the near future. Once these improvements are complete, it is anticipated that the effluent quality will improve and that the overall combined compliance rating for the WWTPs will further improve.

The existing frequency of site visits to monitor WWTPs that are not staffed 24 hours per day is insufficient to provide prompt notice of problems. However, PRASA has included a telemetry program in its CIP and the five regions are currently implementing it, with the objective of remote monitoring the facilities. The facilities to be included in the telemetry program have been prioritized to first include those where telemetry is necessary to comply with the 2006 USEPA Wastewater Consent Decree (2006 Consent Decree, or the "Mega" Consent Decree) and PRDOH Agreement, followed by other facilities where it is deemed operationally critical, as verified with Operational Area directors.

### 3.5 Wells

PRASA has a large number of drinking water wells, most of which deliver water directly into a distribution system with little or no treatment, except chlorination. PRASA's wells vary in size from 100 to 1,200 gallons per minute (gpm). Table 3-13 summarizes the evaluation categories and assigned weighting factors used in the evaluation of wells.

**Table 3-13:  
Wells – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Equipment/Maintenance      | 50%              |
| Operations/Process Control | 50%              |

While compliance information is relevant to the evaluation of wells, insufficient information is available to evaluate that criterion. Wells are not generally staffed and have a limited amount of equipment; therefore the staffing and training category was not included in the evaluation of wells.

### 3.5.1 Inspection Results

A total of 39 wells, 13% of total PRASA wells, were inspected for the 2010 CER, as compared to 72 and 59 in the 2009 and 2008 CERs respectively. Table 3-14 provides a summary of the facility ratings by each of the evaluation categories, as well as the overall facility rating. The average wells overall rating was in the adequate range with an overall rating of 2.1.

**Table 3-14:  
Wells (Number and Percentage of Ratings by Category)**

| Rating Range          | Ops/Process Control |         | Equipment/ Maintenance |         | Overall Rating |         |
|-----------------------|---------------------|---------|------------------------|---------|----------------|---------|
|                       | Number              | Percent | Number                 | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 0                   | 0%      | 1                      | 3%      | 0              | 0%      |
| Poor (0.5-1.4)        | 2                   | 5%      | 4                      | 10%     | 2              | 5%      |
| Adequate (1.5-2.4)    | 26                  | 67%     | 15                     | 38%     | 24             | 62%     |
| Good (2.5-3.0)        | 11                  | 28%     | 19                     | 49%     | 13             | 33%     |
| <b>Average Rating</b> | <b>2.2</b>          |         | <b>2.1</b>             |         | <b>2.1</b>     |         |

The inspection results obtained as part of the 2008 and 2009 CERs were compared with the results from 2010 CER to analyze performance changes since the previous inspections. Table 3-15 illustrates the comparison of the average rating of all facilities by each category evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for the three years is also presented.

**Table 3-15:  
Comparison of Average Results for Wells for Inspection Years  
2008, 2009 and 2010**

| Criteria                   | 2008       | 2009       | 2010       | Change<br>2008 vs. 2010 | Change<br>2009 vs. 2010 |
|----------------------------|------------|------------|------------|-------------------------|-------------------------|
| Equipment/Maintenance      | 2.1        | 1.8        | 2.1        | 0.0                     | 0.3                     |
| Operations/Process Control | 1.8        | 2.1        | 2.2        | 0.4                     | 0.1                     |
| <b>Overall</b>             | <b>2.0</b> | <b>1.9</b> | <b>2.1</b> | <b>0.1</b>              | <b>0.2</b>              |

As shown in Table 3-15, the rating for all categories improved or remained equal to the 2008 and 2009 CER ratings. All categories evaluated remain in the adequate range. The deficiencies noted were minimal and were due in part to a decrease in equipment conditions as a result of missing vent screens, faulty or non-operating pressure gages and flow meters, and deficiencies in chemical containment.

### 3.5.2 Conclusions

The wells are generally in adequate condition and are expected to continue to serve their intended function of supplemental water supply. Most of the deficiencies noted can be addressed through PRASA's R&R program and may not require major capital improvements. Compliance data should be collected to determine if a well is in compliance with the water quality parameters and to assist with preparation and planning for possible impacts of future regulations. Future regulatory requirements (as discussed in Section 5.4) may require additional treatment for certain wells which would require significant capital improvements or closure of certain wells.

## 3.6 Water Pump Stations

PRASA operates a total of 1,182 water pump stations (WPSs). The WPSs consist of two major categories: (1) above ground pumps and (2) below ground pumps in vaults with heavy covers that cannot be readily removed by field inspectors (underground booster stations). For this report, and as on previous CERs, no underground booster stations were inspected due the heavy covers that cannot be removed by the inspector. Consequently, 52 of the above ground pump stations were fully inspected and the assessment of those stations is described below. PRASA's WPSs vary in pumping capability from less than 100 gpm to over 9,000 gpm. Table 3-16 summarizes the evaluation categories and assigned weighting factors used in the evaluation of WPSs.

**Table 3-16:  
WPS – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Equipment/Maintenance      | 50%              |
| Operations/Process Control | 50%              |

Because the WPSs do not treat the water, the compliance category is not significant to the evaluation of water pump stations. Pump stations are generally not staffed and have a limited amount of equipment; therefore, the staffing and training category was also excluded.

### 3.6.1 Inspection Results

Table 3-17 provides a summary of the facility ratings for each of the two evaluation criteria, as well as the overall facility rating for the 52 facilities inspected. The average wells overall rating was in the adequate range with an overall rating of 2.3.

**Table 3-17:  
Water Pump Stations (Number and Percentage of Ratings by Category)**

| Rating Range          | Ops/Process Control |         | Equipment/<br>Maintenance |         | Overall Rating |         |
|-----------------------|---------------------|---------|---------------------------|---------|----------------|---------|
|                       | Number              | Percent | Number                    | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 0                   | 0%      | 0                         | 0%      | 0              | 0%      |
| Poor (0.5-1.4)        | 0                   | 0%      | 7                         | 13%     | 1              | 2%      |
| Adequate (1.5-2.4)    | 15                  | 29%     | 27                        | 52%     | 28             | 54%     |
| Good (2.5-3.0)        | 37                  | 71%     | 18                        | 35%     | 23             | 44%     |
| <b>Average Rating</b> | <b>2.5</b>          |         | <b>2.1</b>                |         | <b>2.3</b>     |         |

The inspection results obtained as part of the 2008 and 2009 CERs were compared with the results from 2010 CER in order to analyze performance changes since the previous inspections. Table 3-18 illustrates the comparison of the average rating of all facilities by each category evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for the three years are also presented.

**Table 3-18:  
Comparison of Average Results for WPS for Inspection Years  
2008, 2009 and 2010**

| Criteria                   | 2008       | 2009       | 2010       | Change<br>2008 vs. 2010 | Change<br>2009 vs. 2010 |
|----------------------------|------------|------------|------------|-------------------------|-------------------------|
| Equipment/Maintenance      | 2.3        | 1.7        | 2.1        | -0.2                    | 0.4                     |
| Operations/Process Control | 2.1        | 2.6        | 2.5        | 0.4                     | -0.1                    |
| <b>Overall</b>             | <b>2.2</b> | <b>2.2</b> | <b>2.3</b> | <b>0.1</b>              | <b>0.1</b>              |

On average, equipment conditions improved measurably between the 2009 CER and 2010 CER inspections mostly due to the fact that at the time of inspections most of the pumps were in operation, and the facilities were equipped with emergency generators. Although the facilities Operations/Process Control rating reduced, the overall ratings show a slight improvement and remain in the adequate range. The percent of facilities with a poor rating reduced from 14% to 2%. In comparison with the 2008 CER, the overall rating experienced slight improvements, the Operation/Process Control improved considerably, changing from adequate to good condition, while the Equipment/Maintenance rating reduced but still remains in good condition.

### 3.6.2 Conclusions

The WPSs are generally in adequate to good condition and are expected to continue to serve their intended function of delivering drinking water throughout the distribution systems. The deficiencies noted were minimal and are related to lack of features to optimize maintenance practices and equipment of facilities. Other noted deficiencies, such as leaks and overgrown vegetation can be addressed through routine maintenance or PRASA's R&R program and may not require major capital improvements.

### 3.7 Water Storage Tanks

PRASA owns and operates a wide range of water storage tanks that vary in storage capacity (size) from 100 to 10,000,000 gallons. They also vary in shape: some are circular and others are rectangular. Construction materials used are steel and concrete. Table 3-19 summarizes the evaluation categories and assigned weighting factors used in the evaluation of water storage tanks.

**Table 3-19:  
Water Storage Tanks – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Equipment/Maintenance      | 50%              |
| Operations/Process Control | 50%              |

Since the water storage tanks inspected are not used to treat the water, the compliance criterion was not considered in their evaluation; however, presence of chlorine boosters at facilities was noted. Because water storage tanks are not generally staffed and have a limited amount of equipment, the staffing and training category was also not considered in the evaluation of the water storage tanks.

#### 3.7.1 Inspection Results

A total of 54 or 3% of the total water storage tanks were inspected. Table 3-20 provides a summary of the facility ratings for each of the two evaluation criteria, as well as the overall facility rating. The average tanks overall rating was in the adequate range with an overall rating of 1.6.

**Table 3-20:  
Water Storage Tanks  
(Number and Percentage of Ratings by Category)**

| Rating Range          | Ops/Process Control |         | Equipment/ Maintenance |         | Overall Rating |         |
|-----------------------|---------------------|---------|------------------------|---------|----------------|---------|
|                       | Number              | Percent | Number                 | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 5                   | 9%      | 6                      | 11%     | 3              | 6%      |
| Poor (0.5-1.4)        | 19                  | 35%     | 19                     | 35%     | 18             | 33%     |
| Adequate (1.5-2.4)    | 21                  | 39%     | 18                     | 33%     | 27             | 50%     |
| Good (2.5-3.0)        | 9                   | 17%     | 11                     | 20%     | 6              | 11%     |
| <b>Average Rating</b> | <b>1.6</b>          |         | <b>1.6</b>             |         | <b>1.6</b>     |         |

The inspection results obtained as part of the 2008 and 2009 CERs were compared with the results from 2010 CER in order to analyze performance changes since the previous inspections. Table 3-21 illustrates the comparison of the average rating of all facilities by each category

evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for the three years are also presented.

**Table 3-21:  
Comparison of Average Results for Water Storage Tanks for Inspection  
Years 2008, 2009 and 2010**

| Criteria                   | 2008       | 2009       | 2010       | Change<br>2008 vs. 2010 | Change<br>2009 vs. 2010 |
|----------------------------|------------|------------|------------|-------------------------|-------------------------|
| Equipment/Maintenance      | 2.2        | 1.6        | 1.6        | -0.6                    | 0.0                     |
| Operations/Process Control | 1.6        | 1.5        | 1.6        | 0.0                     | 0.1                     |
| <b>Overall</b>             | <b>1.9</b> | <b>1.6</b> | <b>1.6</b> | <b>-0.3</b>             | <b>0.0</b>              |

On average, equipment conditions, operations and process control and overall ratings remain similar from the 2009 CER inspections to the 2010 CER inspections. In comparison with the 2008 CER the Equipment/Maintenance category experienced a considerable reduction in rating, but facilities still remain in adequate condition. This reduction in rating was reflected in the overall condition rating. PRASA's tanks require more aggressive O&M and R&R programs, as many were found to have substantial cracking problems, missing vent screens, overgrown vegetation, and safety deficiencies (i.e., access hatches were not secured or locked). Also, access to the facilities was difficult in some cases. Finally, there is no tank interior inspection plan in place. However, both categories remain in adequate range.

### 3.7.2 Conclusions

The water storage tanks are generally in adequate condition and are expected to continue to serve their intended function of providing potable water storage throughout the distribution systems. Some of the noted deficiencies are related to lack of features to optimize O&M of the tanks (e.g. local or remote tank level monitoring) and are not critical to basic function of the tanks. However, there were a few deficiencies that should be addressed to ensure that the tanks provide a safe, reliable source of stored potable water. These deficiencies do not require significant capital upgrades, but rather a modification to O&M practices (e.g. removal of overgrown vegetation, routine water tank water quality testing and periodic tank internal inspections) or can be addressed through PRASA's R&R program (e.g. repairs to tank hatches, vents and security fences).

## 3.8 Wastewater Pump Stations

PRASA operates a total of 1,004 wastewater pump stations (WWPSs). A total of 51 or 5% of these WWPSs were inspected. In general, the inspected WWPSs predominantly used wet pit type submersible pumps, although several dry pit type stations were also inspected. PRASA's WWPSs vary in pumping capability from less than 100 gpm to over 10,000 gpm, depending on the surrounding population density and proximity to the receiving WWTP. Table 3-22 summarizes the evaluation categories and assigned weighting factors used in the evaluation of WWPSs.

Because the WWPSs do not treat the wastewater and there are no effluent standards, the compliance category was not considered in the evaluation of WWPSs.

**Table 3-22:  
WWPS – Evaluation Categories and Weighting Factors**

| Category                   | Weighting Factor |
|----------------------------|------------------|
| Equipment/Maintenance      | 35%              |
| Operations/Process Control | 45%              |
| Staffing/Training          | 20%              |

### 3.8.1 Inspection Results

Table 3-23 provides a summary of the facility ratings for each of the three evaluation criteria for the 51 pump stations inspected, as well as the overall facility rating. The average WWPS overall rating was in the adequate range with an overall rating of 2.0.

**Table 3-23:  
Wastewater Pump Stations  
(Number and Percentage of Ratings by Category)**

| Rating Range          | Ops/Process Control |         | Equipment/Maintenance |         | Staffing/ Training |         | Overall Rating |         |
|-----------------------|---------------------|---------|-----------------------|---------|--------------------|---------|----------------|---------|
|                       | Number              | Percent | Number                | Percent | Number             | Percent | Number         | Percent |
| Unacceptable (0-0.4)  | 2                   | 4%      | 1                     | 2%      | 0                  | 0%      | 0              | 0%      |
| Poor (0.5-1.4)        | 17                  | 33%     | 4                     | 8%      | 3                  | 6%      | 6              | 12%     |
| Adequate (1.5-2.4)    | 28                  | 55%     | 17                    | 33%     | 22                 | 43%     | 37             | 73%     |
| Good (2.5-3.0)        | 4                   | 8%      | 29                    | 57%     | 26                 | 51%     | 8              | 16%     |
| <b>Average Rating</b> | <b>1.6</b>          |         | <b>2.3</b>            |         | <b>2.3</b>         |         | <b>2.0</b>     |         |

The inspection results obtained as part of the 2008 and 2009 CERs were compared with the results from this CER to analyze performance changes since the previous inspections. Table 3-24 illustrates the comparison of the average rating of the facilities by each category evaluated in the 2008, 2009 and 2010 CERs. The overall average rating of each evaluation criteria for the three years is also presented.

**Table 3-24:  
Comparison of Average Results for WWPS facilities for Inspection Years  
2008, 2009 and 2010**

| Criteria                   | 2008       | 2009       | 2010       | Change<br>2008 vs. 2010 | Change<br>2009 vs. 2010 |
|----------------------------|------------|------------|------------|-------------------------|-------------------------|
| Equipment/Maintenance      | 2.2        | 2.2        | 2.3        | 0.1                     | 0.1                     |
| Operations/Process Control | 1.3        | 1.6        | 1.6        | 0.3                     | 0.0                     |
| Staffing/Training          | 2.1        | 2.4        | 2.3        | 0.2                     | -0.1                    |
| <b>Overall</b>             | <b>1.7</b> | <b>2.0</b> | <b>2.0</b> | <b>0.3</b>              | <b>0.0</b>              |



The overall condition between the 2009 and 2010 CERs reflects no change in rating. Equipment/Maintenance and Staff/Training categories experienced minor positive and negatives changes respectively, remaining in adequate condition. The Operation/Process Control reflects no change in rating. In comparison with the 2008 CER, all categories show an improvement trend that was already reflected in the 2009 CER results.

### **3.8.2 Conclusions**

The WWPSs are in adequate condition. In most cases where inspected WWPSs were rated as poor under the Equipment/Maintenance criterion, it was because the facility had at least one major (critical) piece of equipment out of service (e.g. pumps, generator, etc.). In some cases the equipment had been out of service for an extended period of time. However, it should be noted that the number of facilities in poor condition has been reduced from 18% (2009 CER) to 12% (2010 CER), and the facilities with generators in operation increased. This could be as a result of the preventive maintenance efforts performed in the facilities. Nonetheless, greater attention to WWPS equipment maintenance is necessary to maintain and improve reliability.

## **3.9 Buried Infrastructure**

Although buried infrastructure (i.e. water mains, buried valves, sewer mains, manholes, etc.) was not inspected, the following sections provide some discussion regarding indirect indicators of the condition of these assets. PRASA continues to update its GIS database as infrastructure projects are completed and as additional information is obtained regarding existing infrastructure. Furthermore, PRASA has used this data to conduct hydraulic models of specific service areas in the Metro, East and West Regions to identify optimization opportunities in the System.

PRASA continues with its buried infrastructure R&R program, although at a slower pace than in previous years. Pipe R&R, which targets pipe break and leak-prone areas, are identified by PRASA's Operational Areas and prioritized according to severity of the problem. PRASA reported that approximately 305,000 meters (190 miles) and 240,000 meters (149 miles) of water and wastewater piping (combined) were renewed and replaced in FY2007 and FY2008, respectively. However, for FY2009, PRASA reports to have renewed and replaced approximately 188,000 meters (117 miles) of piping, which represents a decrease of approximately 22% from FY2008 results. This decrease could be a result of the reduction in PRASA's R&R budget from FY2008 to FY2009. Nonetheless, PRASA plans to continue replacing and repairing piping in order to bring the System to optimal operating conditions. At the time this CER was being prepared, the metrics of pipe R&R for FY2010 were not available.

### **3.9.1 Water Distribution System**

According to PRASA's fixed asset registry, PRASA owns over 7,500 miles of water pipelines, which include both transmission and distribution pipes, with sizes ranging from 2 inches to 72 inches. However, as a result of PRASA's GIS development efforts, PRASA has improved and expanded its buried infrastructure knowledge and database. Based on the latest GIS database

information, PRASA owns over 14,031 miles of water pipelines. PRASA is in the process of reconciling these values in its fixed asset registry. For purposes of this CER, the calculations included in this section will be shown for both values. However, it is expected that in future reports, PRASA’s GIS-based values for buried infrastructure will be used. As in previous years, MPPR/Malcolm Pirnie did not inspect the water transmission and distribution system. However, it is reasonable to assume that a portion of the water distribution system will require some structural repairs, as well as rehabilitation to reduce leakage.

**3.9.1.1 Non-Revenue Water (NRW)**

NRW is water that has been produced but is not billed to customers. NRW consists of two main components: commercial (apparent) losses and physical (real) losses as shown in the water balance summary presented in Figure 3-1. For purposes of this report, NRW is defined as follows:

$$\text{NRW} = \frac{(\text{volume produced} - \text{volume billed})}{\text{volume produced}}$$

**Figure 3-1: Water Balance Summary**

|  |                        |  |                                  |                     |                       |                   |
|--|------------------------|--|----------------------------------|---------------------|-----------------------|-------------------|
| System Input Volume (Dispatched Water) | Authorized Consumption | Billed Authorized Consumption          | Billed Metered Consumption       | Accounted for Water | Revenue Water         |                   |
|  |                        |  | Billed Unmetered Consumption     |                     |                       |                   |
|  |                        | Unbilled Authorized Consumption        | Unbilled Metered Consumption     |                     | Unaccounted for Water | Non-Revenue Water |
|  |                        |  | Unbilled Unmetered Consumption   |                     |                       |                   |
|  | Water Losses           | Commercial Losses<br>(Apparent Losses) | Unauthorized Consumption (theft) |                     |                       |                   |
|  |                        |  | Customer Metering Inaccuracies   |                     |                       |                   |
|  |                        |  | Data Handling (Billing) Errors   |                     |                       |                   |
|  |                        | Physical Losses<br>(Real Losses)       | Main Line Leakage                |                     |                       |                   |
|  |                        |  | Storage Tank Overflows           |                     |                       |                   |
|  |                        |  | Service Connection Leakage       |                     |                       |                   |

Source: American Water Works Association and International Water Association

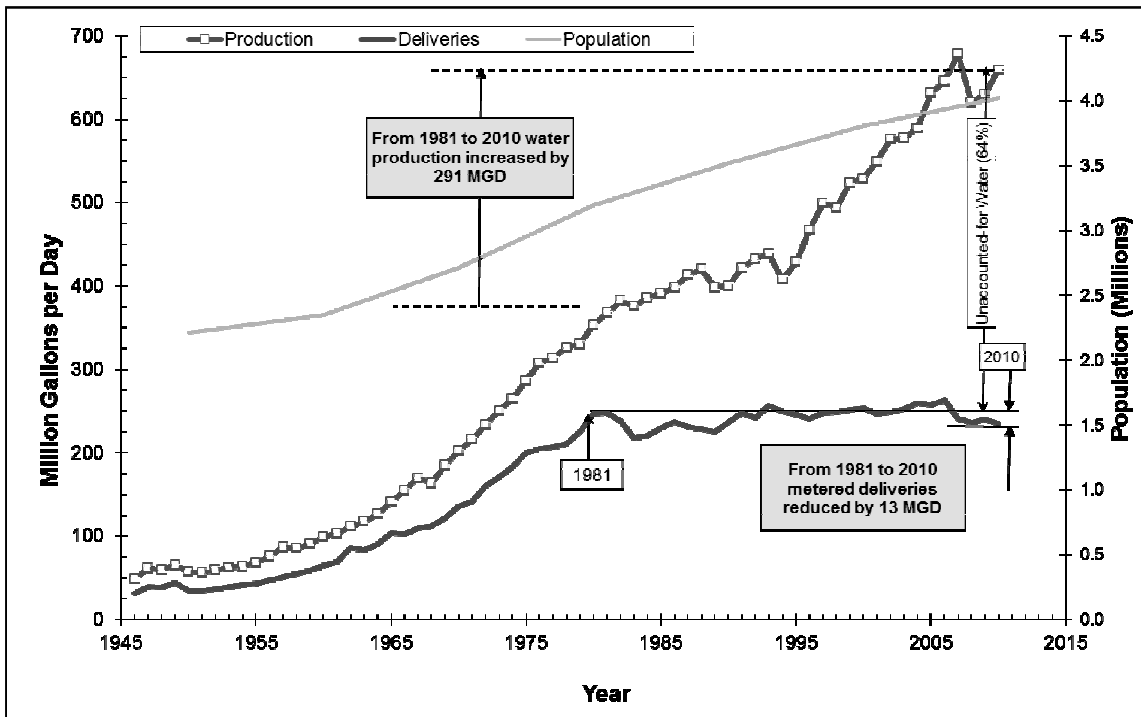
PRASA has recently invested resources in several studies and evaluations to address its NRW problem. Specifically, between 2007 and 2009, PRASA conducted a Water Accountability Pilot Project, which included extensive field research, to further identify the sources of PRASA’s

NRW as well as to understand its causes and estimated magnitude of the various sources. In summary, the main sources of NRW<sup>10</sup> include:

- Commercial Losses
  - Theft or unauthorized consumption.
  - Metering deficiencies at plants, wells and at the point of delivery (customer meters).
  - Use of meter reading estimates and misreads.
  - Customer database problems.
- Physical Losses
  - Leakage in water mains and breaks.
  - Storage tank overflows and leaks.
  - Hydrant use for firefighting and other authorized, but unmetered uses.

Historically, PRASA’s NRW has increased as water production has increased. As illustrated in Figure 3-2 below, PRASA’s NRW has dramatically increased over the past 25 years.

**Figure 3-2: PRASA Production and Delivery of Water**



<sup>10</sup> Source: Gregory L. Morris Engineering: Water Accountability Project Final Report (June, 2009).

As summarized in Table 3-25 below, for the past seven fiscal years PRASA has annually billed, on average, over 340 million cubic meters of water to customers. This amount represents approximately 39% of PRASA's annual water production. The remaining water produced is NRW, which has varied from 56% in FY2004 to 64% in FY2010. Based on the water consumptions calculated by CDM Caribe in the report titled "Update of Puerto Rico Water Demand Forecast", it was estimated that 15% of produced water is NRW due to commercial losses, whereas the other 49% is due to physical losses. The commercial losses are the difference between the water consumption estimated by CDM and the water consumption invoiced by PRASA. The physical losses are the difference between the water production and the consumption estimated by CDM.

**Table 3-25:  
Water Sales and NRW**

| Fiscal Year           | Water Sales by Client Type (m <sup>3</sup> ) |                   |                   |                   |                    | Estimated Total Water Produced (m <sup>3</sup> ) | Non-Revenue Water (m <sup>3</sup> ) | Volume NRW as Percentage of Total Water Production |
|-----------------------|--|-------------------|-------------------|-------------------|--------------------|--|-------------------------------------|--|
|                       | Residential                                  | Commercial        | Industrial        | Government        | Total              |  |                                     |  |
| 2004                  | 261,394,615                                  | 47,134,046        | 14,385,261        | 35,371,383        | 358,285,305        | 813,012,299                                      | 454,726,994                         | 56%  |
| 2005                  | 260,659,631                                  | 46,387,796        | 12,520,946        | 35,848,482        | 355,416,855        | 871,429,383                                      | 516,012,528                         | 59%  |
| 2006                  | 265,730,819                                  | 45,891,974        | 12,140,996        | 35,647,756        | 359,411,545        | 887,456,941                                      | 528,045,396                         | 60%  |
| 2007                  | 263,088,570                                  | 42,712,379        | 11,858,269        | 32,653,127        | 350,312,345        | 934,019,760                                      | 583,707,415                         | 62%  |
| 2008                  | 244,623,520                                  | 41,160,542        | 11,952,555        | 28,867,287        | 326,603,904        | 857,109,800                                      | 530,505,896                         | 62%  |
| 2009                  | 246,561,753                                  | 41,628,183        | 11,575,856        | 31,058,569        | 330,824,361        | 893,225,775                                      | 562,401,414                         | 63%  |
| 2010                  | 244,324,000                                  | 38,284,000        | 9,807,000         | 32,757,000        | 325,172,000        | 910,487,463                                      | 585,315,463                         | 64%  |
| <b>7-Year Average</b> | <b>255,197,558</b>                           | <b>43,314,131</b> | <b>12,034,412</b> | <b>33,171,943</b> | <b>343,718,045</b> | <b>880,963,060</b>                               | <b>537,245,015</b>                  | <b>61%</b>   |

Source: PRASA customer and billing database. Numbers may not add up due to rounding.

Based on a comparison to other utilities in the U.S. and Canada, PRASA's NRW volume is extremely high. In the most recent utility survey available at the time this CER was being prepared, the distribution system water losses median for all survey participants ranged from 8.5% to about 9.9%<sup>11</sup>. The benchmarks results published in the report are summarized below in Table 3-26:

**Table 3-26:  
Distribution System Losses (%) Utility Benchmarks**

| Utility Category | Top Quartile | Median | Bottom Quartile |
|------------------|--------------|--------|-----------------|
| Serve > 500,000  | 6.4          | 9.9    | 15.0            |
| Water Only       | 4.9          | 8.6    | 12.4            |
| Combined W & WW  | 3.7          | 8.5    | 13.0            |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

<sup>11</sup> Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, published by the AWWA (2008).

As indicated above, PRASA's NRW falls well outside the normal range for this performance metric. PRASA management recognizes this amount of NRW is unacceptable and has designated this as a top improvement priority. PRASA also recognizes that if it can reduce NRW, it will increase revenue, reduce O&M expenses, and reduce the need for capital improvements to increase water supply. Therefore, PRASA is developing and implementing a series of actions to address the primary contributors of these water losses. These initiatives are further described in Section 4 of this CER.

### 3.9.1.2 Leak Monitoring and Control

In February of 2009, PRASA began tracking reported leaks in its SAP system and, as a result, modified the tracking methodology (PRASA began using the SAP system as the application software to support its O&M and asset management process in March of 2007). Prior to this change, the leaks were reported directly by each PRASA Region to PRASA's central offices, and a leak reported more than once could not be deleted from the system unless it was reported as repaired, which in turn could artificially increase the number of both reported and repaired leaks. As such, FY2009 and FY2010 values are deemed more accurate than the historical values recorded for fiscal years 2006 through 2008. Also, on previous CERs, given the information made available to MPPR/Malcolm Pirnie, the recorded weekly pending leaks were annualized and reported as PRASA's annual reported leaks. For this CER, a new information database was made available by PRASA, which includes the number of weekly reported and repaired leaks. Compared to the database used for the 2008 and 2009 CERs, this database is more appropriate for calculating both PRASA's total annual leaks and repair effectiveness described below. Although it has been improved, PRASA's system still does not filter out all duplicate leak reports and PRASA has indicated that not all leaks are reported. Therefore, the total number of actual leaks may still vary from the quantities being reported.

As shown in Table 3-27, in FY2010 PRASA indicates that a total of 55,897 leaks were reported. Comparing the data that has been recorded directly through the SAP system, the total number of leaks reported annually reduced by 5% from FY2009 to FY2010. Table 3-27 also shows the average annual leaks occurrence per 100 miles of water piping. These values have been calculated using the updated total annual reported leaks data and the two water piping lengths: the one based on the total length included in PRASA's fixed asset registry (used in the 2008 and 2009 CERs) and the one based on the values included in PRASA's updated buried infrastructure GIS database. As previously described, as a result of PRASA's GIS development efforts, PRASA has improved and expanded its buried infrastructure knowledge and database which has contributed to the increase in the total length of water distribution pipeline owned by PRASA. Although the increase in total water pipeline length improved PRASA's rate of leak occurrence per 100 miles, as shown in Table 3-28, PRASA's rate of leak occurrence continues to be very high compared to other utilities in the U.S. and Canada. This high rate of occurrence contributes to PRASA's NRW.

**Table 3-27:  
Reported Leaks from FY2006 to FY2010**

| Fiscal Year | Total Annual Reported Leaks | Annual Leaks per 100 miles Using 7,537 miles of Water Pipeline <sup>1</sup> | Annual Leaks per 100 miles Using 14,031 miles of Water Pipeline <sup>2</sup> |
|-------------|-----------------------------|---|--|
| 2006        | 80,195                      | 1,064   | 572  |
| 2007        | 83,634                      | 1,110   | 596  |
| 2008        | 83,675                      | 1,110   | 596  |
| 2009        | 58,875                      | 781   | 420  |
| 2010        | 55,897                      | 742   | 398  |

<sup>(1)</sup> Value included in included in PRASA's fixed asset registry; used in 2008 and 2009 CERs.

<sup>(2)</sup> Value extracted from PRASA's updated GIS database.

**Table 3-28:  
Water Distribution System Integrity Utility Benchmarks  
(Annual leaks and breaks per 100 miles)**

| Utility Category | Top Quartile | Median | Bottom Quartile |
|------------------|--------------|--------|-----------------|
| Serve > 500,000  | 31.2         | 48.7   | 115.8           |
| Water Only       | 21.7         | 34.3   | 56.1            |
| Combined W & WW  | 16.6         | 41.9   | 101.2           |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

The average weekly reported and repaired leaks per fiscal year are shown in Figure 3-3. For FY2010, PRASA reports an average of approximately 1,055 leaks per week. Comparing the weekly reported leaks in each fiscal year, it can be observed that the reported leaks increased from FY2006 to FY2008, but decreased from FY2008 to FY2010. Although PRASA's island-wide average of weekly pending overflows was approximately 1,055 in FY2010, it should be noted that PRASA ended the fiscal year with 1,199 pending overflows. Also shown in Figure 3-3 is the percentage of repaired leaks with respect to the number of leaks reported in each fiscal year. This percentage has decreased from 101% in FY2006 to 71% in FY2010.

Figure 3-4 shows the active leaks with duration greater than seven days before being repaired. As shown in the figure, the number of leaks with duration greater than seven days was greatly reduced from FY2006 to FY2007. However, since FY2008 these have increased by almost 300 leaks per year. This jump can be attributed to the change from manually compiled and reported data prior to FY2009, to data tracked and monitored through the SAP system from FY2009 onward. Although PRASA's island-wide average of weekly pending leaks with duration greater than seven days was approximately 891 in FY2010, it should be noted that PRASA ended the fiscal year with 473 pending leaks with duration greater than seven days.

Figure 3-3: Island-Wide Average of Weekly Reported and Repaired Leaks

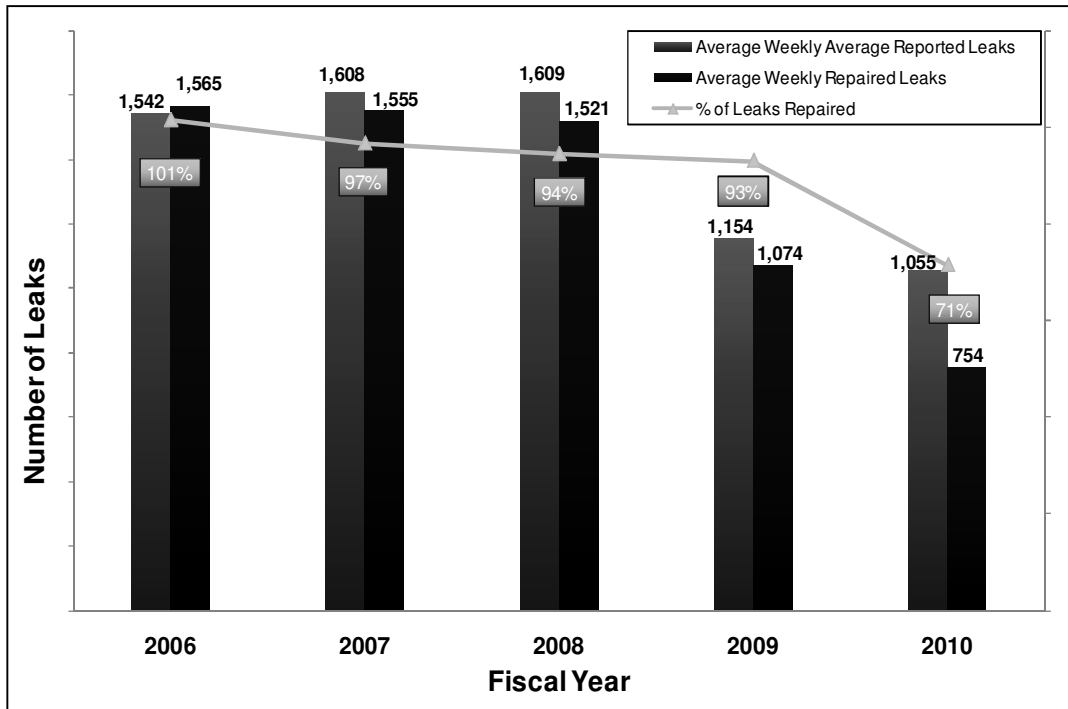


Figure 3-4: Island-Wide Average of Weekly Pending Leaks with Duration >7 Days

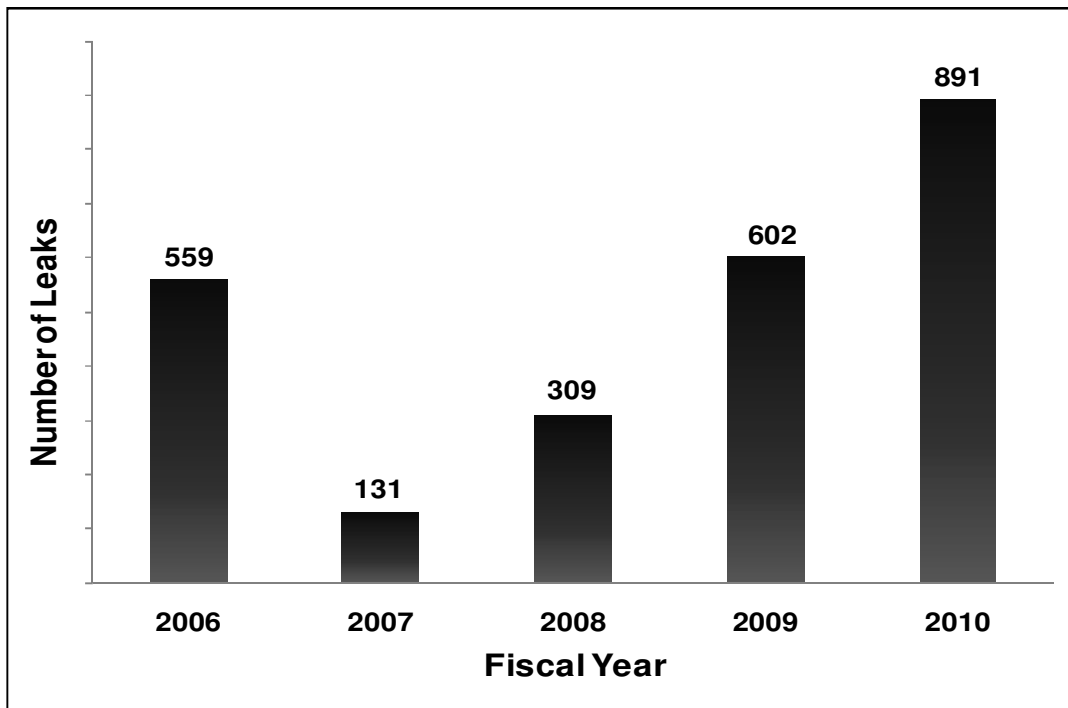


Table 3-29 includes the weekly average of repaired leaks per working day. Based on the weekly average pending leaks and weekly average pending leaks with duration greater than seven days, it can be observed that in FY2010 PRASA averaged a backlog of approximately 11.6 days of pending leaks and a backlog of approximately 5.9 days of pending leaks with duration greater than seven days. However, it should be noted that PRASA ended FY2010 with a backlog of pending leaks of approximately seven days and a backlog of pending leaks with duration greater than seven days of approximately three days. Nonetheless, PRASA’s effectiveness in repairing pending leaks in a timely manner has decreased over the last four years. This could be a result of inadequate data processing (i.e., completed work orders are not closed in the SAP system in a timely manner), inadequate prioritization of repairs and/or lack of personnel allocated to perform the repairs in a timely manner.

**Table 3-29:  
Annual Average Backlog of Pending Leaks**

| Fiscal Year | Average Weekly Pending Leaks | Average Weekly Pending Leaks >7 Days | Average Repaired Leaks per Working Day <sup>1</sup> | Average Backlog Days for Pending Leaks | Average Backlog Days for Pending Leaks >7 Days |
|-------------|------------------------------|--------------------------------------|---|--|--|
| 2006        | 1,506                        | 559                                  | 313   | 4.8                                    | 1.8  |
| 2007        | 1,040                        | 131                                  | 311   | 3.3                                    | 0.4  |
| 2008        | 1,337                        | 309                                  | 304   | 4.4                                    | 1.0  |
| 2009        | 1,616                        | 602                                  | 215   | 7.5                                    | 2.8  |
| 2010        | 1,750                        | 891                                  | 151   | 11.6                                   | 5.9  |

<sup>(1)</sup> Assumes five working days per week.

### 3.9.2 Wastewater Collection System

Similar to the water pipeline, PRASA’s documented total length of sanitary pipelines has increased as a result of the GIS development and sewer system expansion. According to PRASA’s fixed asset registry, PRASA owns approximately 4,048 miles of wastewater pipelines, including collection systems and trunk sewers. However, based on the latest GIS database information, PRASA owns over 5,325 miles of wastewater pipelines. As previously described, PRASA is in the process of reconciling these values in its fixed asset registry. For purposes of this CER, the calculations included in this section will be shown for both values. However, it is expected that in future reports, PRASA’s GIS-based values for buried infrastructure will be used. Although the wastewater collection system was not inspected, it is reasonable to assume that a significant portion of the wastewater collection system will require some structural repairs, as well as rehabilitation to reduce inflow and infiltration. The 2006 Consent Decree requires PRASA to develop and implement a sanitary sewer system evaluation plan (SSSEP) and a sanitary sewer system repair plan for collection systems associated with seven WWTPs. For the balance of its wastewater system, PRASA is to develop and implement a Preliminary Sanitary Sewer System Evaluation Plan (PSSSEP). Based on the results of the PSSSEP, PRASA is to develop and implement a SSSEP for these remaining systems.



PRASA has already commenced this process, which was divided in two phases: the first includes the evaluation and repairing of the seven most critical sanitary sewer systems and the second phase includes the remaining sanitary sewer systems. The island-wide sanitary sewer system evaluation phase 1 report was submitted to the USEPA on June 3, 2009. For the seven most critical sanitary sewer systems, field studies are on-going and/or PRASA is in negotiations with the USEPA to finalize the repair plans. Details of the status of these projects are discussed in Table 5-5.

### 3.9.2.1 Overflow Monitoring and Control

As described above, PRASA began tracking reported leaks in its SAP system and, as a result, modified the tracking methodology. Also, a new information database was made available by PRASA, which includes the number of weekly reported and repaired overflows. Compared to the database used for the 2008 and 2009 CERs, this database is more appropriate for calculating both PRASA's total annual overflows and repair effectiveness described below. Although it has been improved, PRASA's system still does not filter out all duplicate overflows reports and PRASA has indicated that not all overflows are reported. Therefore, the total number of actual overflows may still vary from the quantities being reported.

As shown in Table 3-30, PRASA indicates that in FY2010, 25,735 overflows were reported. Data is not available regarding frequency of overflows in (a) combined sewer systems compared to separate systems or (b) dry weather overflows compared to wet weather overflows. Dry weather overflows are often caused by (a) insufficient cleaning and maintenance of the collection system, resulting in a buildup of roots or grease, restricting or blocking flow or (b) pump station failures due to old or insufficiently maintained equipment, poor design, or lack of reliable backup power supply. Wet weather overflows are an indicator of leaking sewers, storm water connections to sanitary sewer systems, or under-sized pipes or pump stations.

Table 3-30 also shows the average annual overflows occurrence per 100 miles of sewer. These values have been calculated using the updated total annual reported overflows data and the two wastewater piping lengths: the one based on the total length included in PRASA's fixed asset registry (used in the 2008 and 2009 CERs) and the one based on the values included in PRASA's updated buried infrastructure GIS database. As previously described, as a result of PRASA's GIS development efforts, PRASA has improved and expanded its buried infrastructure knowledge and database which has contributed to the increase in the total length of wastewater pipeline owned by PRASA. In FY2010, an average of 483 overflows per 100 miles of sewer was reported. Although the increase in total wastewater pipeline length improved PRASA's leak occurrence rate per 100 miles, as shown in Table 3-31, PRASA's rate of overflow occurrence continues to be very high compared to other utilities in the U.S. and Canada.

**Table 3-30:  
Reported Overflows from FY2006 to FY2010**

| Fiscal Year | Reported Overflows | Annual Overflows per 100 miles Using 4,048 miles of Wastewater Pipeline <sup>1</sup> | Annual Overflows per 100 miles Using 5,325 miles of Wastewater Pipeline <sup>2</sup> |
|-------------|--------------------|--|--|
| 2006        | 40,366             | 997  | 758  |
| 2007        | 34,121             | 843  | 641  |
| 2008        | 29,080             | 718  | 546  |
| 2009        | 24,592             | 608  | 462  |
| 2010        | 25,735             | 636  | 483  |

<sup>(1)</sup> Value included in PRASA's fixed asset registry; used in 2008 and 2009 CER.

<sup>(2)</sup> Value extracted from PRASA's updated GIS database.

**Table 3-31:  
Sewer Overflow Rate Utility Benchmarks  
(Annual overflows per 100 miles)**

| Utility Category | Top Quartile | Median | Bottom Quartile |
|------------------|--------------|--------|-----------------|
| Serve > 500,000  | 1.8          | 6.1    | 9.7             |
| Wastewater Only  | 0.9          | 3.0    | 5.2             |
| Combined W & WW  | 1.0          | 2.7    | 7.6             |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA.

The average weekly reported and repaired overflows per fiscal year are shown in Figure 3-5. For FY2010, PRASA reports an average of approximately 486 overflows per week. Comparing the weekly reported overflows per each fiscal year, it can be observed that the reported overflows decreased from FY2006 to FY2009. However, there was no significant change from FY2009 to FY2010. Although PRASA's island-wide average of weekly pending overflows was approximately 486 in FY2010, it should be noted that PRASA ended the fiscal year with 368 pending overflows. Also shown in Figure 3-5 is the percentage of repaired overflows with respect to the number of overflows reported in each fiscal year. This percentage has decreased from 102% in FY2006 to 81% in FY2010.

Figure 3-6 shows the active overflows with duration greater than seven days. As shown in the figure, the number of overflows with duration greater than seven days decreased from FY2006 to FY2007. However, since FY2008 the overflows increased from eight to almost 200 per week. This jump can be attributed to the change from manually compiled and reported data prior to FY2009, to data tracked and monitored through the SAP system from FY2009 onward. Although PRASA's island-wide average of weekly pending overflows with duration greater than seven days was approximately 193 in FY2010, it should be noted that PRASA ended the fiscal year with 84 pending overflows with duration greater than seven days.

Figure 3-5: Island-Wide Average of Weekly Overflows Reported and Repaired

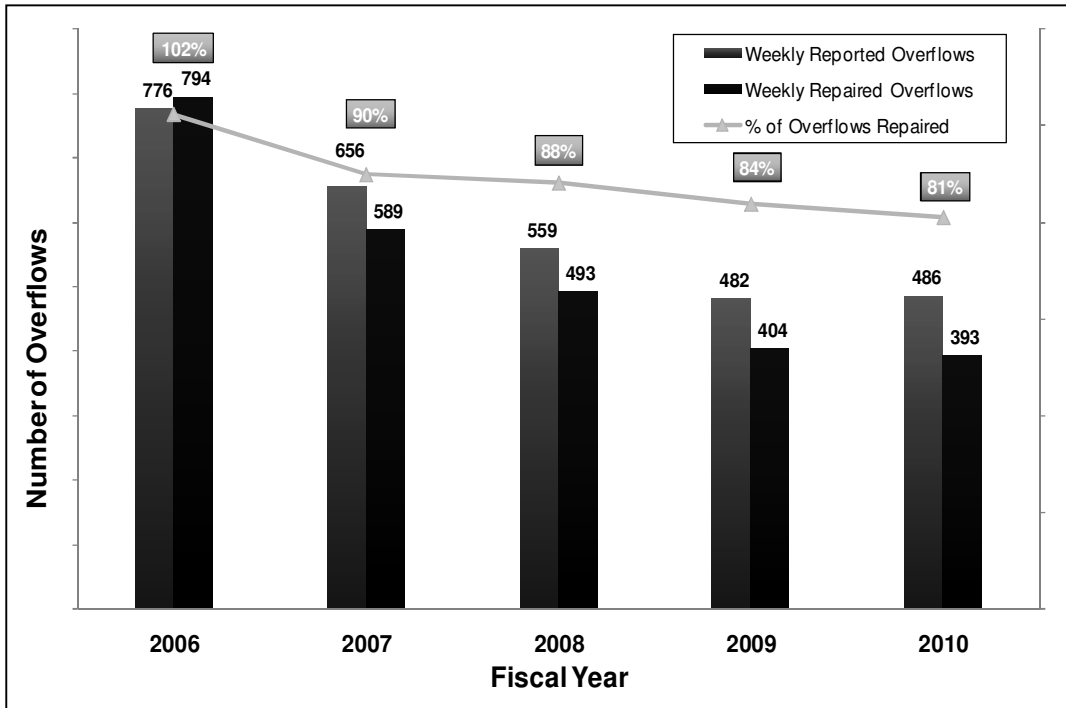


Figure 3-6: Island-wide Average of Weekly Pending Overflows with Duration >7 Days

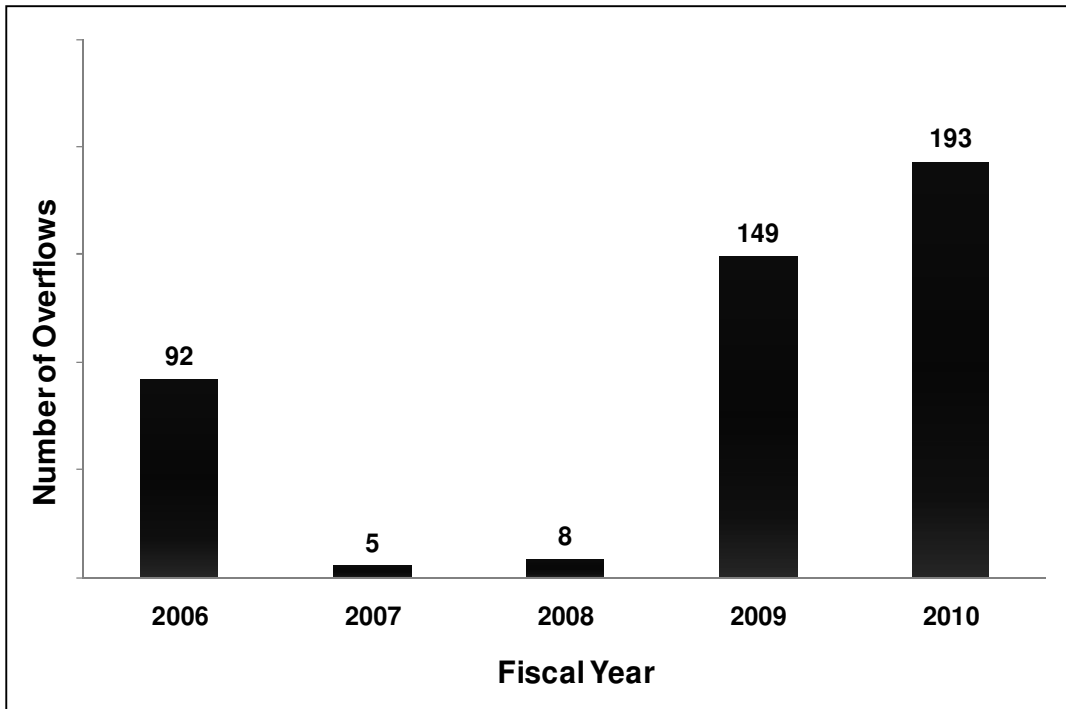


Table 3-32 includes the average of repaired overflows per working day. Based on the average pending overflows and average pending overflows with duration greater than seven days, it can be observed that in FY2010 PRASA averaged a backlog of approximately 5.9 days of pending overflows and a backlog of 2.4 days of pending overflows with duration greater than seven days. However, it should be noted that PRASA ended FY2010 with a backlog of pending overflows of approximately 4.5 days and a backlog of pending overflows with duration greater than seven days of approximately one day. Nonetheless, PRASA’s effectiveness in repairing pending overflows in a timely manner has decreased over the last four years. This could be a result of inadequate data processing (i.e., completed work orders are not closed in the SAP system in a timely manner), inadequate prioritization of repairs and/or lack of personnel allocated to perform the repairs in a timely manner.

**Table 3-32:  
Annual Average Backlog of Pending Overflows**

| Fiscal Year | Average Weekly Pending Overflows | Average Weekly Pending Overflows >7 Days | Average Repaired Overflows per Working Day <sup>1</sup> | Average Backlog Days for Pending Overflows | Average Backlog Days for Pending Overflows >7 Days |
|-------------|----------------------------------|--|---|--|--|
| 2006        | 389                              | 92                                       | 159   | 2.4  | 0.6  |
| 2007        | 250                              | 5  | 118   | 2.1  | 0.0  |
| 2008        | 265                              | 8  | 99  | 2.7  | 0.1  |
| 2009        | 398                              | 149                                      | 81  | 4.9  | 1.8  |
| 2010        | 467                              | 193                                      | 79  | 5.9  | 2.4  |

<sup>(1)</sup> Assumes five working days per week.

### 3.10 Summary of Findings and Conclusions

The condition of the facilities visited varied from new to those requiring capital upgrades. Table 3-29 presents a summary of how the results from this CER correlate, in terms of percentage, to the results of the 2009 CER. A positive percent change indicates an improvement in the asset condition when compared to the 2009 CER results. A negative percent change indicates a reduction in the asset condition when compared to the 2009 CER results.

**Table 3-33:  
Percent Change of Condition Assessments from 2009 CER to 2010 CER**

| Asset Category              | Regulatory Compliance Percent Change | Ops/Process Control Percent Change | Equipment/Maintenance Percent Change | Staffing/Training Percent Change | Overall Percent Change |
|-----------------------------|--------------------------------------|------------------------------------|--------------------------------------|----------------------------------|------------------------|
| Regulated Dams              | 0%                                   | 0%                                 | 5%                                   | 10%                              | 10%                    |
| Water Treatment Plants      | -9%                                  | 4%                                 | 0%                                   | -8%                              | -4%                    |
| Wastewater Treatment Plants | 0%                                   | 4%                                 | -9%                                  | -10%                             | 0%                     |
| Wells                       | NA                                   | 5%                                 | 17%                                  | NA                               | 11%                    |

| Asset Category           | Regulatory Compliance Percent Change | Ops/Process Control Percent Change | Equipment/Maintenance Percent Change | Staffing/Training Percent Change | Overall Percent Change |
|--------------------------|--------------------------------------|------------------------------------|--------------------------------------|----------------------------------|------------------------|
| Water Pump Stations      | NA                                   | -4%                                | 24%                                  | NA                               | 5%                     |
| Water Storage Tanks      | NA                                   | 7%                                 | 0%                                   | NA                               | 0%                     |
| Wastewater Pump Stations | NA                                   | 0%                                 | 5%                                   | -4%                              | 0%                     |

<sup>(1)</sup>NA = Not Applicable

Compliance with discharge permit limits and drinking water standards varied greatly depending on the plant age and condition, and experience of the operators. A number of PRASA's WTPs and WWTPs are included in the 2006 Consent Decree and the PRDOH Agreement, and some of these facilities are either scheduled for closure (through consolidation to regional facilities) or have ongoing or planned capital improvements to address compliance problems and/or increase treatment capacity. Despite some compliance problems, the System is producing and delivering potable water and conveying and treating wastewater. The condition of many facilities is not entirely unexpected, due to historically insufficient commitment of capital and operational resources over the years. The planned capital programs along with the O&M improvements are generally in alignment with the System needs, although the needs of PRASA's buried infrastructure (i.e. water and sewer pipelines) must be assessed to better identify measures to improve performance.

Annual results for leak and overflow metrics show that PRASA should look into the causes of its high reported frequency and duration of these events so that corrective measures can be implemented and performance is improved. Possible adjustments to PRASA's buried infrastructure R&R budget, as well as an evaluation of available staff resources to perform repairs, may be necessary to improve performance levels regarding number and duration of leaks and overflows. Also, PRASA should evaluate and revise its data processing and collection practices regarding reported and repaired leaks and overflows. Finally, PRASA must continue to aggressively work on identifying and addressing its high level of NRW.

# 4 Operations and Maintenance Practices Evaluation

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## 4.1 Introduction

The evaluation of the adequacy of PRASA's O&M practices is based on compliance with regulatory requirements, interviews with PRASA personnel and facility observations by field inspectors, with the purpose of satisfying the requirements of Section 7.07 (a) of the MAT. With respect to maintenance, MPPR/Malcolm Pirnie's evaluation focuses on those critical assets that require continuous maintenance attention including, but not limited to, large dams, WTPs, WWTPs, WPSs and WWPSs facilities.

Many high-performing water and wastewater utilities are developing formal asset management plans that support the development, security, and preservation of utility assets. Asset management is broadly defined as managing the life cycle costs (both capital and O&M expenses), use and reliability of a utility's assets to optimize their value in support of utility operations. A utility's O&M policies and procedures should include the following:

- A process for prioritizing and scheduling maintenance activities.
- A formal process for tracking maintenance activities and costs by specific asset.
- A process that compares scheduled maintenance activities with actual maintenance tasks performed.
- A set of performance measures for rating maintenance performance.
- A formal and effective O&M plan.
- Standard operating procedures (SOPs) for all equipment operation and maintenance activities.

The operational and performance history of the facilities and systems is of critical importance to evaluating the adequacy of O&M practices. This operational performance history is fundamentally measured by compliance with potable water and wastewater effluent quality requirements. As part of the condition assessment described in Section 3 of this CER, compliance ratings were developed for WTPs and WWTPs. A total of 11 WTPs and 13 WWTPs received poor or unacceptable ratings in the compliance category. Although this may be some indication of the effectiveness of O&M practices, in many cases capital projects (or in some cases planned plant closures) are needed to achieve reliable compliance (9 WTPs and 12 WWTPs that received poor or unacceptable compliance ratings are either scheduled for closure or have planned capital improvements). The net effect of these substantial physical modifications or closures should result in improved compliance. After implementation of these projects, a better assessment of the effectiveness of O&M practices as it relates to compliance issues can be made.

As part of the facility visits to conduct the condition assessments described in Section 3, MPPR/Malcolm Pirnie also evaluated the O&M practices and conditions by which the assets are maintained and long-term compliance is achieved. It should be mentioned that while each facility was only visited once, which represents a “snapshot” in time; collectively, there were many common O&M practices observed consistently across the inspected assets. The following sections present a summary of the work that has been performed by PRASA, achievements in its O&M practices, implemented and planned operational initiatives, and identified areas for improvement. Observations and recommendations included in these sections consider the results of the condition assessments presented in Section 3 and how the observed O&M practices have varied (where applicable) from the 2008 and 2009 CERs.

## 4.2 Operations

One recurring finding in the facility inspections is the need for facility-specific O&M plans or manuals for treatment plants. O&M manuals normally consist of written policies and SOPs for process equipment, such as pumps, sand filters, and other treatment processes. The O&M manuals at many of the small WTPs were written solely for the operation of their renovated sand filters. The SOPs at the WTPs deal mostly with procedures for analyzing process control samples for various parameters in the lab, not with equipment or treatment processes.

In general, the inspected large dams had O&M plans or manuals, but in some cases they needed to be updated. Even though the majority of the WTPs and WWTPs had O&M plans or manuals available, these were written by the equipment provider at the time the plant was designed or built. It is industry practice to review and, if needed, update O&M plans on an annual basis. In addition, it is industry practice to have an independent O&M manual or O&M plan in addition to manuals provided by equipment manufacturers. An O&M plan is a core management tool used for an effective operations strategy and serves as a basis for managing the entire operation of a facility.

Regarding WPSs and WWPSs, the common finding was that, with the exception of the operator log book, PRASA does not keep documentation locally at each pump station facility. Most information for pump stations, when available, is maintained at the regional or area operations service center. Industry practice is to keep a certain minimum level of information present at the pump stations, including, but not limited to, a copy of the O&M manual, emergency procedures, relevant safety information (e.g., confined space procedures), vendor manuals and copies of as-built drawings.

In order to address its need for improved O&M manuals, SOPs, and plans of operation for its WTPs and WWTPs, PRASA is planning to develop standardized O&M manuals by type of plant, and later customizing these to each specific plant. This effort will be implemented in all WWTPs as part of the Process Control System program required by the 2006 Consent Decree, and will be expanded to include WTPs. The standardized manuals will be developed taking into consideration USEPA guidelines. This initiative is programmed for completion beyond FY2010.

Currently, PRASA is requiring that project scopes for all plants undergoing rehabilitation include the preparation or updating of the plant's O&M manual, in accordance with regulatory guidelines.

### 4.3 Maintenance

PRASA acknowledges the need to implement standardized processes for prioritizing and scheduling preventive, corrective and routine maintenance activities. Currently, preventive maintenance is only formally conducted at a number of facilities (on track with what has been required by the 2006 Consent Decree). Most of the plant operators described a verbal process of reporting unscheduled (corrective) maintenance (e.g., malfunctions, equipment failures, etc.) to their supervisor. Once notified, the supervisor, in turn, begins the process of generating a work order request, and/or passes it along to the regional maintenance manager. After a written work order is generated, it then goes through a process of approval to authorize the repair (depending on cost amount of request and nature of the work). While effective communication using mobile phones was observed between many of the field staff and supervisors, the lack of formalized systems and procedures leaves prioritization, approvals, and the actual maintenance up to the efficiency of the individuals completing the informal approval process.

Furthermore, the mechanisms available to the supervisors by which maintenance activities are carried out vary significantly between Operational Areas and across Regions. These non-standardized processes may hinder long-term efficient and effective maintenance. For example, some areas rely on PRASA mechanics and electricians to perform maintenance; while others rely on outside contractors and/or a combination of both. The process for implementing maintenance then becomes heavily vested on the supervisor's approach and memory; and when a supervisor leaves, the maintenance history is lost or needs to be recreated.

During facility inspections, MPPR/Malcolm Pirnie found that many equipment units throughout the water and wastewater systems were out of service for an indefinite period of time, indicating a critical need for an effective maintenance program. Some of the units have been out of service for months; some for years. While the root causes for maintenance issues observed were not independently verified, operations staff cited a combination of factors that have contributed to the long-term outstanding maintenance issues including:

- Inadequate funding for maintenance.
- Low spending caps at the plant level.
- A slow bureaucratic process in processing written work orders.
- Supplier and vendor issues, including but not limited to availability and locality (some are located as far away as Canada).

Costs for repairs were generally not available at the plants, unless there was a regional or Operational Area supervisor located at that plant who was involved in the budget appropriations process.



With the exception of several large WTPs and WWTPs, PRASA's plant maintenance personnel work out of regionally-managed offices or shops. These regional maintenance centers service pump stations and plants, an approach that provides some economies of scale since many of the WTPs and WWTPs are small facilities where it would not be cost effective to have dedicated maintenance personnel. However, there are facilities that are large and complex enough to require dedicated maintenance personnel to operate reliably. For example, the Ponce Nueva WTP (a 20-MGD facility) would qualify as a large plant and has a number of outstanding maintenance tasks that confirms the need for on-site maintenance staff. In some cases, the improvements in the maintenance problems at each one of these facilities could help improve their compliance record, which at times is hindered by this lack of on-site maintenance.

Many of the larger WWTPs (i.e. capacities above 5 MGD) had a dedicated maintenance staff. During the inspections, MPPR/Malcolm Pirnie noted that, in many Operational Areas, maintenance personnel with electro-mechanical skills were in high demand and short supply. Subcontractors were used to fill these skill gaps and various other maintenance needs. For example, routine maintenance on pump stations was often conducted by PRASA staff; however, for maintenance in confined space areas, or for pump or motor repairs, outside contractors are often utilized.

#### **4.3.1 Integrated Preventive Maintenance Program (IPMP) Progress**

The 2006 Consent Decree requires that PRASA implement a comprehensive integrated preventive maintenance program, the IPMP, to ensure the proper operation and maintenance of its plants and other critical facilities, including WWPSs. Through the IPMP, PRASA is establishing a plan to enable programmed and continuous maintenance to plants, pump stations, vehicles, and equipment to provide for more reliable service, improve client satisfaction, and achieve long-term operational cost savings through preservation of assets. PRASA is currently financing the program through its CIP. In FY2010, PRASA's cash expenditures for the provisions of preventive maintenance amounted to approximately \$31M. PRASA plans to spend an additional \$37M in the next three fiscal years to complete the development and implementation of the program. In FY2014 and beyond, the associated costs of preventive maintenance will be included in PRASA's annual O&M budget as a regular operational expense.

Currently, PRASA is integrating the following five initiatives of the IPMP:

- New purchasing and logistic processes to provide the appropriate services and materials at the proper time and in an efficient manner.
- Development of the required skills within the organization to support all processes.
- Development of infrastructure standards for new facilities including equipment, and information technology tools for remote monitoring and control.
- Development of detailed maintenance work plans with specific schedules and tasks.

- Provision of the equipment, tools and necessary infrastructure to carry on the new tasks and roles.

Some of the major benefits that PRASA has identified from the implementation of the IPMP include:

- Improvement in asset useful life, resulting in an improvement in reliability of service and reducing the need for future capital programs and maintenance expenses.
- More efficient maintenance processes by expediting work order processes and allowing planning of work plans in advance (e.g. route planning).
- Improvement in inventory management resulting in a reduction of inventory waste, efficient access to replacement availability information and better procurement terms.
- Standardization of equipment in facilities, reducing inventory costs, unnecessary equipment training, and increasing economies of scale in equipment procurement.
- Reduction of equipment downtime and costly repairs.

In March of 2007, PRASA began using the SAP system (SAP PM) as the application software to support its O&M and asset management process. This software is regionally managed and centrally monitored. PRASA continues utilizing the SAP system in the five Regions and, as of June 30, 2010, has integrated 25 WTPs, 60 WWTPs, one well (Maunabo) and 200 WWPSs into the IPMP. Additionally, in March 2009 PRASA completed the integration of SAP-ISU as its platform for customers, billings, and collections database and customer (commercial) services.

PRASA also started implementing, as part of the IPMP, several initiatives described below:

- **Organizational Structure** – This initiative seeks to relocate personnel from other departments (i.e., operations to maintenance department) and allocate them, as needed, in the different areas covered by the IPMP. In the event that additional personnel are needed, PRASA projects contracting external contractors to help in the implementation of the IPMP. The relocated as well as the existing IPMP personnel are in the process of being trained to comply with all the safety and compliance requirements of the Occupational Safety and Health Administration (OSHA).
- **Communications Plan** – As part of this initiative, PRASA has prepared different communication tools that help deliver the information on the extent of, and the accomplishments of the IPMP to PRASA’s employees and customers. Among these tools are: preparation of nine editions of an IPMP newsletter that is delivered to the entire PRASA staff; visits to the WTPs that are in the IPMP; presentations to PRASA’s personnel on the processes of the program that apply at each one of the facilities; and delivery of seminars in each Region to present the general concepts of the program.
- **Logistics and Purchasing** – Initiative includes the reduction and consolidation of warehouses to comply with the Logistics and Purchasing Department’s plan to reduce costs.

PRASA is also planning to complete the phased implementation of the continuous monitoring project in all of the WTPs. The first two phases of the continuous monitoring project were completed and validated by April 30, 2010. Approximately 54% of the facilities included in the third phase had been completed, at the end of FY2010. The remaining facilities are scheduled to be completed and validated by March 15, 2011.

As additional facilities are integrated into the IPMP, PRASA must continue to monitor and assess the program's costs and benefits. As preventive maintenance increases, corrective maintenance should decrease. Using its SAP system, PRASA should employ sound accounting practices to monitor the costs of the program, not only on a regional and operational area level, but also by facility.

#### **4.4 Staffing**

Nearly all the WTPs operate 24 hours per day, seven days per week. There is usually only one operator per shift. Some of the plants have an on-site extra or "stand-by" operator while other plants share an "at-large" operator to fill in for absences and vacations. Occasionally staffing problems arise when absences and vacations coincide. Other plants have a "celador" (or circuit rider) which is a maintenance person who checks the pumps and other major equipment at pump stations, wells, and tanks. Sometimes these circuit riders stand in for operators, though they are usually not certified operators. Several of the plants have operator vacancies which have not been filled.

The majority of WWTPs are staffed with one shift and several plants have two shifts. There are only a few WWTPs with 24-hours-per-day staffing. A critical issue with the WWTPs that are not staffed 24 hours per day is that there is limited telemetry at most of the plants to notify the operator if there is a serious problem such as a chlorine alarm, loss of pumping, power loss or serious electrical problem (e.g., blower malfunction), etc. These limited telemetry installations at the WWTPs are currently being addressed under the IPMP and CIP. Additionally, PRASA is considering the development and implementation of a Plant Automation Program to reduce the dependency on staff. This program consists in the installation of the necessary equipment and the development of the O&M and system protocols necessary to automatically, and remotely, operate a number of WTPs and WWTPs. Additional information on this program is later described.

While a few of the WWPSs have telemetry capacity for a few basic functions, the majority still lack this feature. Typically, the frequency of checks on the wastewater pump station is two, three, five or seven times a week depending on the Operational Area. Thus, there are limited systems in place to monitor the status of these assets between visits. PRASA is, however, in the process of installing telemetry systems throughout a large number of its facilities and the majority of the WWPSs are expected to have telemetry within the next few years (depending on capital funding availability). In addition, the IPMP has been implemented in over 200 WWPSs.

All of the large dams have network connectivity for security and monitoring of reservoir levels. Staffing is usually assigned in combination with adjacent pump stations or WTPs. Dam staffing usually covers a standard 40-hour work week. If weather conditions mandate, full 24-hour staffing is provided for monitoring water levels.

Based on the current total number of employees, it appears that PRASA has sufficient quantity of staff to operate and maintain the System. However, PRASA currently has some staffing needs at individual facilities and within its executive and management teams. Also, given the recent reductions in staff, in FY2010 PRASA decreased its number of field personnel, which include meter readers and buried infrastructure repair crews. As a result, certain PRASA metrics (i.e., percent meters read and effectiveness in repairing leaks and overflows) have fallen.

## 4.5 Training

Training is an important O&M issue that is currently being improved throughout PRASA’s operating system. As shown in Table 4-1, PRASA has continued to provide training to its employees. In FY2010, PRASA offered, on average, 21 hours of training per employee; which is less than the 29 hours offered in FY2009, but higher than the training hours offered in FY2006, FY2007, and FY2008. The increase in training during FY2009 and FY2010 has been due to, among other reasons, the establishment of the Training Master Plan that is included under the IPMP and the requirements of the 2006 Consent Decree and the PRDOH Agreement. Based on a comparison to other utilities in the U.S. and Canada, PRASA’s recent level of training is near the median for all of the utilities. The benchmarks for training hours per employee are summarized in Table 4-2 below.

**Table 4-1:  
Training Hours (FY2006-FY2010)**

| Description                | FY2006 | FY2007 | FY2008 | FY2009  | FY2010  |
|----------------------------|--------|--------|--------|---------|---------|
| Total Training Hours       | 73,411 | 94,357 | 79,042 | 162,330 | 102,830 |
| Average Hours per Employee | 13     | 16     | 14     | 29      | 21      |

**Table 4-2:  
Training Hours per Employee Utility Benchmarks**

| Utility Category | Top Quartile | Median | Bottom Quartile |
|------------------|--------------|--------|-----------------|
| Serve > 500,000  | 31.8         | 16.8   | 12.3            |
| Combined W & WW  | 34.9         | 22.5   | 12.7            |
| All Utilities    | 31.7         | 20.0   | 11.8            |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

In regards to operator training and certification, PRASA continues its plan to provide training to plant operators to prepare them for certification in the operation of treatment plants. As shown in

Table 4-3, as of June 2010, PRASA had 421 WTP operators, of which 346 are licensed operators and 75 are operators in training. For FY2010, the number of WTP operators decreased by 22%. According to PRASA, this reduction could be related to a discrepancy in the data collection process during FY2010 and the data collection process during previous fiscal years, in which an operator that approved the license of a higher category could be counted twice, once in the previous category and once in the new one. Additionally, PRASA had 230 WWTP operators, of which 205 are licensed operators and 25 are operators in training. PRASA increased the number of WWTP licensed operators and, as a result, the number of operators in training reduced from FY2009 to FY2010.

**Table 4-3:  
Licensed WTP and WWTP Operators by Type**

| WTP Operator Type     | 2008 CER   | 2009 CER   | 2010 CER   | Difference 2010 and 2009 |
|-----------------------|------------|------------|------------|--------------------------|
| Operator License IV   | 84         | 145        | 153        | 8                        |
| Operator License III  | 67         | 120        | 86         | -34                      |
| Operator License II   | 95         | 138        | 75         | -63                      |
| Operator License I    | 21         | 41         | 32         | -9                       |
| Operators in Training | 279        | 109        | 75         | -34                      |
| <b>Total</b>          | <b>546</b> | <b>553</b> | <b>421</b> | <b>-132</b>              |
| WWTP Operator Type    | 2008 CER   | 2009 CER   | 2010 CER   | Difference 2010 and 2009 |
| Operator License IV   | 38         | 69         | 133        | 64                       |
| Operator License III  | 8          | 19         | 21         | 2                        |
| Operator License II   | 21         | 30         | 28         | -2                       |
| Operator License I    | 0          | 4          | 23         | 19                       |
| Operators in Training | 111        | 48         | 25         | -23                      |
| <b>Total</b>          | <b>178</b> | <b>170</b> | <b>230</b> | <b>60</b>                |

PRASA should continue with its staff training program, and more specifically should offer additional technical training to operators and field personnel. Examples of these trainings include, but are not limited to: chlorine and chemical handling and application, working in confined spaces, and water main and trunk sewer installation practices. These types of trainings provide the tools necessary for PRASA's staff to execute the work in a safe and efficient manner. Additionally, PRASA could consider identifying qualified personnel within its current organization that could be trained to be plant operators in order to fill, as necessary, vacant positions at its WTPs and WWTPs.

## 4.6 Operations and Maintenance Budgets<sup>12</sup>

PRASA’s total FY2010 net expenses amounted to \$609 million (M). Of this, approximately \$75M was related to commercial activities and provision of customer services, including but not limited to: staffing and operation of customer service offices island-wide; meter reading; connection and disconnection services; invoice preparation, printing and distribution; customer service call centers; and water meter purchases, amongst others. In order to calculate the estimated O&M budget allocated for the water and wastewater system, respectively, the cost related to PRASA’s commercial activities must be subtracted from the total O&M net expenses. Therefore, the total O&M budget for the water and wastewater systems, combined, is approximately \$534M. The following sections provide additional information for both the water and wastewater systems, as well as benchmarking data.

### 4.6.1 Water

PRASA estimates that approximately 70% of its O&M budget is allocated for the water service system. Therefore, for FY2010 the O&M budget allocated for the water system was approximately \$374M. This is equivalent to an annual O&M cost per account of \$292, which is above the median when compared to other utilities in the U.S. and Canada. The benchmarks for O&M cost per account for water service are presented in Table 4-4.

**Table 4-4:  
Water O&M Cost per Account Utility Benchmarks**

| Utility Category | Top Quartile | Median | Bottom Quartile |
|------------------|--------------|--------|-----------------|
| Serve > 500,000  | \$163        | \$233  | \$319           |
| Combined W & WW  | \$134        | \$247  | \$411           |
| All Utilities    | \$148        | \$258  | \$374           |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

Another metric in which PRASA could be compared with other utilities is O&M cost per million gallons (MG) of treated water processed. PRASA reports that it currently produces approximately 659 MGD of treated water (approximately 240,500 MG annually), resulting in a ratio of O&M cost per MG processed of \$1,555 which is also above the median when compared to other utilities in the U.S. and Canada. The benchmarks for O&M cost per MG processed are presented in Table 4-5.

<sup>12</sup> Note: The calculation method used in the 2009 and 2010 CERs differs from the method used in the 2008 CER, as costs related to customer (commercial) services were not included in the calculation of water and wastewater O&M budgets, consistent with AWWA benchmarks.

**Table 4-5:  
Water O&M Cost per MG Processed Utility Benchmarks**

| Utility Category | Top Quartile | Median  | Bottom Quartile |
|------------------|--------------|---------|-----------------|
| Serve > 500,000  | \$885        | \$1,320 | \$1,665         |
| Combined W & WW  | \$863        | \$1,431 | \$2,089         |
| All Utilities    | \$942        | \$1,459 | \$2,114         |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

Given the complexity of its water system, higher O&M cost per account or per MG processed in comparison to U.S. utilities is not unexpected. The largest expense categories for the water service system are related to payroll and benefits and electricity costs. PRASA must implement measures to bring its metrics to more comparable results. Internal realignment of priorities and efficiency initiatives may be required to better optimize the use of such budget.

#### 4.6.2 Wastewater

PRASA's total FY2010 O&M budget for wastewater services is approximately \$160M, which is estimated as 30% of PRASA's total O&M budget. This is equivalent to an annual O&M cost per account of \$214, which is about the median when compared to other utilities in the U.S. and Canada. The benchmarks for O&M cost per account for wastewater service are presented in Table 4-6.

**Table 4-6:  
Wastewater O&M Cost per Account Utility Benchmarks**

| Utility Category | Top Quartile | Median | Bottom Quartile |
|------------------|--------------|--------|-----------------|
| Serve > 500,000  | \$120        | \$209  | \$303           |
| Combined W & WW  | \$114        | \$209  | \$291           |
| All Utilities    | \$127        | \$213  | \$306           |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

Another metric in which PRASA could be compared with other utilities is O&M cost per MG of wastewater processed. PRASA reports that it currently treats approximately 225 MGD of wastewater (approximately 82,100 MG annually), resulting in a ratio of O&M cost per MG processed of \$1,949 which is about average compared to other utilities in the U.S. and Canada. The benchmarks for O&M cost per MG processed are presented in Table 4-7.

**Table 4-7:  
Wastewater O&M Cost per MG Processed Utility Benchmarks**

| Utility Category | Top Quartile | Median  | Bottom Quartile |
|------------------|--------------|---------|-----------------|
| Serve > 500,000  | \$906        | \$1,500 | \$1,859         |
| Combined W & WW  | \$1,200      | \$2,022 | \$3,044         |
| All Utilities    | \$1,148      | \$2,022 | \$2,986         |

Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

One reason that could help explain why PRASA’s wastewater O&M budget is low compared to its water O&M budget (relative to the benchmark comparisons) is that PRASA has several large primary treatment plants (i.e., all the plants with 301(h) waivers), that account for 61% of PRASA’s total wastewater treatment capacity. Secondary treatment plants have significantly more equipment to operate and maintain, which results in higher O&M costs. Similar to the water system O&M budget, the largest expense categories for the wastewater service system are related to payroll and benefits and electricity costs. Although the cost per MG processed is comparable to the U.S. median, PRASA could further optimize the use of such budget, which may require internal realignment of priorities and efficiency initiatives.

## 4.7 Additional Operations and Maintenance Metrics

Since 2004, PRASA has implemented a series of metrics for internally measuring its progress. The metrics have been classified under three primary categories: Departmental, Commercial and Operational. In 2005, the metrics were focused on operational issues such as frequency of sewer overflows and water leaks. Presently, PRASA also focuses on billing and customer service metrics. Table 4-8 summarizes some of PRASA’s metrics. As illustrated in the table, PRASA’s metrics show that significant improvements have been achieved in the reduction of the clients without water service. However, the percent of actual meter readings has been reduced by approximately 23% from FY2009 to FY2010, mainly due to a reduction in temporary employees, who were responsible of performing the meters readings (temporary employees were the first group of employees to be separated under PRASA’s staff reduction plan). The remaining areas have remained near the same results as of the 2008 and 2009 CER.



**Table 4-8:  
PRASA Operational and Performance Metrics Examples**

| Area                          | Metric  | June 2005 | June 2007 | June 2009 | June 2010 |
|-------------------------------|---|-----------|-----------|-----------|-----------|
| Clients without water service | No. of clients without service/ week                        | 14,483    | 9,459     | 5,189     | 4,632     |
| Generators                    | % operating   | 66%       | 98%       | 98%       | 98%       |
| Purchase/Logistics            | -Days to process purchase order                             | 30        | 14        | 10-15     | 10        |
|                               | -Days to process warehouse reserve                          | 25        | 9         | 7-10      | 10        |
|                               | -Inventory turns  | N/A       | 1.8       | 1.7       | 1.9       |
|                               | -Value of excess/obsolete inventory                         | \$3.5M    | \$3.5M    | \$3.6M    | \$3.6M    |
| Actual meter readings         | % Actual Meter Readings                                     | 73%       | 87%       | 82.5%     | 59.0%     |
| Customer service              | Average telephone call wait time for customers (<5 minutes) | >4 min    | 52 sec.   | 1:34 min  | 2:08 min  |

## 4.8 Operations and Maintenance Initiatives and Improvements

PRASA is currently developing and implementing several O&M initiatives to improve and optimize its practices, as are described in the sections below. Additionally, based on MPPR/Malcolm Pirnie’s findings, supplemental improvements are listed and described as well.

### 4.8.1 Water Accountability Program: Non-Revenue Water Reduction Program

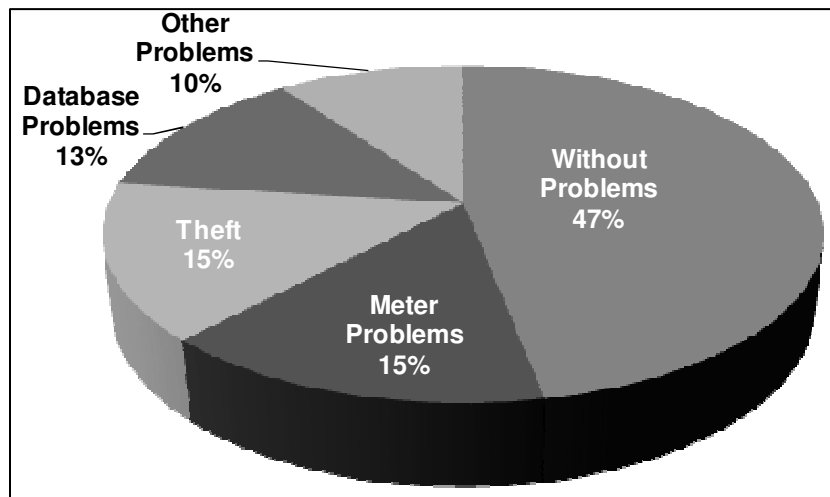
Since FY2008, PRASA has been implementing a series of initiatives that have been designed to reduce its NRW. These initiatives have been integrated into a program named the Non-Revenue Water Reduction Program (NRWRP). The initiatives included under the NRWRP mostly address PRASA’s commercial losses including:

- Execution of the “Mega Census” to:
  - Identify clients who are not currently in PRASA’s billing system.
  - Identify inactive accounts who are still consuming water.
  - Identify illegal connections to PRASA’s water and wastewater systems.
  - Identify incorrect customer tariff classification and service levels.
  - Identify malfunctioning and obsolete meters, and address access difficulties to customer meters.
- Replacement of small and large customer meters according to age and condition.

- Implementation of a proactive collection effort for large customers (top 20,000 receivable accounts) and the aggressive execution of the service disconnection program for non-paying residential customers.
- Proactive collection effort of prior fiscal year receivables generated by certain government clients including municipalities and public corporations.
- Identification of commercial and industrial customers with sprinkler systems that are not registered with PRASA and are not currently paying their corresponding dues.
- Identification of condominium master accounts that are not registered with PRASA.

Field findings of the “Mega Census” initiative have shown that a large percentage of accounts have some sort of problem. Through June 30, 2009, PRASA reports to have visited 258,492 service locations through its Mega Census initiative. Close to 53% of visited service locations had some type of problem ranging from meter function issues (i.e. “stuck” or broken meter or meter box, etc.) to theft, as shown in Figure 4-1. This figure shows that there is a large opportunity for PRASA to obtain additional revenues by identifying, addressing, and resolving such problems.

**Figure 4-1: Mega Census Field Findings Statistics**



In FY2010, PRASA refocused the strategy of the NRWRP considering the program’s 2009 results and bringing new initiatives to generate additional revenues. The initiatives addressed in FY2010 include the following:

- |                            |                      |
|----------------------------|----------------------|
| ■ Small Meters Replacement | ■ Collection Efforts |
| ■ Large Meters Replacement | ■ Sprinklers         |
| ■ Water Theft              | ■ Inactive Accounts  |
| ■ Service Disconnections   | ■ Condominiums       |

PRASA has replaced a considerable amount of customer meters in recent years which have resulted in a reduction in the average age of these assets. A meter degradation analysis determined that if meters are changed after 10 years of use, it will result in a higher revenue impact and a higher return of investment. Figure 4-2 shows the number of meter change outs from FY2007 to FY2010 and the total number of meters and their approximate age. Approximately 54% of the water meters installed have less than five years in operation and only 18% have an average age greater than 10 years. As shown in the figure, PRASA increased the rate of meter replacement between FY2007 and FY2010 by 55% and between FY2009 and FY2010 by 11%. In the next year, PRASA will focus on the replacement of meters with 10 years of use or more. PRASA plans to replace approximately 90,000 small meters in FY2011.

**Figure 4-2: Number of Meter Replacements from FY2007 to FY2010 and Total Number of Meters and Approximate Age**

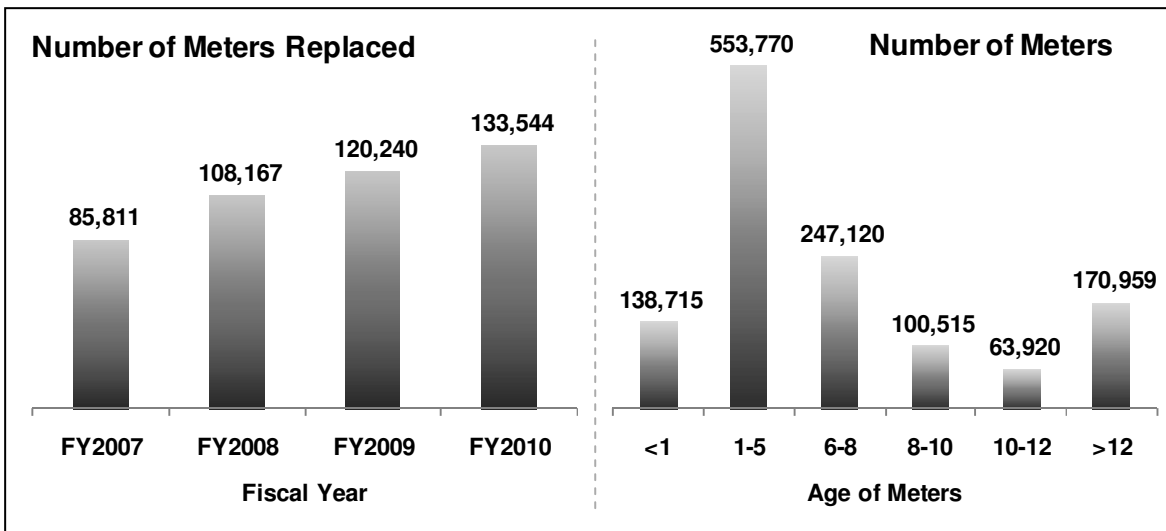
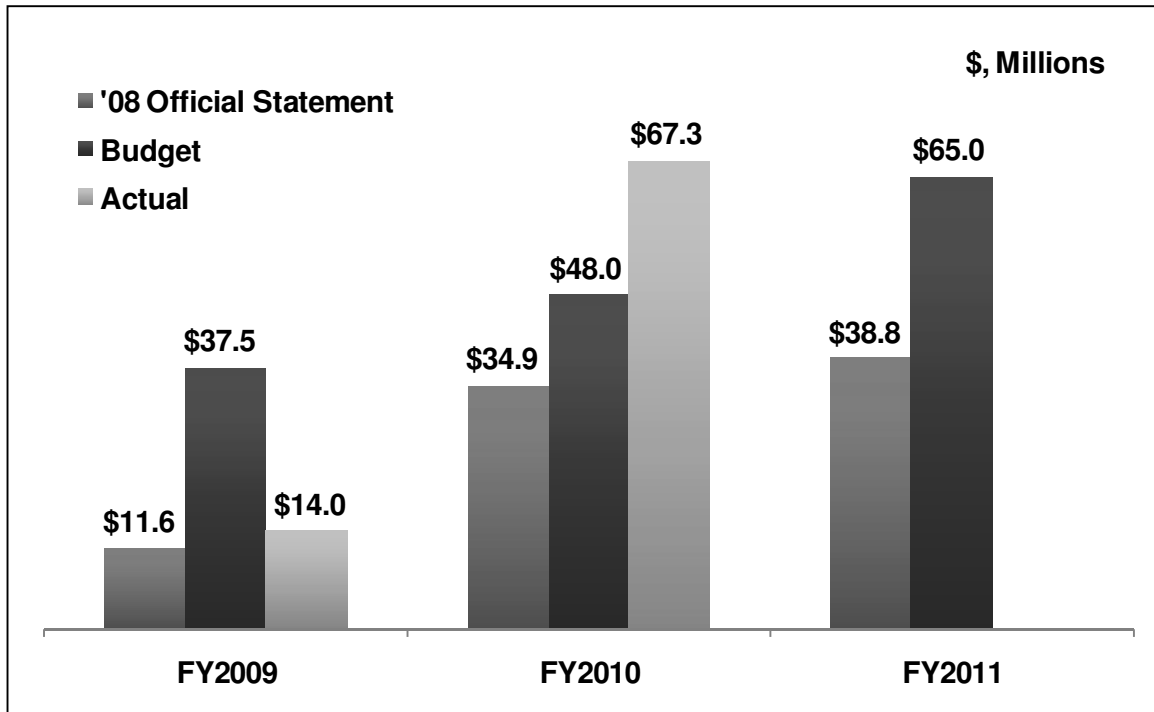


Table 4-9 shows the NRWRP actual and forecasted revenues for FY2010. As shown in the table, the performance of PRASA in these initiatives exceeded the target set at the beginning of the fiscal year by 41%. Figure 4-3 shows the NRWRP projected and actual revenues. In FY2010, the NRWRP initiatives achieved and exceeded PRASA's Official Statement (OS) projections of \$34.9M of revenues. The actual revenues of FY2010 were approximately \$67.3M. PRASA has estimated that the NRWRP could bring revenues of approximately \$65M in FY2011. MPPR/Malcolm Pirnie believes that these NRWRP related initiatives promote the execution of activities that should be part of PRASA's normal course of business, as commercial losses directly affect PRASA's financial capability by increasing operational costs and reducing revenues.

**Table 4-9:  
FY2010 NRWRP Results in Thousands**

| Revenues<br>(\$, Thousands) | FY2010<br>Budget Forecast | FY2010<br>Preliminary<br>Results | % Achieved  | FY2011<br>Forecast |
|-----------------------------|---------------------------|----------------------------------|-------------|--------------------|
| Small Meters                | \$17,025                  | \$10,358                         | 65%         | \$23,370           |
| Degradation                 | (7,000)                   | (7,000)                          | 100%        | (7,000)            |
| Large Meters                | 3,685                     | 2,812                            | 76%         | 6,950              |
| Census                      | 48                        | -                                | 0%          | -                  |
| Theft                       | 10,563                    | 11,142                           | 105%        | 8,568              |
| Sprinklers                  | 3,395                     | 3,683                            | 108%        | 2,376              |
| Collection Efforts          | 2,000                     | 3,675                            | 184%        | 2,500              |
| Inactive Accounts           | 3,600                     | 1,475                            | 41%         | -                  |
| Rate Category Correction    | 698                       | 456                              | 65%         | 1,558              |
| Disconnections              | 9,600                     | 34,666                           | 361%        | 20,387             |
| Condominiums                | 3,056                     | 5,306                            | 174%        | 4,074              |
| Other                       | 1,656                     | 757                              | 46%         | 2,217              |
| <b>Total Revenues</b>       | <b>\$48,325</b>           | <b>\$67,330</b>                  | <b>141%</b> | <b>\$65,000</b>    |

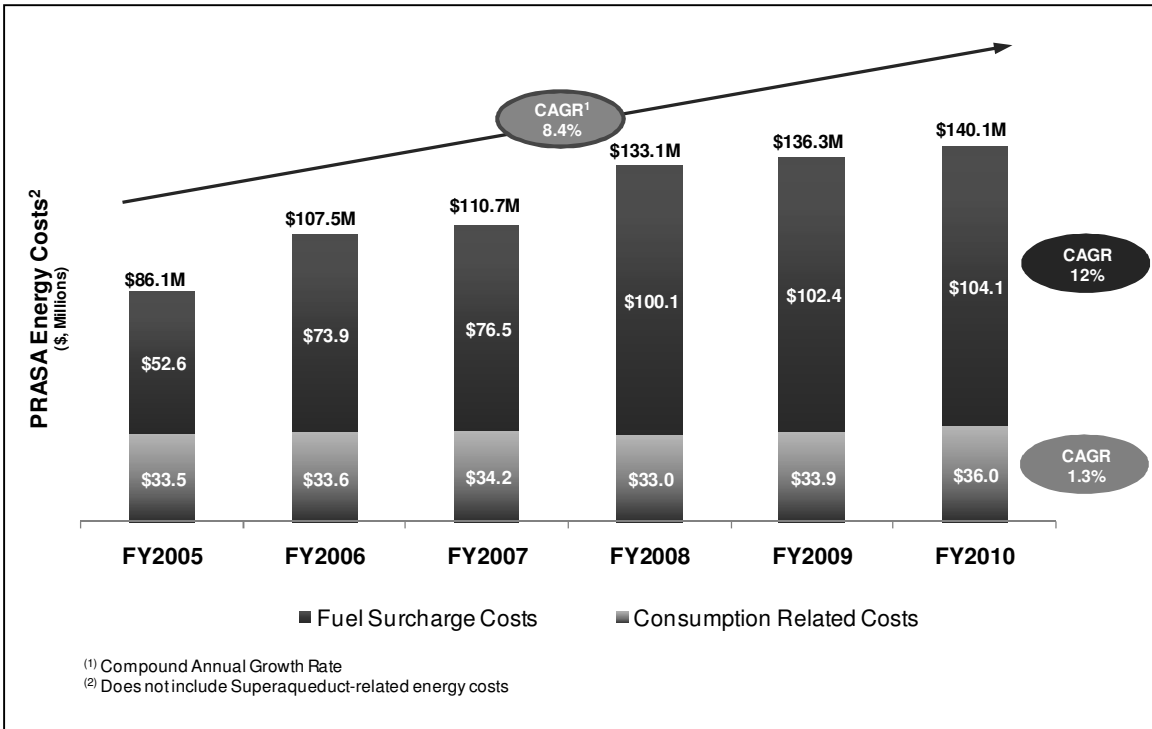
**Figure 4-3: NRWRP Projected and Actual Revenues**



### 4.8.2 Comprehensive Energy Management Program

PRASA’s energy costs have increased in the last six fiscal years at an average rate of 8.4% per year as shown in Figure 4-4. PRASA’s energy cost is the second largest cost behind payroll and make up 22% of its total operational costs. In order to reduce these costs, PRASA is currently undertaking two separate procurement processes to engage the private sector in investing in energy related projects, discussed below.

**Figure 4-4: PRASA’s Energy Costs**



#### 4.8.2.1 Demand Side Projects through Energy Performance Contracts

PRASA is currently procuring the services and investments from private sector firms interested in entering Energy Performance Contracts (EPCs) designed to reduce energy consumption at PRASA’s facilities. The objective of this initiative to have Energy Service Companies (also referred to as ESCOs) perform assessments and invest their own capital to install equipment and implement activities designed to reduce energy consumption. These ESCOs will be paid with a portion of the realized savings for a determined period, until they receive the agreed level of compensation in their EPCs. PRASA has selected 17 companies as eligible to submit EPC proposals. PRASA developed and issued four different Requests for Proposals (RFPs) to the selected companies for: buildings, plants, ancillary facilities (i.e., pump stations), and the North Coast Superaqueduct System. A total of 15 proposals were received and evaluated. PRASA is currently in the process of developing contract documents to commence negotiations with selected proponents.

There are two important benefits for PRASA in employing this type of performance contract. First, PRASA's operations benefit from improvements made with private capital and as such it does not have to place additional burden to its CIP. Second, the EPCs are structured so that payments to ESCOs are only made by realizing measured and verifiable savings, placing most of the risk with the ESCOs and aligning the desired outcomes of both parties. On the other hand, the positive financial impact of this initiative for PRASA is limited by the fact that savings are shared with the ESCOs until they have recovered their investment and earned their agreed returns.

#### **4.8.2.2 Supply Side Projects through Power Purchase Agreements**

PRASA is also undertaking a parallel process in which it is procuring companies who are interested in providing independent energy supply services through Power Purchase Agreements (PPAs). The objective is to secure one or more PPAs for lower energy unit costs per kilowatt-hour (kWh) than what PRASA currently pays PREPA. PRASA developed and issued an RFP for these services and received 19 proposals in response. Some of these proposals are currently being evaluated by PRASA and others are in contract negotiations. The proposals that are currently in contract negotiations are the following:

- **Waste to Energy (WTE):** Proposed WTE facilities at nine municipal WWTPs. Initial phase will convert sludge produced at WWTPs into bio-gas, considered a renewable power source, for generation of electrical power. PRASA's goal is to purchase power at a cost 50% lower than PREPA's current power price. Investment from private sector for initial facility is approximately \$20M. Initial facility is planned to begin operation during 2012.
- **Wind Power:** Proposed wind turbine generator at several WTPs and WWTPs. Total potential capacity of up to 9.75 megawatts (MW). Power generated at each facility will be used within the facility. It is expected that power will be purchased at a cost approximately 30% lower than PREPA's current power cost. Private sector investment is approximately \$8M. Wind turbines are planned to begin operation during 2012.
- **Hydroelectrical Generation:** Proposed rehabilitation of the Carraízo Dam hydroelectrical generators. The facility will have an initial capacity (phase I) of 1.2 MW, with potential expansion of up to 3.6 MW. All power generated will be used for the Sergio Cuevas Water WTP Raw Water Pump Station located at the Carraízo Dam. It is expected that power will be purchased at a cost approximately 25% lower than PREPA's current power cost. Private sector investment is approximately \$2.8M for phase I of the project. Facility is planned to begin operation during 2012.
- **Liquefied Natural Gas (LNG):** Proposed LNG Power Plant at the North Coast Superaqueduct System Raw Water Pump Station. The facility will have an initial capacity of 8 MW (phase I) for direct use at the Raw Water Pump Station and a future expansion of 24 MW (phase II) for use at remote facilities through wheeling regulations. It is expected that power will be purchased at a cost 25% lower than PREPA's current power cost. Private sector investment is currently under evaluation. Facility is planned to begin operation by 2012.

If successfully implemented, these supply side initiatives should be able to provide larger savings to PRASA than the demand side initiative. However, it must be noted that supply side projects, in general, take longer to complete than demand side projects. This is because permitting for and building new plants and facilities for the provision of alternate energy (e.g., wind or solar energy facilities) usually take significantly longer than replacing equipment in existing facilities. Therefore, it is unlikely that PRASA will see any substantial savings from this initiative before FY2013. Another item that affects the implementation of certain projects that require the use of PREPA's grid is the wheeling regulation that will establish the real costs that PREPA will charge to the independent energy suppliers to use its grid. As of June 30, 2010, PREPA was yet to publish a wheeling regulation.

Assuming that the wheeling regulation is implemented in FY2011, and that both procurement processes are completed according to schedule, MPPR/Malcolm Pirnie believes that these initiatives should benefit PRASA with some moderate savings starting as early as FY2012 for the demand-side initiatives. According to the proposed implementation plan, annual savings to be obtained from this program are anticipated to be \$2M in FY2012 and growing to \$13M in FY2014, based on selected proposals and PRASA's revised savings projected during the contract negotiation phase. Additionally, the realized savings will greatly depend on the level of participation of the private sector and the willingness of PREPA to facilitate the process of integrating independent electricity generators into their system.

### **4.8.3 Treatment Plant Automation Program**

PRASA is currently executing the first phase of a program to install the necessary equipment and develop the O&M and system protocols, to automatically, and remotely, operate a number of its WTPs and WWTPs. The project scope includes the procurement and installation of automation control equipment (capital investment is estimated at approximately \$400,000 per facility). The program goals and benefits are the following:

- Automate a total of 157 facilities (127 WTPs and 30 WWTPs) by FY2012. The program's initial focus is to automate the 127 WTPs and then focus the program on the 30 WWTPs.
- Develop and implement a technology-based organization (clusters) to support the automation program and maximize the benefits.
- Align the goals and objectives of the IPMP, Telemetry, and CMMS programs.

PRASA has retained a consultant to help with the development and implementation of this initiative. Also, PRASA is currently in negotiations with the PRDOH to obtain their concurrence to this change in WTP operation. At the end of FY2010, the status of the program is the following:

- Completing the pilot in three WTPs in the East Region.
- Procurement for 12 WTPs is underway with six plants about to start construction.

- Technical teams completed the assessment of 105 WTPs and started design phase.
- Program now includes the automation of the North Coast Superaqueduct WTP.
- Program planning completed and with implementation plan ready.

According to PRASA's proposed implementation plan, annual savings to be obtained from this program are \$8M in FY2012 and growing to \$23M in FY2014. MPPR/Malcolm Pirnie has met with PRASA and its consultant and has reviewed the supporting assumptions for these projected savings. The majority of the potential savings from this initiative is through staff reductions at the automated facilities. Although the potential savings are reasonable, the achievement of these savings projections will depend on the successful and timely execution of the initiative.

#### **4.8.4 Chemical Management and Procurement Program**

As part of its logistics and purchasing controls initiative, PRASA has implemented a chemical management and procurement program which includes:

- Use of alternative products and process control changes.
- More training for employees for the correct use of chemicals.
- Closing and consolidation of smaller, less efficient facilities wherever/whenever possible.

In FY2007, PRASA initiated a procurement process to secure new chemical (polymers and coagulants) providers. Subsequently, PRASA commenced studies at select facilities, first performing jar test sampling and followed by a live trial with four selected companies. Three of these companies were deemed qualified. PRASA divided the implementation of this effort in three phases. Phase I is currently being implemented and include four WTPs located in the Metro Region. Phase II includes nine WTPs that represent the hydrological basins of 60 WTPs. Phase III includes nine additional WTPs that represent the hydrological basins of the remaining 60 WTPs. For the last two phases, RFPs are currently being prepared. Phases II and III are expected to be completed by the fourth quarter of FY2011. The Superaqueduct WTP and the facilities that operate with micro filtration process were not included in this program.

Additionally, PRASA is planning a chemical optimization program in 45 WTPs to control chemical use, and hence reduce O&M costs. The program initiated in FY2010. Based on the results of this program, PRASA's Compliance Department will increase the number of facilities to be addressed. Savings for FY2010 were approximately \$2M. Costs related to this optimization program were included in PRASA's O&M budget.

#### **4.8.5 Implementation of Advanced Technologies for the Reduction of NRW (PPP Project)**

As reported in the 2009 CER, MPPR/Malcolm Pirnie performed an evaluation of PRASA's commercial services, which included its accounting and billing procedures. The results of such evaluation indicate that there is significant room for improvement regarding the performance of



PRASA's commercial services. This situation is negatively affecting PRASA's finances as a significant amount of revenue is unbilled and uncollected.

As a result of these findings, PRASA requested that MPPR/Malcolm Pirnie assess the feasibility of entering into Public-Private Partnerships (PPP) with one or more contractors to improve its meter reading infrastructure, and commercial practices and services as a whole. As part of this assessment, MPPR/Malcolm Pirnie researched what other utilities have done around the world as it relates to engaging the private sector in this operational scope. The main findings highlight that multiple utilities around the world have retained the services of private firms to help them reduce its volume of NRW and provide more effective commercial services.

PRASA's proposed project was selected by the PPP Authority as a potential project for a PPP and was included in the PPP Authority's inventory of projects. In FY2010, the Desirability and Convenience Study and the Request for Qualifications for PRASA's PPP Project were prepared and published by the PPP Authority.<sup>13</sup> The procurement process and contracting is planned to be completed in FY2012.

The anticipated impact on net cash flow to PRASA cannot be accurately estimated at this time as the project scope and payment terms are in development. However, MPPR/Malcolm Pirnie estimates that the potential annual net cash flow impact of these operational improvements, including potential benefits for additional service revenues, a reduced uncollectible rate and lower costs, could be in the range from \$50M to \$125M. The achievement of additional net revenue will depend on the scope and timing of the initiative.

#### **4.8.6 Other Initiatives and Programs**

PRASA completed the production meters project which consists of the installation of water meters at points of distribution in WTPs. Currently PRASA is successfully metering 80% of the water produced in its WTPs. Findings have shown that the metered volume is in line with the values PRASA estimated prior to project implementation. Therefore, the theory that a large part of its NRW was due to poor metering in WTPs and overestimation of water delivered was invalidated. PRASA is currently exploring alternatives to address its commercial activities shortcomings and is focusing on issues such as:

- Technology advancements (includes expansion of AMR pilot project and development of District Metered Areas).
- Reading and billing accuracy.
- Collections program.

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<sup>13</sup> The *Public-Private Partnership Act* (the ACT) was approved on June 8, 2009. The Act created the PPP Authority as a public corporation of the Commonwealth affiliated to the Government Development Bank for Puerto Rico. Additional information related to Puerto Rico's PPP Program can be found on the PPP Authority's website <http://www.p3.gov.pr>.

- Expanding its customer base (includes incorporation of non-paying users).
- Overall customer satisfaction.

Additionally, Regions continue to explore, test, and implement other programs to help improve O&M of the facilities and the System, while at the same time reducing associated costs. For example, the five Regions have entered into agreements with the Department of Corrections and Rehabilitation of Puerto Rico to contract minimum security prisoners to perform grounds up-keeping and maintenance. In the five Regions, the continuous implementation and use of telemetry systems in the water storage tanks have helped reduce the number of tank overflows and improve the distribution system. Also, PRASA began collaborating with several municipalities for the replacement of asphalt after R&R works are performed: PRASA provides the asphalt and the municipality provides the personnel and executes the re-pavement.

## 4.9 Conclusions

PRASA's O&M practices are adequate. One recurring finding in the facility inspections is the need for facility-specific O&M plans or manuals for treatment plants. Also, there is an identified need of standardized process for prioritizing, scheduling, and executing preventive, corrective and routine maintenance activities.

Currently, PRASA's operational and cost metrics are generally unfavorable compared to the median values for utilities in the U.S., which is not a surprising result considering the size and complexity of the System; PRASA's high staffing levels, which translate into high payroll and benefits costs; and high electricity costs.

PRASA's staff has been significantly reduced in recent years and this has affected PRASA's meter reading performance metrics and effectiveness in addressing leaks and overflows. PRASA could benefit from a utility-wide organizational assessment to better identify areas with staffing needs and surpluses, respectively.

Finally, benchmark comparisons show that PRASA has areas that could be improved and that represent large opportunities with regards to the reduction of its NRW and increasing its billings and collections. PRASA continues to develop and implement operational initiatives with the ultimate goal of improving and optimizing its operations.

# 5 Capital Improvement Program and Regulatory Compliance Status

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## 5.1 Introduction

PRASA is implementing a CIP to improve its water and wastewater infrastructure. The purpose of the CIP is to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, permit continued economic development and help bring PRASA's infrastructure into compliance with all regulatory requirements.

The CIP is a dynamic program that is constantly evolving and undergoing revision as needs and funding are identified, and as projects transition from planning through design, construction and startup. PRASA's CIP has a comprehensive listing of projects and budgets through June 30, 2020. A total of 681 projects are scheduled for implementation between FY2010 and FY2020. As required by PRASA's Board, PRASA's Infrastructure Department must annually submit for its approval an updated five-year CIP plan. Given the magnitude of the CIP, it is understandable that it will continue to evolve over time and the number and budgets of projects is expected to be updated regularly.

As of June 30, 2010, PRASA's CIP includes \$1.74 billion (B) in capital expenditures over fiscal years 2010 through 2015, of which approximately \$299M correspond to capital expenditures incurred in FY2010. The remaining \$1.44B is programmed capital expenditures for the FY2011 through FY2015 five-year CIP. In addition, PRASA has projected capital expenditures for FY2016 through FY2020 at \$2.30B. The projects are divided into categories, groups and types. In addition, PRASA has implemented a prioritization system in order to better manage the CIP, given its size and complexity. The individual project cost estimates within the CIP, including the R&R program, have not been independently verified. This section of the report provides:

- an overview of PRASA's CIP (approved by PRASA's Board on March 2010<sup>14</sup>), including summary of the program by project category,
- an assessment of the adequacy of the CIP to address identified system deficiencies and current requirements stipulated in open consent decrees with regulatory agencies, and
- an overview of the potential effects of future regulations on PRASA's System and CIP.

## 5.2 CIP: Project Distribution and Costs

There are 681 projects currently included in the FY2010–FY2020 CIP, with 387 projects that commenced during or prior to FY2010, 195 projects to commence between FY2011 and FY2015,

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<sup>14</sup> CIP version used: "PMC & Cash Flow 2009-2030 All Inclusive 02262010 JD V5"

and 99 projects to commence in FY2016 through FY2020. In addition, PRASA has 33 projects programmed beyond FY2020, and 48 projects that have not been associated to a specific fiscal year, for a total of 762 projects included in the CIP. Projects included in the CIP cover major capital improvements identified throughout all five Regions, as well as island-wide initiatives such as technological advancements, telemetry implementations, preventive maintenance, meter replacement, and R&R to the System.

The CIP is developed by PRASA taking into consideration a) current and future infrastructure and operational needs identified from system planning studies, and b) regulatory commitments as stipulated in consent decrees, administrative orders, and other agreements with regulatory agencies. Once the need for a capital improvement project is identified, a project creation form (“Formulario de Alta”) is prepared. The form summarizes the project scope, preliminary schedule, and cost estimates, amongst other information. The project is then assigned a CIP project number and added to the CIP, where it is categorized and classified according to PRASA’s classification and prioritization system. Periodically, the changes to the CIP are presented to PRASA’s Board for their revision and approval.

Total CIP investments per project are calculated taking into consideration the following estimated costs:

- Planning, Studies, and Land Acquisition Costs
- Design Costs
- Construction Costs
- Project Management and Inspection Costs
- Contingencies
- Miscellaneous Cost (includes financing costs, insurance, O&M documents and administrative costs)

The project management and inspection costs are estimated to be 7.5% of the construction cost. Contingencies are estimated to be 10% of the construction cost. Project costs are inflated, on a compound basis, by 3.8% until the construction notice to proceed is executed. These percentages are considered reasonable, since they are based on historic data of completed projects. Also, throughout the development of the planning and design phases of the project, the contingencies are modified as the construction cost estimates are updated. Once the project goes out to bid and the bid is awarded, the amount calculated for contingencies is no longer updated and it remains as part of the assigned funds of the project until it is completed and closed-out. During the construction phase of the projects, contingencies are used to cover change order costs and other costs that may occur, such as additional land acquisition, permitting, or design activities. Through FY2010, PRASA reports that its rate of change order costs to total construction costs is approximately 6%.

PRASA's PMCs assist PRASA in the development, implementation, and evolution of the CIP. PMCs provide support to PRASA in the project development process and actively participate in the planning, design and construction phases. They also manage key tasks that drive CIP project budgets, such as defining project scopes, negotiating consultant contracts for studies and design services, and preparation of project construction cost estimates.

### 5.2.1 Project Classification and Prioritization

CIP projects are classified into mandatory or non-mandatory categories. Mandatory projects are those that are required by law, as stipulated in consent decrees, administrative orders, and agreements with regulatory agencies. There are five CIP categories, listed below in order of importance:

- Mandatory (USEPA, PRDOH, Civil Action, Administrative Orders)
- Non-Mandatory Compliance (Health and Safety)
- Non-Mandatory Quality, Efficiency, Reliability and Redundancy
- Non-Mandatory Growth
- Non-Mandatory Other

Projects are further classified into groups and types of projects, which include:

- Water System (water supply, water distribution, WTP capacity increase and improvements, new WTP, water pump stations, and WTP STSs)
- Wastewater System (wastewater collection, WWTP capacity increase and improvements, new WWTP, wastewater pump stations)
- Preventive Maintenance (includes water and wastewater project types)
- Planning (includes water and wastewater project types)
- Renewal and Replacement (includes water and wastewater project types)
- PAP Projects, or "Proyectos Apremiantes" (initiative implemented in 2004 to address immediate needs for water and wastewater projects)
- Technology (includes information technology project types)
- Meters
- Buildings
- Fleet

Table 5-1 summarizes the complete CIP project distribution by category and group.

**Table 5-1:  
Number of Capital Projects by Category and Group**

| Category  | Group                   | Number of Projects  |              |              |       |
|---|-------------------------|---------------------|--------------|--------------|-------|
|   |                         | FY2010 <sup>1</sup> | FY 2011-2015 | FY 2016-2020 | Total |
| Mandatory<br>(Consent Decrees, Administrative Orders, Agreements) | Water System            | 74                  | 10           | 17           | 101   |
|   | Wastewater System       | 55                  | 10           | 21           | 86    |
|   | Preventive Maintenance  | 5                   | 0            | 0            | 5     |
|   | Subtotal                | 134                 | 20           | 38           | 192   |
| Non-Mandatory Compliance  | Water System            | 21                  | 11           | 2            | 34    |
|   | Wastewater System       | 70                  | 36           | 14           | 120   |
|   | Subtotal                | 91                  | 47           | 16           | 154   |
| Non-Mandatory Quality, Efficiency, Reliability, Redundancy        | Water System            | 67                  | 60           | 14           | 141   |
|   | Wastewater System       | 17                  | 17           | 3            | 37    |
|   | Meter Replacement       | 5                   | 5            | 5            | 15    |
|   | Buildings               | 1                   | 0            | 0            | 1     |
|   | Fleet                   | 4                   | 5            | 5            | 14    |
|   | PAP Projects            | 2                   | 0            | 0            | 2     |
|   | Planning                | 5                   | 1            | 0            | 6     |
|   | Renewal and Replacement | 4                   | 5            | 5            | 14    |
|   | Technology              | 13                  | 0            | 0            | 13    |
|   | Subtotal                | 118                 | 93           | 32           | 243   |
| Non-Mandatory Growth  | Water System            | 22                  | 21           | 9            | 52    |
|   | Wastewater System       | 6                   | 6            | 2            | 14    |
|   | Subtotal                | 28                  | 27           | 11           | 66    |
| Non-Mandatory Other   | Water System            | 4                   | 3            | 0            | 7     |
|   | Wastewater System       | 2                   | 0            | 0            | 2     |
|   | Buildings               | 6                   | 2            | 1            | 9     |
|   | Planning                | 1                   | 0            | 0            | 1     |
|   | Technology              | 2                   | 0            | 0            | 2     |
|   | Subtotal                | 15                  | 5            | 1            | 21    |
| Non-Mandatory Unclassified  | Water System            | 0                   | 1            | 1            | 2     |
|   | Wastewater System       | 1                   | 2            | 0            | 3     |
|   | Subtotal                | 1                   | 3            | 1            | 5     |
|   | TOTAL                   | 387                 | 195          | 99           | 681   |

<sup>(1)</sup> Projects were initiated during or prior to FY2010.

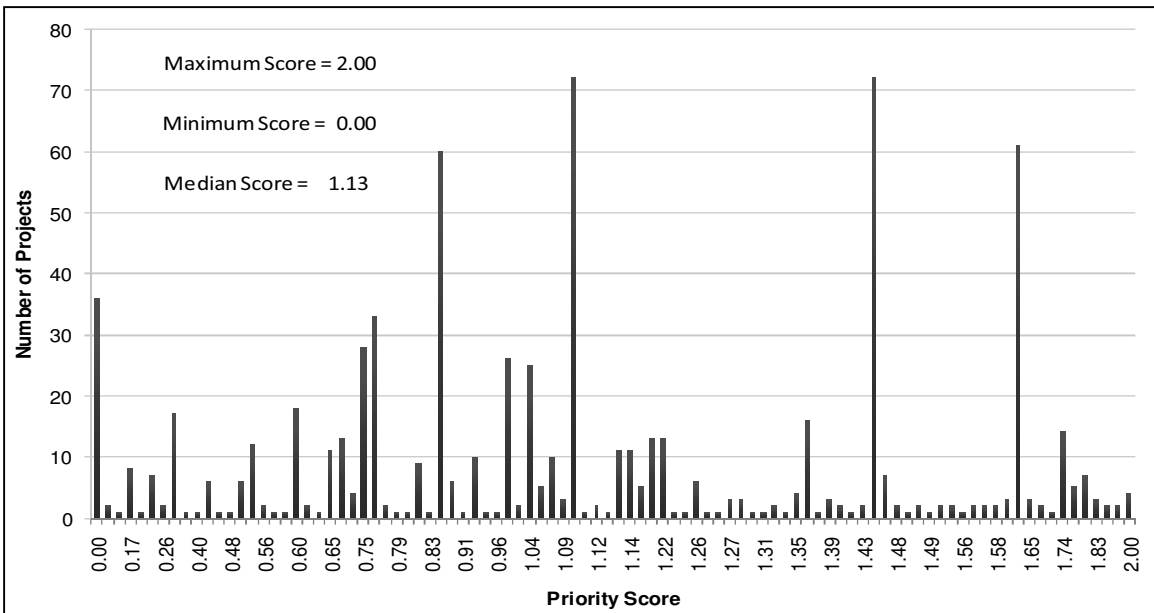
In addition to project classification, CIP projects are ranked according to a prioritization score. This score is the result of the weighted sum of the evaluation criteria adopted in PRASA's Master Plan. Categorizing and prioritizing projects gives PRASA the ability to maintain an organized and dynamic CIP. The criteria and associated weight of importance by which each project is evaluated are:

- Environmental Compliance (35% weight) – Satisfying local and federal environmental regulations, discharge limits, watershed protection, and sludge treatment and handling.

- Quality of Service (22% weight) – Service quality improvements, improvements to existing service areas, service continuity, WTP capacity expansion to meet demand, and treated water storage.
- Operational Efficiency (17% weight) – Reduction of operational costs and physical losses, plant improvements, and instrumentation.
- Reliability and Redundancy (13% weight) – Distribution redundancy to handle peak demand, emergencies and other transient events, raw water storage, transmission redundancy, electrical power redundancy, and intake improvements.
- System Growth (9% weight) – Wastewater service extension, WWTP expansions in to accommodate service extension, and inclusion of Non-PRASA water systems.
- PRASA Management Privilege (4% weight) – Used by PRASA’s management to increase priority of a project and break ties, when necessary.

The maximum score a project can receive is two (High Priority), and the minimum is zero (Low Priority). As shown on Figure 5-1, most projects fall between the medium to high priority ranges. Figure 5-1 shows the score distribution throughout all 762 projects included in the CIP.

**Figure 5-1: Project Distribution by Prioritization Score<sup>1</sup>**



<sup>(1)</sup> A total of 36 projects have received the minimum score of zero. This score is due to the fact that these projects have not yet been classified by PRASA; the CIP table automatically assigns a “0” wherever no score has been assigned. None of the projects that have a “0” score are of highest priority to PRASA.

### 5.2.2 FY2010 CIP

PRASA incurred \$299M of capital expenditures in FY2010, which included \$144M for projects classified as mandatory. During FY2010, PRASA managed 387 capital projects that commenced during or prior to FY2010.

### 5.2.3 CIP Programming: FY2011-2015

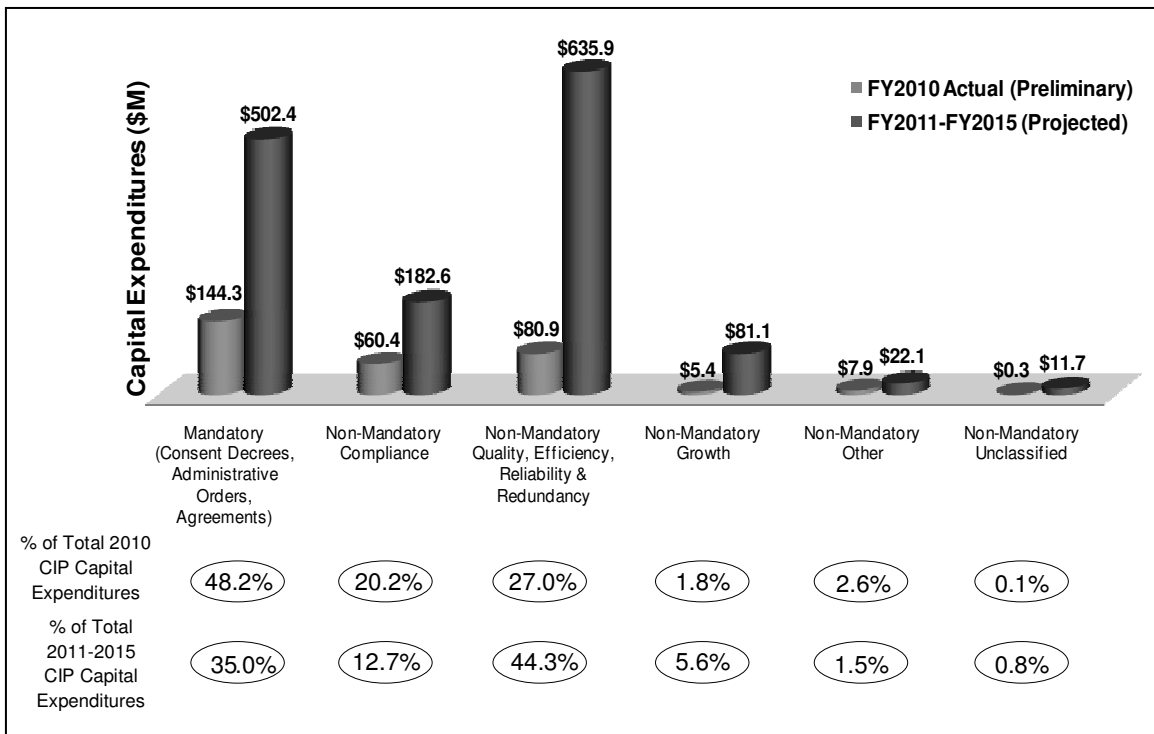
The CIP budget for FY2011 through FY2015 is \$1.44B and includes \$502M for mandatory projects, as shown in Table 5-2. Figure 5-2 shows the total capital expenditures by category for FY2010 through FY2015. Table 5-3 includes the project distribution and capital expenditure by group and type classification for FY2010 through FY2015.

**Table 5-2:  
Capital Improvement Program FY2010-2020 by Category (\$, Millions)**

| Project Category   | Fiscal Year Ending June 30, |                |                |                |                |                | Total <sup>1</sup> | Total <sup>1</sup> |
|--|-----------------------------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|
|  | 2010 (Actual)               | 2011           | 2012           | 2013           | 2014           | 2015           | 2011-2015          | 2016-2020          |
| Mandatory (Consent Decrees, Administrative Orders, Agreements) | \$144.3                     | \$141.3        | \$123.1        | \$66.3         | \$69.8         | \$102.0        | \$502.4            | \$1,060.1          |
| Non-Mandatory Compliance                                       | \$60.4                      | \$46.9         | \$40.6         | \$22.4         | \$27.3         | \$45.5         | \$182.6            | \$393.1            |
| Non-Mandatory Quality, Efficiency, Reliability & Redundancy    | \$80.9                      | \$145.8        | \$184.0        | \$103.9        | \$92.2         | \$109.9        | \$635.9            | \$696.4            |
| Non-Mandatory Growth   | \$5.4                       | \$16.0         | \$21.9         | \$10.2         | \$9.6          | \$23.4         | \$81.1             | \$124.9            |
| Non-Mandatory Other  | \$7.9                       | \$8.6          | \$7.1          | \$1.7          | \$0.6          | \$4.1          | \$22.1             | \$22.2             |
| Non-Mandatory Unclassified                                     | \$0.3                       | \$2.7          | \$5.3          | \$3.6          | \$0.0          | \$0.0          | \$11.7             | \$0.9              |
| <b>TOTAL</b>   | <b>\$299.2</b>              | <b>\$361.3</b> | <b>\$382.0</b> | <b>\$208.0</b> | <b>\$199.5</b> | <b>\$285.0</b> | <b>\$1,435.7</b>   | <b>\$2,297.6</b>   |

<sup>(1)</sup> Numbers may not add due to rounding.

**Figure 5-2: FY2010-FY2015 Total Capital Expenditures by Project Category (\$, Millions)**





**Table 5-3:  
Capital Improvement Program 2010-2020 by Project Type (\$, Millions)**

| Category Type <sup>1</sup> | Sub-Category              | Fiscal Year      |         |         |         |         |         | Total <sup>2</sup> | Total <sup>2</sup> |
|----------------------------|---------------------------|------------------|---------|---------|---------|---------|---------|--------------------|--------------------|
|                            |                           | 2010<br>(Actual) | 2011    | 2012    | 2013    | 2014    | 2015    | 2011-2015          | 2016-2020          |
| Water System               | Water Supply              | \$0.8            | \$4.0   | \$7.6   | \$10.3  | \$11.7  | \$10.2  | \$43.8             | \$230.5            |
|                            | Water Treatment Plant STS | \$0.0            | \$0.0   | \$0.0   | \$0.0   | \$0.0   | \$1.5   | \$1.5              | \$12.5             |
|                            | Water Pump Stations       | \$0.5            | \$1.4   | \$2.0   | \$2.9   | \$2.2   | \$0.2   | \$8.7              | \$16.6             |
|                            | WTP Capacity Increase     | \$7.2            | \$2.0   | \$0.4   | \$0.0   | \$1.1   | \$4.2   | \$7.7              | \$76.4             |
|                            | WTP Improvements          | \$14.2           | \$25.1  | \$38.7  | \$20.0  | \$15.8  | \$20.8  | \$120.4            | \$135.0            |
|                            | WTP New                   | \$25.7           | \$30.4  | \$26.1  | \$3.5   | \$10.6  | \$18.6  | \$89.2             | \$58.9             |
|                            | Water Distribution        | \$33.8           | \$45.2  | \$37.7  | \$9.4   | \$5.6   | \$23.1  | \$121.0            | \$178.4            |
|                            | SUBTOTAL                  | \$82.3           | \$108.0 | \$112.4 | \$46.2  | \$47.0  | \$78.7  | \$392.3            | \$708.2            |
| Wastewater System          | Wastewater Pump Stations  | \$6.3            | \$8.3   | \$13.9  | \$5.6   | \$1.8   | \$3.3   | \$32.9             | \$7.3              |
|                            | WWTP Capacity Increase    | \$31.6           | \$13.4  | \$7.4   | \$11.9  | \$31.7  | \$57.9  | \$122.2            | \$280.2            |
|                            | WWTP Improvements         | \$4.6            | \$7.3   | \$8.1   | \$4.4   | \$2.7   | \$5.5   | \$28.1             | \$93.1             |
|                            | WWTP New                  | \$2.7            | \$5.3   | \$8.0   | \$2.2   | \$0.0   | \$0.0   | \$15.5             | \$186.5            |
|                            | Wastewater Collection     | \$72.3           | \$68.4  | \$78.7  | \$55.1  | \$37.6  | \$46.8  | \$286.6            | \$486.2            |
|                            |                           | SUBTOTAL         | \$117.5 | \$102.7 | \$116.1 | \$79.3  | \$73.8  | \$113.5            | \$485.3            |
| Meters                     | Water Meters              | \$30.0           | \$36.8  | \$16.5  | \$9.9   | \$14.2  | \$18.9  | \$96.3             | \$97.4             |
| Buildings                  | Buildings                 | \$5.6            | \$3.3   | \$2.8   | \$0.9   | \$0.0   | \$3.4   | \$10.4             | \$22.2             |
| Fleet                      | Fleet                     | \$5.7            | \$2.9   | \$3.6   | \$5.7   | \$8.1   | \$12.4  | \$32.7             | \$64.9             |
| Planning                   | Water & Wastewater        | \$6.7            | \$42.2  | \$87.1  | \$14.0  | \$0.0   | \$0.0   | \$143.3            | \$0.0              |
| Preventive Maintenance     | Water & Wastewater        | \$31.1           | \$33.1  | \$3.8   | \$0.0   | \$0.0   | \$0.0   | \$36.9             | \$0.0              |
| Renewal and Replacement    | Water & Wastewater        | \$9.4            | \$30.1  | \$38.5  | \$51.7  | \$56.4  | \$58.0  | \$234.8            | \$351.7            |
| Technology                 | Water & Wastewater        | \$10.8           | \$2.2   | \$1.1   | \$0.3   | \$0.0   | \$0.0   | \$3.6              | \$0.0              |
|                            | SUBTOTAL                  | \$99.4           | \$150.7 | \$153.5 | \$82.5  | \$78.7  | \$92.7  | \$558.1            | \$536.2            |
| <b>TOTAL<sup>2</sup></b>   |                           | \$299.2          | \$361.3 | \$382.0 | \$208.0 | \$199.5 | \$285.0 | \$1,435.7          | \$2,297.6          |

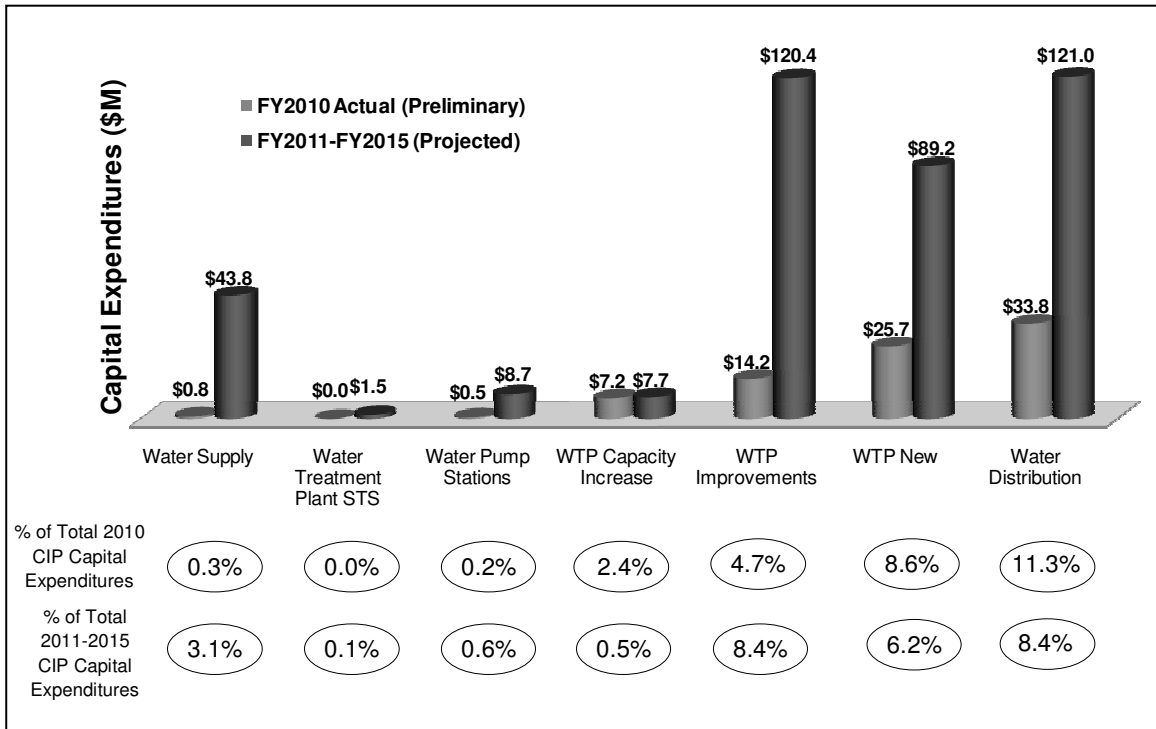
<sup>(1)</sup> Urgent projects (PAP) included in the 2008 and 2009 CERs were completed and no additional capital investments are planned under this project category type. PAP projects were developed as part of an initiative included in PRASA's CIP prior to FY2005. The PAP projects investments included in previous fiscal years were the remnants of that initiative.

<sup>(2)</sup> Numbers may not add due to rounding.

### 5.2.3.1 Water System Projects

The water system projects include projects to improve compliance, new WTPs, new reservoirs and upgrades to water distribution systems. Total capital expenditures in water system projects for FY2011–FY2015 are estimated at approximately \$392M, of which approximately \$213M is allocated for projects classified as mandatory. Figure 5-3 shows the FY2011–FY2015 CIP expenditures for water system projects, alongside the FY2010 expenditures.

**Figure 5-3: Water System Capital Expenditures by Project Type (\$, Millions)**



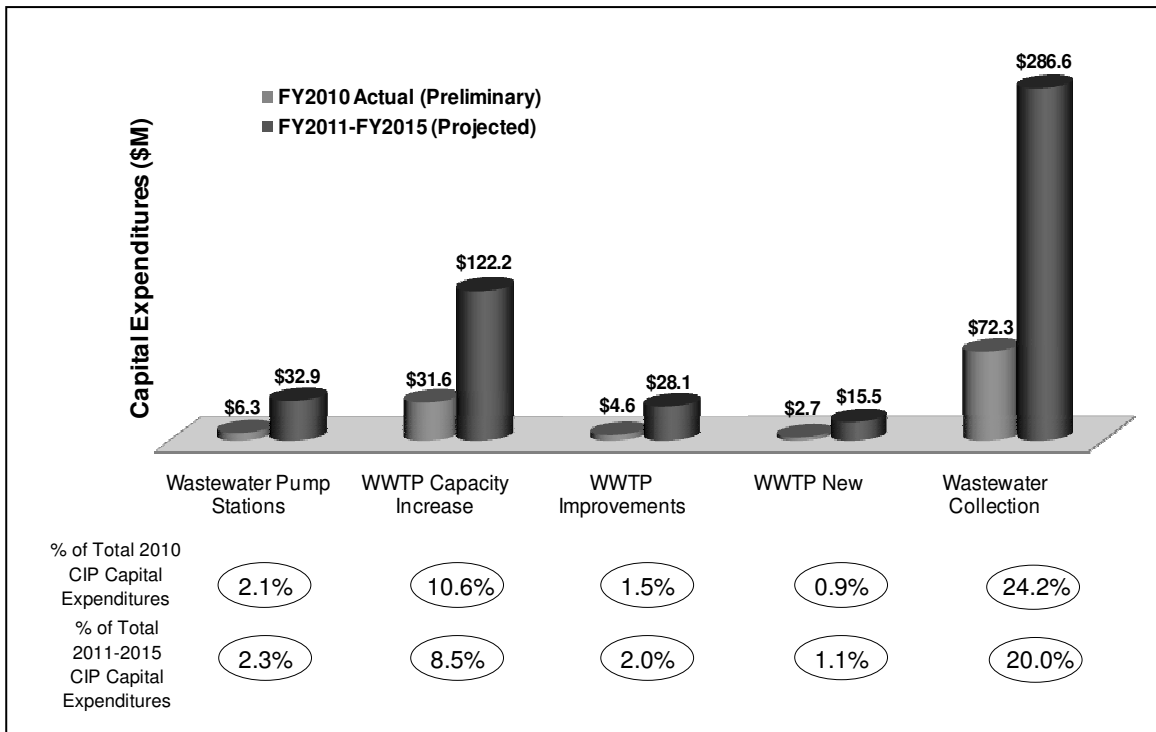
### 5.2.3.2 Wastewater System Projects

The wastewater system projects include projects to improve compliance, new WWTPs, and upgrades to wastewater collection systems. Total capital expenditures in wastewater system projects for FY2011–FY2015 are estimated at \$485M, of which approximately \$252M is allocated for projects classified as mandatory. Figure 5-4 shows the FY2011–FY2015 capital expenditures for wastewater system projects, alongside the FY2010 expenditures.

### 5.2.3.2 Wastewater System Projects

The wastewater system projects include projects to improve compliance, new WWTPs, and upgrades to wastewater collection systems. Total capital expenditures in wastewater system projects for FY2011–FY2015 are estimated at \$485M, of which approximately \$252M is allocated for projects classified as mandatory. Figure 5-4 shows the FY2011–FY2015 capital expenditures for wastewater system projects, alongside the FY2010 expenditures, and the percentage of the total System-wide capital expenditures each project type represents with respect to each period.

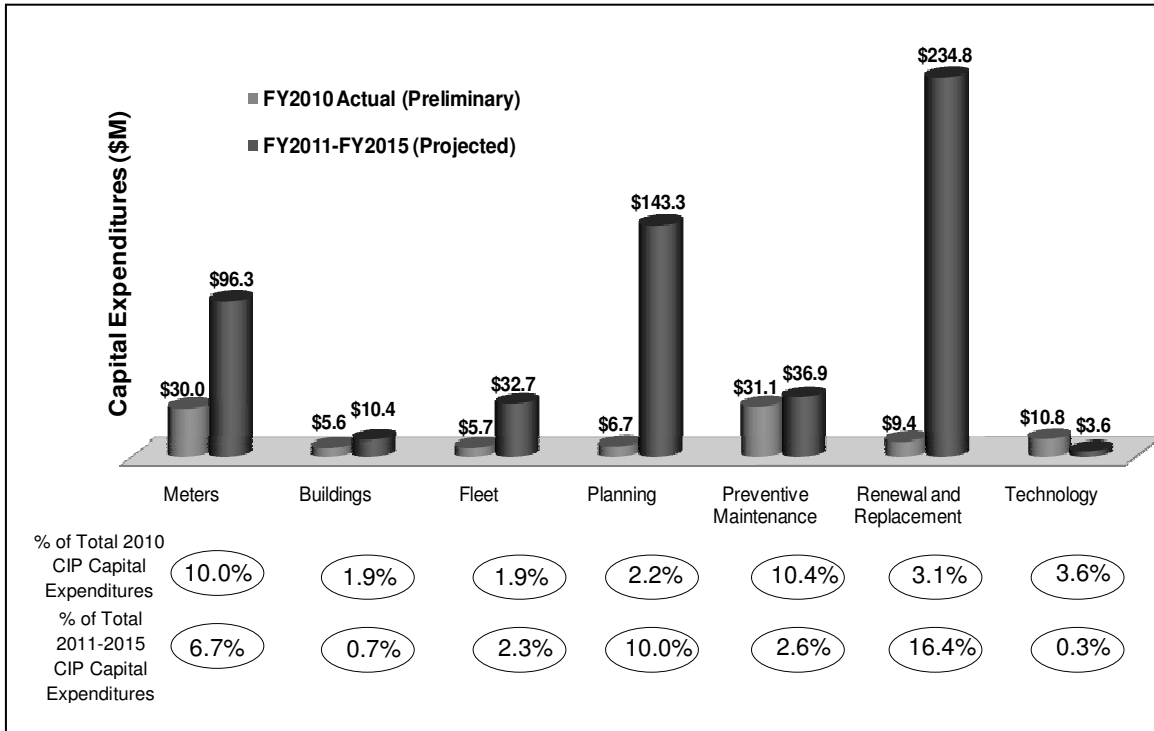
**Figure 5-4: Wastewater System Capital Expenditures by Project Type (\$, Millions)**



### 5.2.3.3 Other Projects: Operational, Planning, Renovation and Technology

Total capital expenditures for all other capital projects are estimated at approximately \$558M for FY2011–FY2015. These projects address preventive maintenance, planning, R&R, meter replacements, office and building improvements, fleet upgrades, and technology improvements. Figure 5-5 shows the FY2011–FY2015 projected capital expenditures for the above mentioned project categories. Preventive maintenance projects, which ensure the proper O&M of the plants and other critical facilities, are categorized as mandatory-driven, with an estimated FY2011–FY2015 capital expenditure of \$37M. Also, within the R&R projects, although not formally categorized as mandatory, there are projects that are required by consent decrees.

**Figure 5-5: Other Projects Capital Expenditures by Project Type (\$, Millions)**



### 5.2.4 CIP Programming: FY2016-2020 and Beyond

Of the total 762 projects included in the CIP, there are 99 projects programmed for development and implementation between FY2016 and FY2020. PRASA estimates capital expenditures for this period will be \$2.30B. Mandatory-driven projects account for \$1.06B of these capital expenditures. Beyond FY2020, PRASA currently has an additional 33 projects programmed for development and implementation on or after FY2020, of which a number are mandatory. Finally, there are 48 projects that have not been associated to a specific fiscal year.

### 5.3 Comparison of CIP with Regulatory Requirements

The CIP projects were compared with existing consent decrees and agreements that PRASA has entered into with regulating agencies in order to determine the adequacy of the identified projects in the CIP with regulatory requirements. These are:

1. PRASA II: 1995 Consent Decree, United States v. PRASA and Commonwealth of Puerto Rico, Civil Action No. 92-1511 (SEC) – Construction of eight STSs and compliance actions on potable water treatment facilities.
2. PRASA III: 2000 Consent Decree, United States v. PRASA, et al., Civil Action No. 00-2554 – Addresses alleged violations of the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA).

3. PRASA IV: 2003 Consent Decree, United States v. PRASA, Commonwealth of Puerto Rico, and Compañía de Aguas de Puerto Rico, Inc., Civil Action No. 01-1709 (JAF) – Addresses violations to the Section 301 and 402 of the CWA and regulations and PRASA’s NPDES permits with regard to certain of PRASA’s wastewater pump stations
4. 2006 Wastewater Consent Decree, United States v. PRASA and Commonwealth of Puerto Rico, Civil Action No. 06-1624 (SEC) – Addresses violations to the Section 301 and 402 of the CWA and regulations promulgated there under, and PRASA’s NPDES permits with regard to PRASA’s WWTPs.
5. Puerto Rico Department of Health 2007 Drinking Water Settlement Agreement Civil Action KPE 2006-0858<sup>15</sup> – Addresses non-compliance and alleged violations with the Puerto Rico Potable Water Purity Protection Law, as amended (“Ley para Proteger la Pureza de las Aguas Potables de Puerto Rico, Ley Num 5 de 21 de Julio de 1977, según enmendada”), the SDWA and applicable regulations, and the General Environmental Health Regulation (“Reglamento General de Salud Ambiental, Reglamento Núm. 6090 de 4 de febrero de 2000”).
6. USEPA STS Consent Decree, United States v. PRASA and Commonwealth of Puerto Rico – Addresses alleged violations to the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA), specifically to the National Primary Drinking Water Regulations (NPDWRs).

The following sections provide a summary update of the compliance status for each regulatory enforcement action listed above. Such analysis includes compliance status and CIP adequacy in addressing compliance with the requirements.

### **5.3.1 PRASA II: 1995 Consent Decree, Civil Action No. 92-1511 (SEC)**

Although the STSs required by PRASA II have been constructed, the STSs are not operating in compliance with their NPDES permit limits. Therefore, size and treatment process assessments should be made at the eight STSs that were constructed in order to determine the cause of the violations of NPDES final effluent limits and develop corrective measures, or determine the need for additional capital improvements to bring the STSs into compliance. These facilities have been included in the list of facilities to be addressed in the STS Consent Decree; as such, PRASA II has been closed.

### **5.3.2 PRASA III: 2000 Consent Decree, Civil Action No. 00-2554**

Although the 23 STSs required by PRASA III have been constructed, 20 of the STSs are not operating in compliance with their NPDES permit limits. Therefore, size and treatment process assessments may be required at these 20 STSs in order to determine the cause of the violations of NPDES final effluent limits and develop corrective measures to bring the STSs into compliance. The Fajardo WTP ceased water distribution on September 22, 2008 and reported the last

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<sup>15</sup> In 2008 CER and PRASA’s Official Statement, it was referred to as 2006 Drinking Water Settlement Agreement. Year has been updated to reflect date Settlement Agreement was signed: March 15, 2007. Subsequently, the Settlement Agreement was amended on June 16, 2008.

discharge on October 28, 2008. This treatment plant was not included in the 20 STSs that are not in compliance with the NPDES permit limits. These facilities have been included in the list of facilities to be addressed in the STS Consent Decree; as such PRASA III has been closed.

**5.3.3 PRASA IV: 2003 Consent Decree, Civil Action No. 01-1709 (JAF)**

On June 2, 2010, PRASA submitted to the USEPA the Quarterly Compliance Report No. 21 that covers the period from January 1 to April 30, 2010. A summary of the requirements and status is included in Table 5-4. Under PRASA IV, 111 WWPSs were selected by PRASA and approved by the USEPA to undergo rehabilitation improvements. As of the date of the report, all 111 WWPS projects were completed.

Additional assessments of the WWPSs may be required to determine the cause of the unanticipated bypasses associated with the pump stations, and in turn reduce the frequency of violations for which PRASA self-assessed penalties. Additional capital improvements may be required to further reduce the frequency of bypasses at these facilities.

**Table 5-4:  
PRASA IV Requirements and Compliance Progress Status**

| Requirement   | Requirement Reference     | Status  |
|---|---------------------------|---|
| 1. Payment of a civil penalty in the amount of one million dollars (\$1,000,000) to the United States.  | Section V, Paragraph 8    | Civil penalty was paid on July 22, 2003.  |
| 2. Submit a detailed list of remedial actions to be performed at the agreed upon pump stations (referred to as Group A in PRASA IV) and a proposed schedule for completion to the USEPA for approval. | Section VI, Paragraph 11  | On April 29, 2004 a final list of the Group A pump stations, comprised of 111 wastewater pump stations, was approved by the USEPA and remedial actions were to be completed in three terms ending on January 2005, November 2005 and November 2006; an extension was requested by PRASA as a result of the strike by its major union, pushing back the deadlines to May 2005, March 2006 and March 2007 respectively; all 111 wastewater pump station remedial action projects have been completed. |
| 3. Submit Operation and Maintenance Plan (OMP) to the USEPA for approval.   | Section VII, Paragraph 12 | OMP was submitted in 2003 to the USEPA, which in turn evaluated it and submitted comments to PRASA; further modifications were discussed and approved by the USEPA in subsequent meetings; OMP is currently being implemented in a phased approach. Phase I (40 WWPS) was completed by December 31, 2008. Phase II (160 WWPS) was completed by December 31, 2009. Phase III (446 WWPS) is currently being implemented, and is expected to be completed by December 31, 2010.                        |

| Requirement  | Requirement Reference      | Status  |
|--|----------------------------|---|
| 4. Submit to USEPA for approval a Spill Response and Cleanup Plan (SRCP) that specifies actions to be taken by PRASA for unanticipated bypasses from any pump station facility.  | Section VIII, Paragraph 17 | The SRCP manual was submitted to the USEPA, which in turn evaluated it and submitted comments to PRASA; the SRCP was later approved, once it was translated to English. During the months of July through October 2007 and the summer of 2008, several SRCP refresher sessions were offered to approximately 150 PRASA employees of every level. These sessions covered all aspects of the utility's SRCP. PRASA has scheduled to update the SRCP during FY2011.                                      |
| 5. Develop, fund, and implement projects to improve drinking water quality of selected non-PRASA systems that fail to comply with applicable local and federal regulations for public drinking water supplies as a Supplemental Environmental Project (SEP). | Section XIX and Appendix E | PRASA selected the El Chichón, Villa Blanca and Lajitas communities for implementation of the SEP. A scope of work was submitted on May 11, 2007 for evaluation and comments. The construction of these SEPs began during July 2007 and was completed in FY2010. The start-up of the system is pending for the disinfections of the pipelines and the distribution tanks, and the connection to the existing distribution pipelines, since the community does not want to be connected to the system. |

### 5.3.4 2006 Consent Decree, Civil Action No. 06-1624 (SEC) (or Mega Consent Decree)

On June 1, 2010, PRASA submitted to the USEPA the Quarterly Progress Report No.12, covering the period from March 1, 2010 through May 31, 2010. A summary of the requirements and status is included in Table 5-5. The 2006 Consent Decree specifies that PRASA shall implement system-wide remedial measures at all WWTPs owned/operated by PRASA. These remedial actions were identified for the selected facilities; and will be completed in three phases, consisting of short and mid-term remedial actions, and long term capital improvement projects. The long term projects, in turn, are divided into three terms varying by completion dates. Table 5-6 includes a breakdown of the projects by term and current status of remedial measures and CIP projects.

**Table 5-5:  
2006 Consent Decree Requirements and Compliance Progress Status**

| Requirement  | Requirement Reference | Status  |
|--|-----------------------|---|
| 1. Progress report on probation and plea agreement special conditions and compliance with terms and conditions of the 2006 Consent Decree. | Civil Action          | At present time, PRASA is in compliance with all terms and conditions of the 2006 Consent Decree. |

Section 5

Capital Improvement Program and Regulatory Compliance Status

| Requirement   | Requirement Reference                   | Status  |
|---|---|---|
| 2. Implementation of system-wide remedial measures at WWTPs owned and/or operated by PRASA included in the 2006 Consent Decree appendices A, B, C, and D.   | Section V, and Appendix A, B, C, and D  | See Table 5-6 of this report: 2006 Consent Decree Remedial Measures and CIP Project Status Table.   |
| 3. Comply with the respective interim limitations and monitoring asset forth for each of the WWTPs in Appendix E of the 2006 Consent Decree, as specified for that parameter in the respective NPDES permit for each facility, and submit results of each sample on the facility's Discharge Monitoring Report (DMR). | Section VI, Paragraph 11 and Appendix E | Effective June 1, 2006, the interim discharge limits are active in all PRASA WWTPs. PRASA is complying with the DMRs submittal of each of the facilities included in Appendix E of the Consent Decree, and exceedances are being notified to the USEPA.   |
| 4. Develop and implement an Integrate Preventive Maintenance Program (IPMP).  | Section VII                             | On October 31, 2007 PRASA's submitted to USEPA the IPMP and implementation schedule. This report was approved by PRASA on November 14, 2007. In the organizational structure, a training tool was developed to track employee's training history and compliance, and first training was performed on June 2010. The communication plan and integrated program were implemented in the 60 WWTPs. Periodic follow-up visits are performed in each facility to verify compliance with maintenance procedures. PRASA continues using SAP PM (Plant Management) in all the WWTPs. The equipment inventory was received and validated and is in process of being uploaded to SAP PM. In the Purchasing and Logistic Department, PRASA consolidated the five regional warehouses in two distribution warehouses. |
| 5. Submit for evaluation and approval, no later than October 1, 2006, a Spill Response and Cleanup Plan (SRCP) that specifies actions to be taken by PRASA for SSOs from all facilities owned and/or operated by PRASA.   | Section VIII                            | The SRCP was approved by the USEPA on October 19, 2007. PRASA is working in several initiatives, in order to reduce the SSOs, this includes the creation of pretreatment programs, training for employees and the development of SOPs for the cleanup, response, mitigation and repair of sewage spills. Sewage personnel at PRASA developed SOPs for cleanup, response, mitigation and repair. Final revision was submitted on June 29, 2009 for USEPA revision and approval.  |
| 6. Develop and implement a Sanitary Sewer System Evaluation Plan (SSEP1) and a Sanitary Sewer System Repair Plan  | Section IX and Appendix H               | A progress report was submitted for the implementation of these plans. The evaluation and repair is divided   |



Section 5  
Capital Improvement Program and Regulatory Compliance Status

| Requirement  | Requirement Reference     | Status   |
|--|---------------------------|--|
| (SSSRP1) for the Aguadilla, Bayamón, Isabela, Juncos, La Parguera, San Sebastian New, and Unibón Morovis facilities.   |                           | in two phases; first phase will work with the seven most critical sanitary sewer systems and the second phase includes the remaining sanitary sewer systems. The first phase is currently under development. The Bayamón, La Parguera, Unibón, Juncos, and San Sebastian SSSEP1 were submitted on January 14, 2009 to the USEPA. Isabela and Aguadilla SSSEP1 were submitted on March 20, 2009. Unibón SSSRP1 was submitted to USEPA on May 1, 2009. Toa Alta SSSEP1 and SSSRP1 were submitted on April 29, 2009. Island-wide SSSEP1 was submitted on June 3, 2009. PRASA is in negotiations with USEPA, regarding the implementation of the repair plans. |
| 7. Monitoring and management of wastewater treatment capacities.   | Section X                 | No changes to PRASA's sewer connections policy are proposed. Monthly average permitted flows of the facilities owned and/or operated by PRASA were submitted. On November 27, 2007, PRASA implemented ban on new sewer connections at the Bayamón RWWTP, also rehabilitated the Rabúa pump station, allowing the Bayamon RWWTP to comply with NPDES permit limit for flow parameter. Furthermore, on July 22, 2008 USEPA terminated the new sewer connections ban of the Patillas WWTP.  |
| 8. PRASA shall pay \$1,000,000 within 30 days of entry of the Consent Decree to the United States as a civil penalty.  | Section XII, Paragraph 39 | PRASA complied and paid the civil penalty in compliance with the requirement of the Consent Decree on February 6, 2007.  |
| 9. PRASA shall pay to the United States stipulated penalties for the violations listed in the 2006 Consent Decree for each wastewater treatment facility owned and/or operated by PRASA. | Section XIII              | No stipulated penalty was assessed for failing to complete specified works for each facility. PRASA deposited the amount of \$457,300 in an escrow account that covers stipulated penalties listed in the Consent Decree during the period of January to December 2009.  |
| 10. Eligibility of removal and reincorporation of facilities from stipulated penalties provisions in the 2006 Consent Decree.  | Section XIV and XV        | No facilities were removed or reincorporated.  |
| 11. Develop, fund, and implement a Supplemental Environmental Project (SEP).   | Section 84(a)             | An Escrow Account and deposits have been made as set forth in PRASA V. As of June 01, 2008, the  |

| Requirement | Requirement Reference | Status   |
|-------------|-----------------------|--|
|             |                       | fourth and last deposit was completed. The Naranjito La Plata Community was selected by PRASA and approved by the USEPA on December 15, 2006. The scope of work (SOW) of the project was submitted to USEPA for evaluation and approval on June 2007, and was approved by USEPA on September 7, 2007. As of January 2009, the 30% design has been completed. The construction of this project is scheduled to be substantially completed by June 2013. PRASA is coordinating a meeting with USEPA to discuss the schedule and scope of work of this project. |

**Table 5-6:  
2006 Consent Decree Remedial Measures and CIP Project Status**

| Term   | Total Projects | Status   |
|--|----------------|--|
| Short (6 months) <sup>1</sup>  | 32             | All 32 remedial measures have been completed.  |
| Mid (12-24 months) <sup>1</sup>  | 49             | 27 measures have been completed and USEPA granted an extension for another one. The remaining measures are in progress.  |
| CIP Long<br>Term 1 ending<br>June 1, 2008 (3)<br>June 1, 2010 (4)<br>June 1, 2011 (13) | 20             | Completed - 11 projects<br>Construction - 8 projects<br>Bidding - 0 projects<br>Design - 1 project   |
| CIP Long<br>Term 2 ending<br>June 1, 2016  | 24             | Six projects are in the construction phase and one project has been completed. Remaining projects are currently in planning, study phases or being evaluated under PRASA's 2010 Master Plan. |
| CIP Long<br>Term 3 ending<br>June 1, 2021  | 19             | Design development completed for one project. Additionally, one project is in the construction phase. Remaining projects are scheduled to commence planning activities beyond FY2014.        |

<sup>(1)</sup> It refers to implementation completion date, measured from the date of PRASA and USEPA entered into agreement in the 2006 Consent Decree.

The projects included in the CIP were reviewed to determine how adequately the CIP addresses the 2006 Consent Decree requirements. In summary:

- Short-Term measures have all been completed (see Table 5-6).
- Mid-Term measures are in progress as indicated in Table 5-6. All deadlines have been met to date.

- All 20 projects included in Long-Term 1 are on schedule to meet compliance with the 2006 Consent Decree requirements and currently have projects programmed in the five-year CIP. Eleven projects have been completed to date, ahead of schedule.
- All 24 Long-Term 2 projects have identified CIP projects within the 10 year CIP. However, not all project scopes have been finalized given that planning efforts for some of these projects are scheduled to commence between FY2011 and FY2012. This is reasonable since the 2006 Consent Decree requires they are placed in operation by June 1, 2016, which allows for enough time to complete the projects. PRASA classified these projects as mandatory; therefore, it is assumed that the projects scopes will be developed to comply with the 2006 Consent Decree.
- All 19 Long-Term 3 projects have CIP projects within the 10 year CIP program. However, not all project scopes have been finalized given that planning efforts for some of these projects are scheduled to commence between FY2014 and FY2018. This is reasonable since the 2006 Consent Decree requires they are placed in operation by June 1, 2021, which allows for enough time to complete the project. PRASA classified these projects as mandatory; therefore it is assumed that the projects scopes will be developed to comply with the 2006 Consent Decree.

Upon review of this information, the CIP adequately addresses the requirements of the 2006 Consent Decree. PRASA has indicated that project scopes will be defined to address the 2006 Consent Decree requirements, thus bringing these facilities into compliance. PRASA's compliance with the 2006 Consent Decree requirements during FY2010 and improved communication with the USEPA, re-affirm PRASA's commitment to its operational objectives. PRASA has set aggressive project completion schedules to meet compliance. Projects shall be advanced or postponed as funding is identified. It is PRASA's intention to implement all mandatory projects in a fast-track basis to reduce and minimize violations, improve the O&M and reliability of the system, and comply with the consent decree.

### **5.3.5 Puerto Rico Department of Health 2007 Settlement Agreement Civil Action KPE 2006-0858 (904)**

In 2007, PRASA and the Government of Puerto Rico (Puerto Rico Department of Health, or PRDOH) entered into a Settlement Agreement Civil Action KPE 2006-0858 (PRDOH Agreement), which addresses a total of 132 potable water systems (including 112 WTPs).

PRASA must comply with the following requirements, in accordance with the PRDOH Agreement:

- Provide a Progress Report in a quarterly basis where a compliance statement of the decree is detailed.
- Develop and implement an operational and preventive maintenance program, currently in the development phase, which program shall include continuous monitoring programs for water

systems. The continuous monitoring program is to be implemented in three phases for the systems listed in the PRDOH Agreement.

- Comply with stipulated interim mitigation measurements and protocols (i.e. SOPs) for non-compliance systems, as well as preventive measures for intermittent non-compliance systems, for bacteriology, turbidity, nitrates, DBPs, and chemical contaminants.
- Provide and require operator, and supervisors, certification and training.
- Transaction penalty payment of \$1,000,000.
- Quarterly penalty payments for Non-compliance.
- Comply with short, mid, and long term remedial measures within the stipulated completion dates, for the water systems addressed.

The PRDOH Agreement was filed on December 2006 and was signed by PRASA and PRDOH on March 15, 2007. Subsequently, on June 16, 2008, the PRDOH Agreement was amended replacing the original in its totality.

### **Short-Term Measures**

A list of 540 short-term remedial actions was identified to be completed within 12 months of PRASA and PRDOH entering into the PRDOH Agreement. These remedial actions with due date of December 31, 2008, that were pending for a final compliance determination, were evaluated and completed, as per a communication from the PRDOH dated June 23, 2009. Two additional remedial actions were established between PRASA and PRDOH in a meeting held on June 3, 2009. These remedial actions included the Ceiba Sur WTP and Jacanas 2 WPS. A deadline was set for December 2009 to complete both remedial actions. PRASA has indicated that the remedial actions for the Ceiba Sur WTP and the Jacanas 2 WPS were completed.

Most of the short-term actions are operational and/or compliance related, and includes monitoring and studies. The facilities that require capital improvement projects, were not addressed as individual CIP projects, but were addressed under PRASA's R&R program, managed by each Region, for which budgeting was included in the CIP.

### **Mid-Term Measures**

A total of 115 mid-term remedial actions were identified to be completed by March 14, 2010. Prior to the expiration date, PRASA requested to PRDOH a time extension for those projects that were scheduled to be completed after March 2010. The time extension was approved, with expiration dates of May 28, 2010 and December 1, 2010. The status of those projects is the following:

- A total of 82 remedial actions were completed in the stipulated period.

- Seven remedial actions that had expiration date of March 14, 2010 were completed after this date, resulting in penalties of \$65,700, since no time extension was requested on time.
- For five remedial actions, a time extension was requested and the actions were completed before or within the time extension period, resulting in no penalties.
- The remaining 21 remedial actions are scheduled to be completed by December 1, 2010.

**Long-Term Measures**

The long-term remedial actions are divided into three terms to be respectively completed in the scheduled time frames. Table 5-7 includes a breakdown of the projects by term and current status of remedial measures and CIP projects.

**Table 5-7:  
PRDOH Agreement Remedial Measures and CIP Project Status**

| Term  | Total Projects | Status   |
|---|----------------|--|
| Term 1: 5 years or no later than December 15, 2011  | 38             | There are 38 projects, of which 28 require capital improvements, as per the PRDOH Agreement project scope description; the other 10 projects require operational and maintenance programs, equipment installation (i.e., valves, meters), evaluations, studies, etc. Three of the 28 projects that require capital improvements will be directly managed by the respective Regions and are to be funded by the renewal and replacement budget. The remaining 25 projects have identified CIP projects with scopes that comply with the requirements stipulated in the PRDOH Agreement. PRASA is currently on schedule with development and implementation of the projects. Eleven of these projects have been completed, and are currently in operation. |
| Term 2: 10 years or no later than December 15, 2016 | 18             | There are 18 projects, of which 17 require capital improvements, as per the PRDOH Agreement project scope description; the other project require operational and maintenance programs, equipment installation (i.e., valves, meters), evaluations, studies, etc. Five of the 17 projects that require capital improvements will be directly managed by the respective Regions and are to be funded by the renewal and replacement budget. The remaining 12 projects have identified CIP projects with scopes that comply with the requirements stipulated in the PRDOH Agreement.  |
| Term 3: 15 years or no later than December 15, 2021 | 13             | There are 13 projects and all require capital improvements. All 13 projects have identified CIP projects that cover the requirements stipulated in the PRDOH Agreement. One of these projects was completed and is currently in operation  |

Upon review of this information, the CIP adequately addresses the requirements of the PRDOH Agreement. PRASA has set aggressive project completion schedules to meet compliance. Projects will be advanced or postponed as funding is identified.

### Other Non-CIP Requirements

- Continuous Monitoring Program – PRASA has complied with the requirements addressed in the PRDOH Agreement, with the implementation of a continuous monitoring program in all WTPs. The program includes the installation of monitoring equipment for residual chlorine and turbidity. Phase I of the program establishes the implementation of the monitoring system for the facilities with a production greater or equal to 5 MGD and/or that serve more than 100,000 clients. The 11 facilities included in this phase were completed. Phase II establishes the implementation of the program in facilities with a production between 1 to 5 MGD and/or that serve to a population between 10,000 to 100,000 clients. The 52 facilities included in the phase were completed. On April 30, 2010 the validation process of Phase I and II was completed. Phases III establishes the implementation of the program in facilities with a production less than 1 MGD and/or that serves to less than 10,000 clients. This phase is in the process of being implemented: 37 of the 69 facilities included in this phase were already completed. The remaining facilities shall be completed and validated by March 15, 2011, and are on track to comply.
- Optimization Program – Comprehensive Technical Assistance (CTA) evaluations were performed in the 16 facilities included in the optimization program. PRASA is currently in the process of defining the action plans in the 16 facilities according to the requirement of the PRDOH Agreement.
- Integrated Preventive Maintenance Program – As stipulated by the PRDOH Agreement, PRASA is expanding its IPMP program with the purpose to operate and maintain the water systems. An integration pilot plan of 16 WTPs was completed during the first trimester of year 2010 and follow-up is being performed to this facilities. The Standard Operating Procedures (SOPs) are in development and implementation process as required by the Agreement.
- Interim Mitigation Measures – The PRDOH Agreement requires that a general interim measure of mitigation be performed to minimize any possible health risks from the non-compliant system while the remedial measures are being implemented. The mitigation measures are established for turbidity, bacteriology, disinfection byproducts, nitrates and other parameters. Compliance certifications, including the penalties, were delivered regarding these measures. Penalties have been paid entirely on a quarterly basis.
- Training Program and Operator’s License – In accordance with the PRDOH Agreement, PRASA submitted to PRDOH a training plan for water system operators and supervisors. Table 5-7 summarizes the training program status as of June 30, 2010. All PRASA’s WTPs are supervised or operated by licensed personnel.

**Table 5-8:  
Status of Training Program**

| Training  | Number of Employees to be Trained | Number of Employees Trained | Percent of Trained Employees |
|---|-----------------------------------|-----------------------------|------------------------------|
| PRDOH Agreement (Managers)                            | 128                               | 1139                        | 889.8% <sup>1</sup>          |
| PRDOH Agreement (Operators)                           | 667                               | 316                         | 47.4%                        |
| Federal and Local Drinking Water Regulations and Laws | 685                               | 506                         | 73.9%                        |
| WTPs Operation Practices                              | 620                               | 285                         | 45.9%                        |
| Preparatory Courses for Operator License Exam         | 620                               | 410                         | 66.1%                        |
| Drainages SOPs  | 133                               | 133                         | 100.0%                       |
| Wells Disinfection SOPs                               | 133                               | 133                         | 100.0%                       |
| Continue Monitoring Program                           | 702                               | 507                         | 72.2%                        |
| SOPs  | 779                               | 779                         | 100.0%                       |
| Optimization  | 620                               | 126                         | 20.3%                        |
| Problem Solution Techniques <sup>2</sup>              | 611                               | -                           | -                            |

<sup>(1)</sup> PRASA decided to include in this training additional employees that are not necessarily related to the Compliance Department.

<sup>(2)</sup> This training topic was included as part of the other training topics listed.

### 5.3.6 USEPA STS Consent Decree

PRASA negotiated with USEPA a new consent decree to address non-compliance with NPDES discharges of STSs in WTPs. This new consent decree, in turn, closes PRASA II and PRASA III Consent Decrees, consolidating all STS compliance projects and simplifying both PRASA’s management and regulatory agency monitoring. This consent decree was approved in April 2010 and applies to all PRASAs WTPs and three unfiltered plants located at Naguabo, Lares and Las Marías.

PRASA must comply with the following requirements, in accordance with the STS Consent Decree:

- Remedial Measures at Water Treatment Plants – PRASA shall implement remedial measures to address washwater discharges at WTPs owned and operated by PRASA. These remedial measures will be completed in three phases, consisting in short-term remedial measures, mid-term remedial measures and long-term capital improvements
- Interim Effluent Limits – PRASA shall comply with the respective interim limitations set forth for each WTP included in Appendix F and G of the Consent Decree. For each pollutant for which an interim limit is established in Appendix F, PRASA shall monitor for compliance with the same measurement frequency and sample type as specified for that pollutant in the respective NPDES permit for each WTP and shall submit the results of each sample in the monthly Discharge Monitoring Report (DMRs) submitted for each WTP. For those plants without NPDES permit, listed in Appendix G, PRASA shall monitor the effluent as established in the Decree and submit the reports to USEPA in the Triannual Progress Reports.

- IPMP for WTPs – All WTP STSs under this consent decree shall be operated and maintained in accordance with the USEPA-approved IPMP.
- Sludge Treatment Capacity – The capacity of the existing STS shall be evaluated to determine: (1) whether the existing STS has the capacity to adequately treat the WTP washwater discharges to comply with the effluent limitations contained in the WTP’s NPDES permit; and (2) to identify the actions PRASA must undertake to ensure that washwaters, are adequately treated including, but not limited to, the construction of additional facilities to adequately treat the sludge and achieve compliance with the respective NPDES permit.
- Training and Additional Requirements for Sludge Treatment Operators – By signing the consent decree PRASA certifies that it has trained its existing STS operators in the monitoring, recording and reporting requirements of the individual NPDES permits as applicable to the WTPs.
- Alternate Power Units (APUs) for the STSs – PRASA shall provide for APUs for all its STS, except when PRASA informs to USEPA that such APU is not necessary because the respective WTP is not intended to be operational when normal power sources are interrupted, and it is determined by USEPA that it is not necessary.
- Additional Requirements Regarding Installation and Operation of Flow Meter Devices and High Level Indicators – PRASA shall install flow meter devices and high level indicators according to requirements and schedule set forth in the consent decree.
- SOPs for Filter Backwashing and the Washing of Process Treatment Units – PRASA shall have SOPs in place for the filter backwashing of process treatment units at all its WTPs.
- Establishment of a Process Control System – PRASA shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by PRASA to achieve compliance with the conditions of the NPDES permit.
- Monitoring, Records and Reporting Requirements – PRASA shall monitor and sample the washwater discharges from each STS. Such monitoring and sampling shall be completed for all of the effluent limitations established in the respective NPDES permit and for any interim limitations established herein, at the monitoring frequency and sample type specified in the NPDES permit or in the consent decree.
- Standardized Records – PRASA shall standardize all record keeping and reporting procedures for STSs at its WTPs.
- Solids Handling – Once an STS is constructed and operational, all sludge generated due to the STS operation shall be:



- a. Disposed of in compliance with the applicable requirements established in 40 CFR Part 257.
  - b. Transported adequately in such a way that the sludge is not discharged to any water body or soil.
- Remedial Actions for Unfiltered Plants – PRASA shall construct and operate the Maizales WTP for the Cubuy Public Water System (PWS). The construction shall be completed no later than March 1, 2010. Operation of the Maizales WTP and distribution to the Cubuy PWS shall commence no later than March 25, 2010.
  - Interim Measures for Unfiltered Plants – Until PRASA ceases to provide unfiltered water from the Cubuy PWS, PRASA shall comply with the interim measures set forth in the consent decree.
  - New Plants – Any new PRASA WTP that begins operation after the date of lodging of the consent decree shall include an STS with sufficient capacity to manage washwater discharges and respective APUs.
  - Civil Penalty – PRASA shall pay \$1,024,427.00 as a civil penalty within thirty (30) days of enactment of the STS Consent Decree.
  - Stipulated Penalties – PRASA shall be liable to pay to the U.S., automatically and without notice or demand (except where indicated otherwise), stipulated penalties in the amounts set forth in the STS Consent Decree for specific violations.

## 5.4 Future Regulations

The CIP was reviewed for adequacy to comply with future regulations that could impact compliance limits for PRASA's water and wastewater facilities. Although plant-specific changes to effluent permit limits may change from time to time, due to site-specific issues, there are no identified future regulations anticipated to require additional capital improvements to the WWTPs beyond those future effluent limits identified in the consent decrees. Anticipated future regulations for PWSs at the time of this report writing include:

- Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2 ESWTR).
- Groundwater Rule (GWR).
- Future contaminants of concern based on current scientific knowledge.

Likely concerns for PRASA pertaining to each regulation are discussed in the following subsections.

A final determination of the CIP adequacy for addressing compliance problems at PWSs cannot be made at this time based on the available compliance information at the time of the preparation of this report. However, there are 346 projects programmed over the next ten years that will address compliance issues for water and wastewater systems, of which 135 will address water system compliance issues, including WTPs. Of these, 116 are programmed for implementation by FY2015. It is expected that PRASA, along with its PMCs and other external consultants, will address any future, impending regulations when defining project scopes.

PWSs that are complying with current regulations may or may not be able to comply with future regulations. In general, PWSs will require both continual preventive and corrective maintenance of existing treatment facilities in order to comply with all regulations, both current and future. In all likelihood, the current programming and expected investments will be impacted by the effects of future regulations.

#### **5.4.1 Stage 2 Disinfection and Disinfection Byproducts Rule**

In January 2006, USEPA published the final Stage 2 DBP Rule. Stage 2 DBPR is one part of the Stage 2 Microbial and Disinfection Byproducts Rules (M-DBP). The Stage 2 M-DBP Rules are interrelated regulations that address risk from microbial pathogens and DBPs. The LT2 ESWTR, described later in this section, addresses microbial issues. Stage 2 M-DBP Rules are the final phases in the M-DBP rulemaking strategy affirmed by Congress as part of the 1996 Amendments to the SDWA.

The goal of the rule is to reduce cancer and reproductive and developmental health risks from DBPs in drinking water. The rule strengthens public health protection by strengthening total trihalomethane (TTHM) and haloacetic acid (HAA) compliance monitoring. The rule applies to all community water systems (CWSs) and non-transient water systems.

The largest difference between Stage 2 and the Stage 1 DBPR is that Stage 2 DBPR compliance will be determined by locational running annual averages (LRAA) for each sample point in the distribution system, rather than a running annual average (RAA) of all sample points for the whole system. To determine compliance, new distribution system monitoring points must be determined through approved sampling programs, or waivers. Sampling for Stage 2 begins on April 1, 2012 for large systems (>100,000 customers) through October 1, 2014 for very small systems (<10,000 customers).

##### **5.4.1.1 Likely Effects of Stage 2 DBPR on PRASA**

Compliance data from records provided by PRASA for 2006 show that 34.1% of PWSs have DBPs greater than the 64 parts per billion (ppb) for TTHMs or 48 ppb for HAAs. While the maximum contaminant levels (MCLs) for TTHMs and HAAs are 80 ppb and 60 ppb respectively, 64 ppb and 48 ppb were used because they represent 80% of the MCL. As a general rule of thumb, if a PWS is within 80% of the MCL for DBPs, it is in danger of violating Stage 1 DBPR and should be considered as a likely violator of Stage 2 DBPR. This data suggests that 34% of the

PWSs are likely to be affected by Stage 2 DBPR. The following are the likely effects of the Stage 2 DBPR on some PRASA drinking water systems:

- Changes in the management of the distribution system to minimize residence times hence reduce the formation of DBPs.
- Movement of the point(s) of chlorine addition without compromising overall disinfection efficacy (additional disinfectants may be needed)
- Optimizing organics removal through the treatment process – through additional treatment or enhanced coagulation/softening measures
- Use of alternative disinfectants

It is important to note that these measures have varying degrees of costs. Some measures are not capital intensive, and the costs are mainly associated with administrative and operational changes, while others, such as new solids removal systems for sedimentation basins or expanded solids treatment systems for greater quantities of coagulants (to reduce organics), will require capital expenditures.

#### **5.4.2 Long Term 2 Enhanced Surface Water Treatment Rule**

The LT2 ESWTR was published in January 2006. The purpose of this rule is to improve public health protection through the control of microbial contaminants by focusing on systems with higher *Cryptosporidium* risk. In general, the rule requires all PWSs that use surface water or ground water under the direct influence of surface water to monitor their source water, calculate an average *Cryptosporidium* concentration, and use that data to determine if and the extent their source is vulnerable to *Cryptosporidium* contamination. Based on the results of the monitoring, the Rule may require systems to install additional treatment to specifically address *Cryptosporidium* occurrence.

A major provision of the rule requires that filtered and unfiltered systems conduct source water monitoring for *Cryptosporidium*. Filtered systems achieving 5.5 log (99.9993% removal) of treatment and unfiltered systems achieving at least 3 log (99.9% removal) of treatment for *Cryptosporidium* are not required to conduct source water monitoring. Systems that have previously collected *Cryptosporidium* monitoring data may be able to grandfather their historical data if they meet certain requirements.

Based on the results of the monitoring data, systems will be classified into one of four bins that will determine how much additional treatment will be required to provide the desired level of microbial protection. Depending on the bin assignment, systems will require either no additional treatment or up to 3 log (99.9% removal) additional *Cryptosporidium* removal. Treatment options will be selected from the “microbial toolbox” – a list of approved alternatives that provide assigned levels of *Cryptosporidium* inactivation credit.

Uncovered finished water reservoirs either must be covered or have their discharges treated to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia*, and 2-log for *Cryptosporidium*.

Compliance schedules are based on population served. Systems must comply with additional treatment requirements as follows:

- >100,000 customers by March 31, 2012.
- > 50,000 to 99,999 customers by September 30, 2012.
- > 10,000 to 49,999 customers by September 30, 2013.
- < 10,000 customers by September 30, 2014.

#### **5.4.2.1 Likely Effects of LT2 ESWTR on PRASA**

Efforts to prepare this report revealed that 15% of WTPs (a total of 19 out of 127) have experienced turbidity violations from January to December 2009. In comparison to the 2009 CER, a decrease in this percent from 24% to 15% was observed. Plants struggling to meet turbidity compliance will certainly continue to struggle under the more stringent LT2 requirements for *Cryptosporidium*. If any of the struggling plants have significant occurrences of *Cryptosporidium* (which must be determined by required monitoring), they will most likely require additional removal of pathogens and more stringent treatment. In all likelihood, plants struggling with turbidity removal will require capital projects to continue to meet more stringent regulations. Some PRASA projects that are currently under development or are being implemented include provisions to comply with this future regulation, including projects at Hatillo-Camuy, Sanamuerto and Enrique Ortega WTPs. Moreover, PRASA has established policy for new WTPs to be designed for an effluent turbidity level of 0.1 NTU although the current regulatory limit is 0.3 NTU.

Once the results of source water monitoring have been tabulated for each WTP, and Bin Classifications (level of additional treatment required) made, this can be used to determine the appropriate compliance strategy for each WTP. Plants will complete this source monitoring between 2009 and 2012.

#### **5.4.3 Ground Water Rule**

The purpose of the GWR, published November 8, 2006, is to provide increased protection against microbial pathogens in PWSs that use ground water sources. All PWSs that serve ground water, including those that blend with surface water, must comply with the rule. The GWR includes the following requirements:

- Sanitary surveys are required for all ground water systems. The initial sanitary survey for each Community Water System (CWS) must be conducted by December 31, 2012 and for

non-community water systems by December 31, 2014. Surveys must be repeated depending on system size and treatment capabilities.

- Triggered Source Water Monitoring is required for systems that have total coliform-positive samples in the distribution system and do not treat to at least 4-log inactivation/removal of viruses prior to the first customer.

PRDOH can make exceptions to triggered source water monitoring if it determines the routine Total Coliform Rule sample contamination was caused by a deficiency in the distribution system.

- Source Water Assessment Monitoring may be required by PRDOH. Samples positive for fecal indicators will require public notification.
- Hydrogeologic Assessments may be conducted by PRDOH to determine if sources are sensitive to contamination. Systems are required to provide any existing information that may facilitate PRDOH's assessment.
- Corrective Action is required if a system has a significant deficiency, as identified by PRDOH, or detects a fecal indicator in source water samples.

Water systems must report the completion of the corrective action, failure to meet disinfection or treatment performance, and exceptions to triggered source water monitoring.

#### 5.4.3.1 Likely Effects of the GWR on PRASA

The GWR has two primary requirements: completing sanitary surveys and triggered source water monitoring. Because systems will not be completing their own surveys, PRASA will need to work closely with PRDOH and provide it with all the necessary information to complete the sanitary surveys. The rule also requires source water monitoring. It is important to note that the rule gives PRDOH many enforcement options. Hence, PRASA and PRDOH can work together to determine how to implement the rule.

#### 5.4.4 Future Contaminants of Concern

The Safe Water Drinking Act requires the USEPA to conduct research into the occurrence and health effects of new and emerging contaminants. The following identifies contaminants that may be regulated in the future:

- **Endocrine Disrupting Compounds.** A rapidly increasing number of man-made chemicals, or their breakdown products, are known to be capable of interfering with the human endocrine system. Such chemicals are called endocrine disrupting compounds (EDCs). Implicated chemicals include industrial chemicals such as PCBs, as well as a wide variety of pesticides, including herbicides, fungicides, nematocides, and insecticides. Potential health effects of exposure to EDCs include adverse reproductive outcomes, birth defects, breast cancer, developmental disabilities, endometriosis, thyroid problems and testicular cancer.

- **Pharmaceuticals and Personal Care Products.** Pharmaceuticals and personal care products (PPCPs) refers to a very diverse collection of thousands of chemical substances, including prescription and over-the-counter drugs (e.g., aspirin and antibiotics), fragrances, cosmetics, sun-screen agents, diagnostic agents, nutraceuticals, biopharmaceuticals, and many others. The PPCP residues in treated wastewater effluent (or run off or directly discharged raw sewage) can then enter the environment. PPCPs are considered emerging contaminants because detection of the chemicals in the environment has occurred over the last 10 years.
- **NDMA.** N-nitrosodimethylamine (NDMA) occurrence in drinking water may result from industrial groundwater contamination (rocket fuel), from the chlorination of cationic polymers, from the use of ion exchange resins, and as a chloramination byproduct. NDMA has also been found in wastewater influent from industrial sources (carbamate users, etc.) and is formed during the chlorination of secondary effluent at WWTPs.
- **Chromium (VI).** Chromium (VI) may cause cancer in laboratory animals but the evidence of carcinogenicity via ingestion is not compelling. Total chromium (sum of Cr(III) and Cr(VI)) is regulated by USEPA with an MCL of 0.1 mg/L, but no specific limit has been set for Cr(VI). The National Toxicology Program has been conducting toxicity studies on Cr(VI) and this data will be used for future regulation development.
- **Perchlorate.** Perchlorate is both a naturally occurring and man-made chemical that originates in the environment from the solid salts of ammonium, potassium, or sodium perchlorate. Perchlorate has been used as a rocket fuel propellant and has been found in numerous drinking water sources. Perchlorate has an adverse effect on the thyroid gland and body metabolism and can persist for many decades under typical groundwater and surface water conditions because of its resistance to react with other available constituents.
- **Algal Toxins.** In the last decade, harmful algae and their toxins have continued to threaten public and natural resources health and to impact local economies. From a public health standpoint, four human illnesses are associated with toxic algal blooms and consumption of toxin-contaminated shellfish in the U.S.: paralytic, neurotoxic, amnesic, and diarrhetic shellfish poisoning.

#### 5.4.4.1 Likely Effects of the Future Contaminants on PRASA

Based on available information, no determinations could be made to determine the likely impact on PRASA due to potential regulations from candidate future contaminants. Treatment for emerging contaminants varies greatly depending upon the nature of the contaminant. However, several of the above contaminants require advanced treatment technologies to be used as effective measures for mitigation. Some of the possible technologies available are:

- Carbon – Granular Activated Carbon has been shown to be an effective barrier for naturally occurring organic matter in some cases as well as has adsorptive capacity to remove certain pharmaceuticals and endocrine disruptors.

- NF/RO – In order to remove the most persistent contaminants, high pressure filtration methods are necessary to mitigate contamination. This comes at a high cost to the public utility.
- UV – Ultraviolet radiation is being used throughout the industry to address concerns with DBP formation and cryptosporidium inactivation. Evidence suggests that UV radiation may play a role in helping to address some emerging contaminants as well.
- AOP – Advanced Oxidation Processes can be used with or without UV radiation to aggressively treat total organic carbon (TOC) and initial evidence suggests AOP may be used to treat some contaminants of concern.

## 5.5 Identified CIP Needs

As a result of the condition assessment and CIP review completed by MPPR/Malcolm Pirnie for the 2009 CER, additional capital project needs beyond those already included in the CIP were identified for plant facilities. Also, MPPR/Malcolm Pirnie prepared conceptual cost estimates (total investment) of the potential costs associated with the implementation of these projects. Tables 5-9 provides a summary of the status and actions undertaken by PRASA related to the CIP needs indicated in the 2009 CER. As shown in Table 5-9, facilities with CIP needs related to STS projects have been included in PRASA's STS Consent Decree and will be addressed through the CIP or R&R program. The remaining facilities included in Table 5-9 have a CIP or an R&R project already identified for improvements. No additional CIP needs at plant facilities were identified for this CER.

MPPR/Malcolm Pirnie also identified additional budgetary needs for PRASA's ancillary facilities (i.e. wells, tanks and pump stations) estimated based on the following assumptions:

1. Assumed facilities with unacceptable or poor ratings under the Equipment/Maintenance category require an upgrade.
2. Assumed the same percentage of ancillary facilities used in 2009 CER with unacceptable or poor ratings applies to both inspected and non-inspected assets.
3. Assumed \$10,000 per well facility, \$15,000 per tank facility<sup>16</sup> and \$25,000 per pump station facilities as the budgetary estimates for the complete cost of the required improvements.

Table 5-10 provides an updated estimated number of potential ancillary facilities that could require additional improvements, and a summary of the status and actions undertaken by PRASA related to the recommendations included in the 2009 CER. Number values for locations that could require improvements have been updated to reflect the most recent condition assessment

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<sup>16</sup> Value updated from 2009 CER to better reflect estimated costs of improvements at water storage tank facilities.

inspection results, described in detail in Section 4. These identified additional budgetary needs are not in addition to those recommended in the 2009 CER.

While many of these improvements could be addressed out of the existing R&R budget within the CIP, the comparison of condition ratings between the past two inspections has indicated that the R&R budget in the CIP is adequate only to maintain status quo and not make substantial progress towards the improvements needed for these assets. PRASA should evaluate the historical breakdown of its R&R budget and re-evaluate its budget moving forward to assure proper condition of the assets for reliable operation and to preserve their value.

The implementation period for the improvements listed in Table 5-10 is recommended to be three years; however, considering the negotiated implementation schedules of the consent decrees and agreements with regulatory agencies and given that PRASA is in the process of finalizing its updated Master Plan, it is expected that these recommended needs will be further analyzed by PRASA and ultimately prioritized and scheduled utilizing the methodology prescribed in the Master Plan. Nevertheless, PRASA has expressed that it is committed to further investigating its facility needs and addressing these as part of its CIP and R&R program.

Buried infrastructure was not inspected as part of the preparation of this CER; however PRASA's operational metrics for occurrence and duration of leaks and overflows and its current NRW levels indicate a growing need for increased budgeting for assessment and rehabilitation of its water distribution and wastewater collection systems. The CIP budgets for these systems may be insufficient and should, therefore, be analyzed in detail.



**Table 5-9:  
Additional CIP Needs at Plant Facilities**

| Facility           | Identified Need   | Status / Actions  |
|--------------------|---|---|
| Rocha WTP          | Construction of a sludge treatment system (STS).  | Facility has been included in the STS Consent Decree. Rocha WTP will be eliminated.   |
| Ceiba Sur          | Superpulsator rehabilitation; can be used as pre-settlers.  | PRASA has rehabilitated the superpulsator and has reduced the solids loading to the filters.  |
| Caguas Norte WTP   | Rehabilitation of the STS, new emergency generator unit, rehabilitation of two of the six filter units, one additional pump for the raw water pump station for redundancy, one additional pump for transfer water to the filters. | PRASA began planning efforts for improvements at the Caguas Norte WTP in February of 2010. Construction is projected to commence in January of 2011 and completed by December of 2012. Total project investment is estimated at \$6.5M.   |
| Canóvanas WTP      | Rehabilitation of the STS, filter rehabilitation, roof of drying beds and emergency generator at raw water pump station.  | Facility has been included in the STS Consent Decree. The following improvements are programmed: Install cover (roof) over sludge drying beds; If necessary replace drying beds floor tiles and gates. Will be funded through the R&R program.  |
| Cidra WTP          | Controls and telemetry system. Safety issues for old WTP.   | PRASA has noted these recommendations and will address through Plant Automation Program.  |
| Quebrada Honda WTP | Provide redundancy to the microfiltration system, new emergency generator.  | PRASA has noted these recommendations and will analyze as part of its planning efforts.   |
| Tanamá WTP         | Construction of a STS.  | Project has been included in the STS Consent Decree. Tanamá WTP will be eliminated.   |
| Villalba WTP       | Construction of a STS.  | Project has been included in the STS Consent Decree. A new STS system will be constructed.  |
| Guajataca WTP      | Rehabilitation of a STS.  | Facility has been included in STS Consent. The following improvements are programmed: Construction and/or rehabilitation of sampling point or south chamber, installation and/or reparation of flow meter, installation and/or reparation of flow meter, high level indicators, and/or dechlorinator. |
| Ponce Vieja WTP    | Compliance improvements to meet the TOC removal, CFE turbidity, THM and HAA parameters.   | PRASA has noted these recommendations and will analyze as part of its planning efforts.   |
| Aguas Buenas WWTP  | Package plant rehabilitation.   | PRASA has noted these recommendations and will analyze as part of its planning efforts.   |

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**Table 5-10:  
Additional Budgetary Needs at Ancillary Facilities**

| Facility                 | Identified Need                                    | Estimated Investment Cost (updated) | Status / Actions   |
|--------------------------|--|-------------------------------------|--|
| Wells                    | Various improvements at 38 locations <sup>1</sup>  | \$0.4M                              | PRASA is currently in the process of reviewing all inspection forms for the facilities inspected in 2009 and 2010. PRASA's planning team will, in turn, develop an action plan to address improvement needs at its ancillary facilities through its R&R program. |
| Water Pump Stations      | Various improvements at 153 locations <sup>1</sup> | \$3.8M                              | PRASA is currently in the process of reviewing all inspection forms for the facilities inspected in 2009 and 2010. PRASA's planning team will, in turn, develop an action plan to address improvement needs at its ancillary facilities through its R&R program. |
| Water Storage Tanks      | Various improvements at 793 locations <sup>1</sup> | \$11.9M                             | PRASA is currently in the process of reviewing all inspection forms for the facilities inspected in 2009 and 2010. PRASA's planning team will, in turn, develop an action plan to address improvement needs at its ancillary facilities through its R&R program. |
| Wastewater Pump Stations | Various improvements at 98 locations <sup>1</sup>  | \$2.5M                              | PRASA is currently in the process of reviewing all inspection forms for the facilities inspected in 2009 and 2010. PRASA's planning team will, in turn, develop an action plan to address improvement needs at its ancillary facilities through its R&R program. |
| <b>Total</b>             |  | <b>\$18.6M<sup>2</sup></b>          |  |

(1) Estimated number of locations that could require additional improvements has varied from those recommended in 2009 CER based on the inspection results presented in this CER and in accordance with the assumptions described in this section.

(2) Value increased as a result in the increase of PRASA's total assets, described in Section 3.

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## 5.6 Master Plan Updating

In 2003, while PRASA was still operated and managed by a private contractor, PRASA developed a water and wastewater Master Plan for the period of 2002–2027. At the time, it was recommended that PRASA’s Master Plan be revised and updated every five years. As most of the construction related to the first phase of PRASA’s extensive CIP was completed during FY2010 and with its Master Plan update analysis overdue, PRASA is looking to continue with the related planning activities in order to address its current and future infrastructure needs. In February 2009, MPPR/Malcolm Pirnie was contracted to aid PRASA in the preparation of an updated Water and Wastewater Infrastructure Master Plan for the period of 2010–2030. The 2010–2030 Master Plan will allow PRASA to review in detail and update the existing CIP, and it will provide a clear roadmap for the implementation of its future investments in water and wastewater infrastructure over the next 20 years.

The main objective of the 2010–2030 Master Plan is to execute a comprehensive analysis of PRASA’s major infrastructure needs and develop a list of projects and actions that addresses such needs in the form of an updated CIP that optimizes the use of PRASA’s resources and ensures financial feasibility. The major needs being addressed in the 2010–2030 Master Plan include:

- **Environmental Compliance and Protection:** to protect the sustainability of the water supply and disposal resources and comply with the environmental requirements and commitments (USEPA, PRDOH, etc.) to ascertain this protection.
- **Reliability of Service:** to provide plans to improve water and wastewater services to existing areas with inadequate service, and explore alternatives to extend PRASA’s service network (i.e., conversion of non-PRASA water systems).
- **Service Area Expansion:** to ensure that all necessary infrastructures to address forecasted future growth for all client types (residential, commercial, industrial and governmental) is planned for the relevant service areas.
- **Economic Sustainability:** to provide an updated CIP spending plan and schedule that will allow the implementation of the recommended list of projects and actions for a horizon of twenty years (until year 2030).
- **Non-Revenue Water:** to integrate the insights and recommendations of the NRWRP with the Master Plan analysis and its resulting list of projects.

The Master Plan development was divided into seven tasks that are described as follows:

- **Task 1 – Master Plan Work Plan Development:** Development of the work plan that will serve as a detailed guide to follow during the execution of the Master Plan. The work plan will determine specific details such as: sources of information, guidelines, standards, design

criteria, analysis and procedures, and a detailed schedule of activities. This task was completed and delivered to PRASA in July 2009.

- **Task 2 – Service Area Assessment:** The objective of this task is to define all water and wastewater client service areas, as well as assessing the existing condition of the PRASA water and wastewater systems. This task was completed and delivered to PRASA in September 2009.
- **Task 3 – Identification of Service Area Infrastructure Needs:** The objective of this task is to identify current and future needs for each service area. This task was completed and delivered to PRASA in February 2010. Assuming that no water loss control measures are implemented, it was estimated that by year 2030, if the CIP is not implemented properly and/or new infrastructure projects are not developed to supply the water demand, PRASA could have an island-wide water production deficit at average and maximum daily demand of approximately 88 MGD and 286 MGD, respectively. However, if water loss control measures are implemented, PRASA could have an island-wide water production surplus of 5 MGD at average daily demand and a deficit of 160 MGD at maximum daily demand.
- **Task 4 – Service Area Project Development:** During this task feasible solutions to the needs identified in Task 3 were evaluated. Based on the proposed solutions, projects will be developed under a subsequent task. This task was completed and delivered to PRASA in July 2010. It was estimated that PRASA will need a capital investment of approximately \$3.9B over the next 20 years, to supply the water deficit at maximum daily demand by year 2030 assuming water loss control measures are implemented.
- **Task 5 – CIP Development:** The objective of this task is to facilitate and provide PRASA with a comprehensive list of capital improvement projects to be implemented over the next 20 years. This task is currently under development.
- **Task 6 – Master Plan Report Preparation:** This task will document the findings, conclusions, and recommendations of the previous tasks. It is scheduled to begin once Task 5 is completed.
- **Task 7 – CIP Planner and Modeling Application:** MPPR/MPI will develop a custom CIP modeling application that will allow PRASA to work with different scenarios for its proposed CIP in the future. It is scheduled to begin once Task 5 is completed.

The 2010–2030 Master Plan will be completed during FY2011.

## 5.7 Conclusions

With the possible exception of buried infrastructure improvements as noted above, PRASA’s CIP addresses the general needs of the System and complies with PRASA’s commitments with

regulatory agencies. The CIP includes projects that cover a broad array of current and future needs, as identified by PRASA and as required by consent decrees. The CIP includes funding for R&R projects and the IPMP, both essential to maintaining and preserving the utility assets. Additional capital project needs beyond those already included in the CIP are listed in Table 5-8. The operational metrics of leaks and overflows and the current NRW levels indicates that the budget for buried infrastructure may be insufficient. Therefore, PRASA should analyze its budget in detail to determine additional buried infrastructure budgetary needs.

PRASA's classification and prioritization process allows for an organized and systematic management of the CIP. Projects are not only classified by category, group and type, but are also ranked according to a prioritization score which allows PRASA to easily identify priority projects as the CIP evolves. By categorizing and prioritizing the projects in the CIP, PRASA is able to keep track of mandatory-driven projects versus the non-mandatory, and make adjustments as projects move from planning through start-up. Periodic revisions to PRASA's Master Plan also give PRASA the opportunity to validate the CIP and guide future changes to the CIP to meet PRASA's needs. Based on the CIP evaluation, PRASA has an adequate CIP implementation program.

PRASA will need to perform additional assessments and implement operational changes or additional capital improvements to bring non-compliant facilities, which include WTPs, WWTPs, STSs, amongst others, into compliance. Review of PRASA's CIP showed that all of the WTPs and WWTPs that were considered unacceptable in terms of compliance currently have CIP projects identified to either rehabilitate or close the facility, thus addressing existing compliance problems. Furthermore, PRASA's FY2010 record of compliance with the 2006 Consent Decree and PRDOH Agreement requirements and the noticeable transformation in communications with regulatory agencies (i.e. USEPA and PRDOH) further supports PRASA's ongoing commitment to bring its System into compliance. PRASA recently entered into a new STS Consent Decree with USEPA to address STS compliance issues in WTPs.

The full impact of future regulations on the water treatment and supply system are not known at this time. In some cases, future regulations are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes. In general, the existing CIP does not include projects intended solely to address future regulations. However, PRASA is implementing some improvement projects with consideration for compliance with LT2 ESWTR. To further assist with compliance of future regulations, PRASA has established a policy for new WTPs to be designed for an effluent turbidity level of 0.1 NTU although the current regulatory limit is 0.3 NTU. Presently, regulatory agencies, PRASA's PMCs, and other consultants actively participate in the project planning and design phases, providing support to PRASA in the project development process, overseeing compliance with consent decrees, and searching for innovative solutions to comply with current, and when applicable, future regulations. As the impact of future regulations becomes more defined, could be possible

to assign specific budgets to those needs and perform CIP modifications to adequately accommodate the resulting needs.

PRASA expects to have an updated 20-year Water and Wastewater Infrastructure Master Plan by the end of FY2011. The 2010–2030 Master Plan will allow PRASA to review in detail and update the existing CIP, and it will provide a clear roadmap for the implementation of its future investments in water and wastewater infrastructure over the next 20 years. CIP needs identified through the CER effort will be addressed and incorporated in PRASA’s 2010–2030 Master Plan.

# 6 Insurance Program

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## 6.1 Introduction

Section 7.08 of the MAT establishes that “[PRASA] shall employ an Insurance Consultant to review the insurance program of the Authority from time to time (but not less frequently than biennially). If the insurance Consultant makes recommendations for the increase of any coverage PRASA shall increase or cause to be increased such coverage in accordance with such recommendations, subject to a good faith determination of PRASA that such recommendations in whole or in part are in its best interest.”

MPPR/Malcolm Pirnie issued an RFP for insurance consulting services to address said requirement and AON Risk Services of Puerto Rico, Inc. (AON) was selected to review PRASA’s current insurance coverage and determine its adequacy considering the type and value of PRASA’s fixed assets. AON also provided a professional opinion on the appropriateness of such coverage and recommendations related to PRASA’s insurance coverage, as detailed in the following sections. AON has submitted to MPPR/Malcolm Pirnie an update to its 2009 report which summarizes its findings, opinion and recommendations of PRASA’s insurance program as of June 30, 2010. In turn, MPPR/Malcolm Pirnie has submitted this report to PRASA. The data, opinions, and comments included in this section have been extracted from AON’s 2010 report. All references to specific insurance policies not defined in detail in this section shall take the meaning included in PRASA’s insurance policies and detailed in AON’s report.

## 6.2 Risk Management

Risk is exposure to loss. It is the chance of something happening that will lead to a loss or an undesirable outcome and it is measured in terms of consequences and likelihood. Risk management is an effective process that is directed towards management of risks and hazards in order to produce a desired set of results.

The treatment of risk takes the following forms:

- Loss Control:
  - Elimination or reduction of risk by physical, technical or mechanical means, loss prevention techniques, loss prevention engineering.
- Contractual transfer:
  - Hold harmless agreements, indemnity agreements in contracts with suppliers, contractors, service providers, customer agreements.
- Transfer of risk through insurance:
  - Self-insurance.

- Insurance policies and coverage available from insurance companies.
- Insurance products/programs available from government (FEMA) and State (Commonwealth of Puerto Rico) (Workers' Compensation, Health/Medical).

### **6.2.1 PRASA Insurance Department**

The risk management function is an integral part of the management function. Within PRASA, risk identification and treatment is performed by all departments at all levels in conformity with local and federal regulations (including OSHA regulations). Risk management is applied through the employment of independent engineering and consulting firms in planning, design and construction and in the implementation of excellence in practices and processes. Furthermore, new construction is carried out in accordance with applicable building codes and regulations. In FY2010 PRASA's full time Insurance and Risk Manager retired. The Executive Director of Finance currently oversees PRASA's Insurance Department.

### **6.2.2 Identification of Risk**

The risks affecting PRASA can be broadly categorized as follows:

1. Risks to property, facilities, and physical assets from natural and human element causes.
2. Financial risks arising from damage to, or loss of, physical assets, such as loss of income, interruption of operations and an increase in operating expenses to continue operations.
3. Theft of owned and non-owned property- theft of water production.
4. Liability risks, including suits from third parties for injury or loss of property, fines/penalties, injuries caused by vehicles or properties, advertising injury, liable slander, false arrest/detainment and injuries occurring on premises.
5. Pollution liability claims and fines.
6. Public authority/errors and omissions liability, which is liability arising from financial loss incurred by other that does not result in physical injury to persons or property.
7. Reputation Risk which includes incidents, events or human actions which seriously damage the image and reputation of the organization.
8. Epidemic or pandemic that causes wide-spread injury or sickness to PRASA employees.
9. Kidnap, ransom, extortion risks.

## **6.3 Assessment of Insurance Program**

This section of the report provides AON's summary and recommendations with respect to PRASA's insurance policies currently in force.



### 6.3.1 Property Insurance

PRASA's property is insured by a policy issued by Chartis Insurance Company (Chartis). Two other insurance companies and the "London Market" are shown on the Chartis policy as "subscribers." This means they have agreed to bear a portion of each loss.

Coverage is written on an "all risks" basis. The policy insures real and business personal property, impounded water, dams, and underground piping. Coverage is included for the Superaqueduct. Except for flood and earthquake, the property policy provides a \$150M limit in excess of a \$25M retention and in excess of other specific policy deductibles. A \$100M business income sublimit and a \$50M extra expense sublimit are included in the \$150M limit. The combined flood and earthquake limit is \$300M per occurrence, with no aggregate limit.

Contingent business income coverage is also included, subject to a sublimit of \$35M. This provides coverage for the additional cost PRASA might incur should it be necessary to purchase chemicals and other supplies from alternative sources should a primary supplier or a major PRASA customer suffer property damage of the type covered by PRASA's policy.

Flood and earthquake deductibles are the sum of the \$25M retention and a \$3M flood deductible and a 5% earthquake deductible. The earthquake deductible is subject to a \$7.5M maximum plus the \$25M retention. The \$25M retention does not apply to boiler and machinery or electronic data processing losses.

#### 6.3.1.1 Recommendations

The following recommendations were made by AON regarding PRASA's property insurance policy:

1. **Review the property limit and complete a Probable Maximum Loss (PML) Study.** There are two facilities which, based on the 2006 End Book Value computations provided by MPPR/Malcolm Pirnie, have a replacement cost of over \$200M each. These are the Toa Vaca Dam (\$203.6M) and the Puerto Nuevo WWTP (\$206.8M).

The property values for the Toa Vaca Dam and the Puerto Nuevo WWTP plant listed above are not current and may or may not reflect the maximum potential loss that could arise from a single event, such as a flood or earthquake.

PRASA indicates to have reported property values to insurers of \$10.9B for the current policy period. To identify PRASA's potential exposure, a PML study was recommended in AON's 2008 report. PRASA has indicated that a PML study was concluded on June 2010.

2. **Consider revising the flood definition.** The flood definition says "Flood is defined as a rising and overflowing of a body of water onto normally dry land." This definition could be interpreted to limit flood coverage for a WWTP facility where the treatment ponds are not normally dry land. In the event of a large flood loss to such a facility, an insurer could argue

the damage was not caused by a flood as defined in the policy. To avoid potential claim disputes, AON recommends eliminating the phrase “normally dry” and revising the flood definition to apply to the rush of water flowing over and/or onto land.

3. **Consider terrorism coverage on renewal.** Endorsement 6 excludes war and terrorism loss. Dams represent a potential terrorism target, especially if there is a potential for severe property damage or injury below a dam that would generate media attention. PRASA should consider obtaining terrorism coverage on renewal.

### 6.3.2 Crime

PRASA maintains a crime policy providing the coverage and limits shown in Table 6-1. Coverage is provided by Chartis.

**Table 6-1:  
Crime Policy Coverages and Limits**

| Coverage                                | Limit       | Deductible     |
|---|-------------|----------------|
| Employee Dishonesty                     | \$1 million | \$10,000       |
| Loss Inside Premises                    | \$500,000   | \$10,000       |
| Loss Outside Premises                   | \$500,000   | \$10,000       |
| Counterfeit currency and Money Orders   | \$500,000   | \$10,000       |
| Depositors Forgery                      | \$500,000   | \$10,000       |
| Computer Fraud and Funds Transfer Fraud | \$500,000   | \$10,000       |
| Incoming Check Forgery                  | \$500,000   | \$10,000       |
| ERISA Extension                         | \$500,000   | \$0            |
| Policy Aggregate                        | \$1 million | Not Applicable |
| Extortion Threats to Persons            | \$100,000   | \$10,000       |

#### 6.3.2.1 Recommendations

The following recommendation was made by AON regarding PRASA’s crime policy:

1. **Consider eliminating the exclusion for the Treasurer.** Exclusion D, d in the Public Employee Dishonesty Coverage form excludes loss caused by a treasurer. AON recommends that PRASA ask Chartis to remove this exclusion. Many insurers will remove this exclusion at no or little cost.

### 6.3.3 General Liability

PRASA maintains commercial general liability coverage through Triple S Propiedad, Inc. (Triple S) with the limits shown in Table 6-2. Aggregate limits have been amended to apply per location or per project. A \$100,000 deductible applies to each occurrence.

**Table 6-2:  
General Liability Coverages and Limits**

| Coverage                              | Limit       |
|---------------------------------------|-------------|
| General Liability – Per Occurrence    | \$1 million |
| General Liability – General Aggregate | \$2 million |
| Personal and Advertising Injury       | \$1 million |
| Products/ Completed Operations        | \$2 million |
| Employer’s Stop-Gap                   | \$1 million |
| Employee Benefit Liability            | \$1 million |

**6.3.3.1 Recommendations**

The following recommendation was made by AON regarding PRASA’s general liability policy:

1. **Obtain watercraft liability insurance.** PRASA has indicated that it owns a few boats, which are used from time to time in its operations. PRASA’s general liability policy excludes liability arising from the use of owned watercraft. To cover this exposure, AON recommends that PRASA purchase watercraft liability or protection and indemnity insurance.

PRASA’s umbrella policy also excludes owned watercraft over 26 feet in length. Thus, it will cover liability claims arising out of boats 26 feet and under, but coverage is subject to a \$1M self-insured retention.

**6.3.4 Automobile Liability**

PRASA maintains automobile liability coverage through Triple S for:

- Any automobile with a \$1M per accident limit.
- Garage liability coverage for any automobile with a \$1M per accident limit and a \$3M aggregate limit for garage operations.

A \$2 million limit covers physical damage to owned automobiles for any one event caused by fire, lightning, windstorm, earthquake, hail or flood, subject to a \$50,000 deductible.

Subject to deductibles of \$250 for comprehensive coverage and \$500 for collision, garage keeper’s legal liability is provided at a \$1M limit per location for non-owned automobiles in the insured’s care. Trailer interchange coverage is also provided for non-owned trailers, subject to limits of \$35,000 for tank and refrigerated trailers, \$20,000 for non-refrigerated and van units, and \$15,000 for other trailers.

**6.3.5 Umbrella and Excess Liability**

PRASA maintains a primary umbrella policy which provides a \$20M limit excess of the primary general, automobile and employer’s liability policies. The umbrella is otherwise subject to a \$1M

self-insured retention (SIR) for bodily injury, property damage and personal and advertising injury losses not covered by the primary insurance. Coverage is provided through Triple S.

PRASA also maintains an excess liability policy providing a \$40M limit in excess of the \$20M umbrella limit described in the preceding paragraph. Coverage is also provided through Triple S.

**6.3.5.1 Recommendations**

The following recommendation was made by AON regarding PRASA’s umbrella and excess liability policy:

1. **Complete review of the downstream liability exposure for PRASA’s dams.** The failure of a PRASA dam could potentially cause a very large liability loss, especially if there are residential communities located below a dam. The question of PRASA’s exposure to liability from destruction of a dam was raised during the interviews. PRASA indicated that it is in the process of assessing this exposure.

**6.3.6 Directors and Officers Liability**

PRASA maintains one primary and two excess layers of directors & officers (D&O) liability insurance. The D&O carriers and limits are shown in Table 6-3.

**Table 6-3:  
Directors and Officers Liability**

| Insurer   | Limit                               |
|---|-------------------------------------|
| XL Specialty Ins. Co. (Primary)                               | \$10 million                        |
| ACE Ins. Co. (First Layer)                                    | \$10 million excess of \$10 million |
| American International Ins. Co. of Puerto Rico (Second Layer) | \$10 million excess of \$20 million |
| Total D&O Limit   | \$30 million                        |

The primary layer of D&O insurance is subject to a \$100,000 retention for claims against indemnified persons or a claim against PRASA alleging a breach of duty involving securities issued by PRASA.

**6.3.7 Employment Practices Liability**

PRASA maintains primary and excess employment practices liability (EPL) policies providing total limits of \$10M in the aggregate annually for employee claims alleging wrongful termination, discrimination, sexual harassment, retaliation or other violation of an employee’s civil rights. A \$100,000 retention applies to each claim. Primary coverage is provided through ACE Insurance Company (ACE). Excess EPL coverage is through Liberty Mutual Insurance Company.

**6.3.8 Professional Liability**

PRASA maintains a primary professional liability policy through ACE and an excess professional liability policy through Universal Insurance Company (Universal). Together these policies

provide a \$25M per claim limit and a \$50M annual aggregate limit, subject to a \$250,000 per claim deductible. Claims and defense costs are both included within the limits and serve to reduce the deductible.

Both policies are written on a claims-made basis covering claims made during the policy period if the occurrence giving rise to the claim occurred after the policy's September 21, 2004 retroactive date. Coverage applies to professional construction management services, contract management and administration, design, engineering, consulting, and inspection and testing services.

### 6.3.8.1 Recommendations

The following recommendations were made by AON regarding PRASA's ACE professional liability policy:

1. **Try to Amend Professional Exclusion Z.** Exclusion Z in Endorsement EO-0002, excludes loss "alleging, based upon, arising out of, or attributable to the Insured's ownership, rental, leasing, operation, maintenance, use or repair of any real or personal property, including property damage to owned, occupied, rented or leased by or to the Insured." This exclusion might be interpreted to exclude injury or damage caused by an error or omission in a repair or renovation designed by PRASA.

If, for example, PRASA prepares engineering designs for repairing a PRASA owned dam and the dam later collapsed due to a design error, this exclusion could be alleged to exclude resulting injury or damage. AON recommends removing the reference to "repair" in the exclusion, and clarifying that the exclusion does not apply to any design work performed by or on behalf of PRASA.

2. **Request deletion of exclusion DD, Mechanical Electrical Failure.** Exclusion DD in Endorsement EO-0002, excludes loss "based on or arising out of any mechanical or electrical failure, breakdown or defect of any hardware." For example, this exclusion can be interpreted to exclude injury and damage resulting from the failure of equipment specified by PRASA in its designs for a pumping station. If the pumping station failure resulted in a back surge of sewage or water, it could injure persons or property. If the failure resulted in a lack of water needed to attack an uncontrolled fire, again the resulting injury or damage could be alleged to arise from a PRASA's design error. PRASA should request the deletion of this exclusion.

### 6.3.9 Pollution Legal Liability

PRASA maintains a pollution legal liability policy through Liberty Mutual Insurance Company (Liberty) providing per occurrence limits and deductibles shown in Table 6-4. The policy applies a \$10M annual aggregate limit to all coverage.

The policy is written on a claims-made basis and covers claims made during the policy term if the occurrence giving rise to the claim occurred after the policy's July 1, 2002 retroactive date. The policy specifically excludes sewage back up events.

**Table 6-4:  
Pollution Legal Liability Limits and Deductibles**

| Coverage   | Per Occurrence Limit | Deductible |
|--|----------------------|------------|
| Pollution Clean Up at or Arising from Scheduled Sites                                      | \$5 million          | \$250,000  |
| Bodily Injury and Property Damage  | \$5 million          | \$250,000  |
| Bodily Injury, Property Damage and Pollution Clean Up from Cargo Transported by Automobile | \$5 million          | \$50,000   |
| Bodily Injury, Property Damage and Clean Up at Specified Non-Owned Disposal Sites          | \$5 million          | \$250,000  |

### 6.3.9.1 Recommendations

The following recommendations were made by AON regarding PRASA's pollution legal liability policy:

1. **Confirm there is no need for pollution clean-up for overseas shipments.** PRASA's pollution liability policy includes coverage for clean-up of pollutants spilled from a covered auto and covers obligations to clean up pollution at scheduled sites in which pollutants are disposed.

The disposal sites scheduled in PRASA's policy include three sites on the U. S. mainland (Cycle Chem, Inc in New Jersey; Ensco Inc in Arizona; and Trans Cycle Industries in Alabama) and one site in Puerto Rico (BFI Industrial Landfill in Ponce). PRASA's pollution liability policy does not cover pollution clean-up at sea. PRASA has advised us it makes no off-island shipments of pollutants. If this situation changes, PRASA should consider obtaining pollution coverage for any ocean transit it might undertake.

2. **Consider adding underground storage tank coverage.** At the time of AON's review and interviews with PRASA personnel, PRASA was unable to confirm if it has underground storage tanks (USTs) used to store pollutants (such as fuel, chemicals or waste) in any of its facilities. PRASA's commercial general liability policy has a Total Pollution Exclusion Endorsement which excludes all pollution liability claims, including the USTs.

The pollution policy excludes loss arising from an "Underground Storage Tank System," which is defined broadly as a tank or tanks operated by the insured at a location designated on the policy which has at least ten percent of its volume beneath the surface of the ground. Technically, this excludes pollution liability coverage for any tank if the tank meets the above definition, no matter what the tank may contain, unless the UST coverage endorsement has

been added to the pollution policy. The UST endorsement is not on the current pollution policy. If PRASA identifies a UST pollution exposure, PRASA should consider adding UST coverage to insure bodily injury, property damage and clean up arising from an underground storage tank leak.

### **6.3.10 Cyber Liability**

PRASA does not currently purchase cyber liability insurance. PRASA has indicated that the website allows for on-line customer payment of water and sewer bills. To the extent customer account information and customer payment information is maintained by PRASA's computer system, such customer information is potentially at risk if an accomplished computer hacker were able to access customer's personal information.

#### **6.3.10.1 Recommendations**

The following recommendation was made by AON regarding PRASA's cyber liability policy:

1. **Consider cyber liability coverage.** PRASA should consider cyber liability coverage to insure liability arising from potential allegations such as PRASA failed to adequately secure customer data and the associated identification theft costs needed to repair customer credit.

### **6.3.11 Heliport Liability**

PRASA owns and maintains a helipad on the roof of its main building. PRASA has indicated that the helipad is rarely or never used. If there is a potential for emergency use of the helipad, or possible future use, AON recommends that PRASA obtain liability coverage for this exposure. Coverage is now excluded from other liability policies.

### **6.3.12 Business Travel and Accident**

PRASA maintains travel and accident insurance on its personnel while traveling on business. Life Insurance Company of North America is the insurer. Coverage is provided at a limit of \$500,000 per incident and \$2M in the aggregate annually.

## **6.4 Owner Controlled Insurance Program**

PRASA maintains an Owner Controlled Insurance Program (OCIP) for its multi-year CIP. In addition to covering PRASA, the OCIP is designed to insure enrolled contractors, subcontractors and design professionals working on the CIP. The OCIP is not open to suppliers, site security firms, vendors, truck and delivery personnel or other parties which are not directly involved in construction.

The OCIP program provides builder's risk, general liability, umbrella and excess liability, and pollution liability insurance. Each of these coverages is discussed below.

### 6.4.1 Builder's Risk

PRASA maintains a builder's risk policy as part of its OCIP program. Chartis is the insurer. Coverage applies to all risks of direct physical loss, except as excluded by the policy. Coverage applies to scheduled projects under \$50M in contract value. The policy provides a \$100M per occurrence and annual aggregate limit, including the perils of flood and earthquake, and subject to various sub limits which are detailed in AON's report.

The All Other Perils deductible is \$20,000. There are additional deductibles for some losses, which range from \$100,000 to \$250,000, with percentage deductibles of 2% for flood and named windstorm, and 5% for earthquake. All percentage deductibles are subject to a minimum deductible of \$100,000.

#### 6.4.1.1 Recommendations

The following recommendations were made by AON regarding PRASA's OCIP builder's risk policy:

1. **Define Existing Surrounding Property.** A deductible of \$250,000 applies with respect to "Existing Surrounding Property". While the term is capitalized, indicating it is a defined term, the policy does not include a definition.
2. **Consider revising the flood definition.** The flood definition describes flood, in part, as "A general and temporary condition of complete inundation of normally dry land areas..." The reference to "normally dry land areas" could be interpreted to exclude damage to holding or treatment ponds or similar property located in a water treatment facility, as those facilities are not a normally dry land areas. PRASA should request that the definition eliminate the word "dry" and simply refer to the inundation of land areas.
3. **Consider amending Endorsement 1 to include coverage for wet works.** AON understands that PRASA's OCIP operations will include some wet work. Endorsement 1, age 20 of the builder's risk policy lists "Wet Works" among the "Excluded Works". To cover wet works associated with the OCIP operations, AON recommends that PRASA ask Chartis to amend the endorsement to cover wet works.
4. **Amend Endorsement number 1 to include coverage for underground works.** Underground works are already listed in the base policy, in the Excluded Property section, item I. This section says the exclusion does not apply to works in laying pipelines and constructing of underground sewer collector systems.
5. **Endorsement 1 (page 20) adds all underground works to the list of "Excluded Works."** PRASA should consider removing "underground works" from this list on page 20 so coverage is provided for laying pipelines and construction of underground sewer collector systems.



6. **Consider amending exclusion R.** Exclusions R, 1 and R, 2 exclude any loss based on the failure of the internet or any software. If security camera systems do use the internet or specialized software to view activity at OCIP sites, PRASA should consider amending this exclusion to cover property loss arising from a system failure.

### 6.4.2 General Liability

The OCIP general liability policy is provided by ACE and includes the limits shown in Table 6-5.

**Table 6-5:  
OCIP General Liability Coverages and Limits**

| Coverage                                   | Limit       |
|--|-------------|
| General Liability – Per Occurrence         | \$2 million |
| General liability – General Aggregate      | \$4 million |
| Personal and Advertising Injury            | \$2 million |
| Products/ Completed Operations - Aggregate | \$4 million |

The OCIP general liability policy is renewable annually each February 1 during the project period stated in the policy. This project period stated in the policy is February 1, 2010 to February 1, 2013. The \$4M products/completed operations aggregate applies for each annual policy period during the three year project period and for each of five years beyond the end of the project period (i.e., through February 1, 2018). The policy includes a deductible endorsement, but does not specify the deductible amount in the endorsement or in the policy declarations.

#### 6.4.2.1 Recommendations

The following recommendation was made by AON regarding PRASA’s OCIP general liability policy:

1. **Delete the deductible endorsement.** A deductible endorsement (Form CG 03 00 01 96) is attached to the policy and says if the deductible schedule in the endorsement is blank, the information in the policy declarations pages shall apply. The deductible endorsement does not show a deductible amount. The declarations pages also do not show any deductible. AON understands that no deductible is to apply to the primary OCIP general liability policy. AON recommends deleting the deductible endorsement to avoid confusion in the event of a substantial claim.

### 6.4.3 Umbrella Liability

The OCIP umbrella liability policy is provided by ACE. Except for employer’s liability, the policy provides a limit of \$25M per occurrence subject to a \$50M annual policy aggregate, in excess of the primary OCIP general liability limits. The umbrella policy includes an employer’s liability limit of \$3M per occurrence \$6M annual aggregate, in excess of the \$2M employer’s liability limit in the underlying general liability policy.

#### 6.4.4 Excess Liability

The excess liability policy is issued by Chartis. It applies in excess of the OCIP umbrella policy. The excess policy limits are \$25M per occurrence, \$50M annual policy aggregate. This provides total umbrella and excess liability limits of \$50M per occurrence, \$100M annual aggregate.

##### 6.4.4.1 Recommendations

The following recommendation was made by AON regarding PRASA's OCIP excess liability policy:

1. **Amend the Contractor's Limitation Endorsement.** The last paragraph of The Contractor's Limitation Endorsement (endorsement no. 212) says, "It is further agreed that this policy does not apply to any liability for personal injury or property damage arising out of: ...2. Any project insured under a "Wrap-Up" or similar rating plan". This limitation appears to exclude the coverage intended by the OCIP insurance program. AON recommends that PRASA ask the insurer to amend the last paragraph of the endorsement to add, "unless such liability is covered by valid and collectable underlying insurance described in the Schedule of Insurance."

#### 6.4.5 Pollution Liability

OCIP pollution liability insurance is provided by Chartis. Coverage applies on a "claims-made" basis. The policy provides a \$25M limit each loss and annual aggregate, and covers PRASA and OCIP contractor participants for pollution arising from contractor operations at scheduled projects. Coverage does not apply to PRASA's activities. Scheduled projects which are started during the policy period are covered for claims made up to four years after the policy expiration date. Defense costs and other claim expense erode the aggregate limit.

#### 6.4.6 Conclusions

In the opinion of AON, the insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. AON has provided several recommendations to PRASA's insurance program. Particularly, PRASA should address the following key recommendations:

1. Review the adequacy of the property insurance limit.
2. Complete a Probable Maximum Loss study to assist in the evaluation of the property insurance limit.
3. Review the downstream liability exposure for PRASA's dams.
4. Consider adding underground storage tank coverage to the pollution liability policy.

The OCIP covering PRASA's exposures to risks of accidental property and liability losses arising from construction activities provides reasonable coverage. AON has provided several

recommendations to PRASA's OCIP. Particularly, PRASA should address the following key recommendations:

1. Revise Endorsement 1 on the builder's risk policy to include coverage for underground property.
2. Remove the Wrap Up exclusion in the Contractor's Limitation Endorsement contained in the excess liability policy.

# 7 System Assets and Financial Analysis

## 7.1 Introduction

In accordance with Section 7.07(e) of the MAT, MPPR/Malcolm Pirnie hereby provides a statement of the estimated cost of all additions made to the Systems and of all the retirements of property made in FY2010. Also, in accordance with Section 7.07(f) of the MAT, MPPR/Malcolm Pirnie evaluated PRASA's financial forecast and assessed the appropriateness of rates and charges.

## 7.2 System Assets

### 7.2.1 Additions and Deletions of System Assets

Table 7-1 shows that, as of June 30, 2010, PRASA reported an estimated total book value of fixed assets of approximately \$5,469M, which represents an increase of \$1,069M (24%) over the FY2009's reported value of fixed assets. Additionally, PRASA reported it had approximately \$1,616M of assets that are currently under construction or as "Work in Process", which represents an increase of approximately \$24M (2%) than reported in FY2009. As such, total fixed assets increased by approximately \$1,092M (18%) over FY2009's reported value. This increase is primarily attributable to a \$933.4M capital assets transfer from the Puerto Rico Infrastructure Financing Authority (PRIFA). Table 7-2 provides a summary of the assets that have been added to and deleted from the System in FY2010.

**Table 7-1:  
Fixed Assets Summary through June 30, 2010  
(in Thousands)**

|                    | Original Cost | Accumulated Depreciation | Book Value |
|--------------------|---------------|--------------------------|------------|
| Fixed Assets       | \$8,111       | (\$2,642)                | \$5,469    |
| Work in Process    | 1,616         | -                        | 1,616      |
| Total Fixed Assets | \$9,727       | (\$2,642)                | \$7,085    |

**Table 7-2:  
Fixed Assets Additions and Deletions FY2010  
(in Thousands)**

|               | Deletions to Work in Process | Equipment Write-Offs | Additions to Work in Process | Additions to Plants in Service |
|---------------|------------------------------|----------------------|------------------------------|--------------------------------|
| <b>FY2010</b> | \$17,461                     | \$937                | \$338,582                    | \$1,226,218                    |

### 7.3 Financial Analysis

PRASA's 2008 MAT with bondholders contains specific Debt Service Coverage (DSC) requirements that must be met. The Rate Covenant requirements which PRASA must meet include the following:

- Net Revenues shall be sufficient in each fiscal year to be at least equal to 120% of the annual debt service with respect to the senior indebtedness for such fiscal year.
- Net Revenues shall be sufficient in each fiscal year to be at least equal to 110% of the annual debt service with respect to the senior indebtedness and the senior subordinate indebtedness for such fiscal year.
- Net Revenues shall be sufficient in each fiscal year to pay:
  - annual debt service on Indebtedness;
  - the amounts, if any, necessary to be deposited in any Senior Debt Service Reserve Account, Senior Subordinate Debt Service Reserve Account or Subordinate Debt Service Reserve Account to restore the respective amounts on deposit therein to the amount of the applicable Debt Service Reserve requirement;
  - the amount, if any, necessary to be deposited in the Operating Reserve Fund to maintain the balance therein at the Operating Reserve Fund requirement;
  - the amount, if any, necessary to be deposited in the Capital Improvement Fund as specified in the annual budget;
  - the amount, if any, necessary to be deposited into the Commonwealth Payments Fund for the Commonwealth Guaranteed Indebtedness and/or Commonwealth Supported Obligations; and
  - the amount, if any, necessary to be deposited into the Rate Stabilization Account of the Surplus Fund in accordance with the annual budget for such fiscal year.

As defined and summarized from the MAT, net revenues is the difference between Revenues (including new installation fee revenues) and Current Expenses. Current Expenses are the reasonable and necessary expenses, calculated on an accrual basis, to maintain, repair and operate the System, excluding non-cash reserves or expenses, e.g., depreciation expense. Indebtedness is defined as Bonds, Other System Indebtedness, Commonwealth Guaranteed Indebtedness (CGI) and Commonwealth Supported Obligations (CSO), collectively.

The DSC requirements of the Rate Covenant vary by the seniority of the debt and are summarized in Table 7-3. Also, should PRASA decide to issue additional debt in any given year of the FY2011 through FY2014 forecast period, Additional Bonds Test (ABT) requirements would also have to be met. The ABT is a measure of whether or not DSC will still be met after the issuance of additional debt. Where two DSC values are shown for the ABT on Table 7-3, the first value is

the minimum for net revenues divided by existing and proposed debt service (at the specific lien level). The second value is the minimum for net revenues divided by existing and proposed debt service (regardless of lien level) plus specified reserve fund deposits.

**Table 7-3:  
Trust Agreement Treatment of Existing and Proposed Debt**

| Lien Level         | Debt Secured                         | DSC for Additional Bonds Test <sup>1</sup> | DSC for Covenant Test <sup>1</sup> | In Default if not Paid? |
|--------------------|--------------------------------------|--|------------------------------------|-------------------------|
| Senior             | 2008 Senior Bonds                    | 1.20 / 1.00                                | 1.20                               | Yes                     |
| Senior Subordinate | Bank Term Loan                       | 1.10 / 1.00                                | 1.10                               | Yes                     |
| Subordinate        | Not applicable currently             | 1.00                                       | 1.00                               | Yes                     |
| Below Subordinate  | Commonwealth Guaranteed Indebtedness | N/A  | 1.00                               | No                      |
| Below Subordinate  | Commonwealth Supported Obligations   | N/A  | 1.00                               | No                      |

<sup>(1)</sup> Two tests apply to future debt. The first test is net revenues divided by existing and proposed debt service (at the existing lien level); the second test is net revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

### 7.3.1 FY2010 Results

Table 7-4 summarizes PRASA’s FY2010 financial results, as compared to the FY2010 financial projection included in the OS. As shown, PRASA’s financial results deviated from OS projections as a result of PRASA’s inability to generate sufficient revenues due to lower than expected growth in customer accounts, a reduction in average water consumption per account, and the fact that no rate adjustment/increase was implemented. Additionally, PRASA experienced a higher rate of uncollectible accounts and higher electric power costs.

Current local economic conditions and unemployment rates continue to negatively impact PRASA’s budget for revenues, growth, and uncollectibles. Also, housing development and general construction in Puerto Rico continued to decline as first reported in the 2009 CER, thus reducing the amount of revenues collected by PRASA for new house and project connections, recorded under its Special Assessments revenue category.

PRASA’s electricity costs were much higher than projected in the OS. Although PRASA incorporated moderate annual increases in the Forecast of electricity costs to account for inflation, these were not sufficient to cover the FY2010 costs. O&M costs of the Superaqueduct Service Contract were slightly higher, as electricity costs are passed through to PRASA by the contract operator. However, it is important to note that PRASA continued to reduce some of its operational costs, achieving reductions in all other expense categories, with significant recorded reductions in the payroll and related expense category.

**Table 7-4:  
FY2010 Financial Results Compared to Official Statement Projections  
(in Thousands)**

|   | FY 2010 OS<br>Projection<br>Base Case | FY2010<br>PRELIMINARY<br>RESULTS | \$<br>VARIANCE    | %<br>VARIANCE |
|---|---------------------------------------|----------------------------------|-------------------|---------------|
| <b>1 REVENUES</b>   |                                       |                                  |                   |               |
| 2 Base Fee and Service Charges  | \$775,000                             | \$740,993                        | (\$34,007)        | -4%           |
| 3 Average Annual Growth/(Decrease)                                    | 23,483                                | -                                | (23,483)          | -100%         |
| 4 Rate Increases  | -                                     | -                                | -                 | -             |
| 5 Rate Adjustments  | 35,576                                | -                                | (35,576)          | -100%         |
| 6 General Fund Special Contribution                                   | -                                     | 27,240                           | 27,240            | 100%          |
| 7 Operational Initiatives (Includes NRWRP & PPP Project)              | 34,875                                | 67,330                           | 32,455            | 93%           |
| 8 Collections Lag and Uncollectibles Reserve                          | (51,875)                              | (100,147)                        | (48,272)          | 93%           |
| 9 Actual Collections Adjustment/Reimbursements Prior Years            | -                                     | 72,543                           | 72,543            | 100%          |
| 10 Subsidy (PAN/TANF)   | (3,993)                               | (3,533)                          | 460               | -12%          |
| 11 Subsidy to Public Housing (Includes recommended subsidy reduction) | -                                     | (7,000)                          | (7,000)           | -100%         |
| 12 Other Income   | 13,000                                | 7,692                            | (5,308)           | -41%          |
| 13 Special Assessments  | 20,000                                | 6,502                            | (13,498)          | -67%          |
| 14 Interest Income  | 6,209                                 | -                                | (6,209)           | -100%         |
| <b>15 Total Operating Revenues, Net</b>                               | <b>\$852,275</b>                      | <b>\$811,620</b>                 | <b>(\$40,655)</b> | <b>-5%</b>    |
| 16  |                                       |                                  |                   |               |
| <b>17 OPERATING EXPENSES</b>  |                                       |                                  |                   |               |
| 18 Payroll and Benefits (Includes staff reductions through attrition) | \$346,138                             | \$299,948                        | (\$46,190)        | -13%          |
| 19 Electricity  | 119,343                               | 140,131                          | 20,788            | 17%           |
| 20 Chemicals  | 30,292                                | 26,264                           | (4,028)           | -13%          |
| 21 Superaqueduct Fee  | 22,354                                | 22,800                           | 446               | 2%            |
| 22 Insurance  | 14,618                                | 9,443                            | (5,175)           | -35%          |
| 23 Other Expenses   | 158,766                               | 152,801                          | (5,965)           | -4%           |
| 24 Operational Initiatives (PPP Project)                              | -                                     | -                                | -                 | -             |
| 25 Capitalized Operating Expenses                                     | (44,948)                              | (42,340)                         | 2,608             | -6%           |
| <b>26 Total Operating Expenses, Net</b>                               | <b>\$646,563</b>                      | <b>\$609,047</b>                 | <b>(\$37,516)</b> | <b>-6%</b>    |
| 27  |                                       |                                  |                   |               |
| <b>28 OTHER FINANCING SOURCES</b>                                     |                                       |                                  |                   |               |
| 29 Surplus Funds & Non-Cash Adjustments                               | -                                     | -                                | -                 | -             |
| 30 Other Sources of Fund (\$150M Facility)                            | -                                     | -                                | -                 | -             |
| 31  |                                       |                                  |                   |               |
| <b>32 TOTAL NET REVENUES AVAILABLE FOR DEBT SERVICE</b>               | <b>\$205,712</b>                      | <b>\$202,573</b>                 | <b>(\$3,139)</b>  | <b>-2%</b>    |
| 33  |                                       |                                  |                   |               |
| <b>34 TOTAL DEBT SERVICE (Includes CSO)</b>                           | <b>\$201,717</b>                      | <b>\$192,307</b>                 | <b>(\$9,410)</b>  | <b>-5%</b>    |
| 35  |                                       |                                  |                   |               |
| <b>36 ENDING BALANCE AFTER DEBT SERVICE</b>                           | <b>\$3,995</b>                        | <b>\$10,266</b>                  | <b>\$6,271</b>    | <b>157%</b>   |

\*Numbers may not add up due to rounding.

### 7.3.1.1 FY2010 Debt Service Coverage

In FY2010, the Government Development Bank of Puerto Rico (GDB) supported PRASA by making a special contribution using Central Government Funds which helped PRASA meet its debt service obligations, as shown in Table 7-5.

**Table 7-5:  
FY2010 Debt Service Coverage Calculation**

| Type of Debt  | Debt Service<br>(\$, Thousands) <sup>1</sup> | Debt Service Coverage |
|---|--|-----------------------|
| <b>Senior Debt</b><br>Coverage Required = 1.20                          | \$68,756                                     | 2.95                  |
| <b>Senior Subordinate Debt</b><br>Coverage Required = 1.10              | 10,751                                       | 2.55                  |
| <b>Subordinate Debt</b><br>Coverage Required = 1.00                     | -  | 2.55                  |
| <b>Commonwealth Guaranteed Indebtedness</b><br>Coverage Required = 1.00 | 85,561                                       | 1.23                  |
| <b>Commonwealth Supported Obligations</b><br>Coverage Required = 1.00   | 27,240                                       | 1.05                  |
| <b>TOTAL DEBT SERVICE<sup>1</sup></b>                                   | <b>\$192,307</b>                             |                       |

<sup>(1)</sup>Numbers may not add up due to rounding.

### 7.3.2 FY2011 – FY2014 Forecast: PRASA’s Base Case

MPPR/Malcolm Pirnie reviewed the revenues provided by PRASA for the FY2011 through FY2014 PRASA’s Base Case forecast period (the Forecast or the forecast period) shown in Exhibit 1. In both the 2008 and 2009 CERs a five-year forecast period projection was included. At the time of preparation of this CER, PRASA was in the process of updating its financial projections past FY2014; hence, only a four-year projection has been reviewed and presented in this CER. Each of the major revenue categories of the Forecast is described in this subsection along with a description of how PRASA’s Base Case was developed. Additionally, MPPR/Malcolm Pirnie has prepared a sensitivity analysis of PRASA’s Forecast (the MPPR/Malcolm Pirnie-prepared Alternate Case forecast.) The objective of the sensitivity analysis is to demonstrate the impact that more conservative assumptions will have on PRASA’s projections.

The Forecast presents PRASA’s estimate of the expected results of operations and DSC for the forecast period. Thus, the Forecast reflects PRASA’s judgment, based upon present circumstances, as to the most likely set of conditions and course of action. However, there will usually be differences between forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. MPPR/Malcolm Pirnie has no responsibility for updating this CER for changes that occur beyond June 30, 2010.

#### 7.3.2.1 Revenues

As defined in the MAT:

*“Revenues” shall mean all moneys received by or on behalf of the Authority (PRASA), including (i) the moneys derived by or on behalf of the Authority from the sale of water produced, treated or distributed by, or the collection, transmission, treatment or disposal of sewage by the Systems, (ii) any proceeds of use and occupancy insurance on the Systems or any part thereof, (iii) except as provided in the following sentence, any income from the investments made under this Agreement, (iv) except as provided in the following sentence, any governmental grants or appropriations available to pay Current*



*Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (v) any special assessments, including assessments in the nature of impact fees, (vi) amounts, if any, paid from the Rate Stabilization Account into the Deposit Fund in any Fiscal Year minus the amounts, if any, paid from the Deposit Fund into the Rate Stabilization Account during the same Fiscal Year; and (vii) regularly scheduled payments received under any Qualified Swap or Hedge Agreement during such period. In no event shall Revenues include (i) income from the investment of moneys on deposit to the credit of the Construction Fund, proceeds of insurance (except use and occupancy insurance) or condemnation awards (which are required to be deposited directly to the credit of the Capital Improvement Fund), (ii) proceeds of sales of property constituting a part of the Systems (which are required to be deposited directly to the credit of the Capital Improvement Fund), (iii) any amounts received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited in the Commonwealth Payments Fund), (iv) the proceeds of Bonds or other Indebtedness and (v) any termination or similar payment under any interest rate swap or similar hedge agreement received by the Authority (which are required to be deposited directly to the credit of the Capital Improvement Fund).*

PRASA's revenue projections, on a cash basis, and their respective assumptions are discussed below:

1. **Base Fee and Service Charges (Exhibit 1, line 2)** – PRASA's single largest source of revenue is from the monthly base charge and volume rate for service. PRASA implemented a two-phase rate increase effective October 10, 2005 and July 1, 2006. Resolution No. 2167 (the Resolution) was approved on October 6, 2005 by PRASA's Board of Directors after recommendation by PRASA's Executive President and the Board's Revenue Committee. The Resolution included provisions for future increases as outlined below:
  - a) Rates for water and sewer service are not allowed to be increased prior to July 1, 2009 (FY2010);
  - b) Increases after July 1, 2009 will be calculated according to a specified formula (Coefficient of Annual Adjustment [CAA] described below);
  - c) Beginning July 1, 2009, there is a cap or limit on future annual increases of 4.5% and a limit on the cumulative increase of 25%;
  - d) If PRASA requires an increase in excess of 4.5% in any single year, or once the 25% cumulative limit is reached, PRASA must follow the formal approval process for requesting a rate increase.

Increases implemented after July 1, 2009 are limited by the calculation of the CAA described in the Resolution. There are three steps to determining the CAA as follows:

STEP 1 – Calculate the Coefficient of Deficiency (CD) for the applicable year:

$$CD = \frac{\text{Operating Expenses and Debt Service}}{\text{Operating Revenues}}$$

STEP 2 – Calculate the Annual Base Coefficient (CAB) for the Base Year:

$$CAB = \frac{\text{Operating Expenses and Debt Service (FY2007)}}{\text{Operating Revenues (FY2007)}}$$

STEP 3 – Calculate the CAA:

$$CAA = CD/CAB$$

If the CD for any year is greater than the CAB from FY2007, i.e., CD is greater than CAB, then the rates can be increased by the lesser of the CAA less one (CAA-1) or 4.5% until the 25% cumulative maximum is reached.

In addition to the change in rates, PRASA converted from bimonthly to monthly billing in October of 2005 using estimated readings. Beginning in October of 2007, PRASA began using actual versus prior estimated meter readings to bill customers: readings are performed every two months and the recorded consumption for a two-month period is divided by two before calculating monthly billing charges.

PRASA's forecast projections include service revenues of \$754M, approximately \$13M more than the FY2010 \$741M results. FY2010 results were approximately 2% lower than FY2009 actual results. Declines in service revenues are due in part to a reduction in demand for utility services and current economic conditions.

PRASA has experienced a modest growth in its total number of customer accounts averaging approximately 0.67% per year from FY2004 to FY2010, as shown in Table 7-6 below.<sup>17</sup> However, in its forecast period, PRASA has made a conservative assumption of zero percent (0%) customer growth rate in each fiscal year (Exhibit 1, line 3).

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<sup>17</sup> Compound Annual Growth Rate (CAGR) of number of accounts for FY2004 through FY2010.

**Table 7-6:  
Customer Accounts FY2004 – FY2010**

| Fiscal Year                       | Customer Class |               |               |               | Total        |
|-----------------------------------|----------------|---------------|---------------|---------------|--------------|
|                                   | Residential    | Commercial    | Industrial    | Government    |              |
| FY 2004                           | 1,145,963      | 67,375        | 1,528         | 11,033        | 1,225,899    |
| FY 2005                           | 1,161,350      | 68,093        | 1,533         | 11,584        | 1,242,560    |
| FY 2006                           | 1,173,040      | 68,396        | 1,526         | 11,688        | 1,254,650    |
| FY 2007                           | 1,178,677      | 67,560        | 1,472         | 11,706        | 1,259,415    |
| FY 2008                           | 1,181,366      | 63,004        | 1,447         | 11,519        | 1,257,336    |
| FY 2009                           | 1,184,661      | 61,657        | 1,280         | 11,290        | 1,258,888    |
| FY 2010                           | 1,204,636      | 62,938        | 1,237         | 10,946        | 1,279,757    |
| <b>CAGR 2004-2010<sup>1</sup></b> | <b>0.84%</b>   | <b>-1.13%</b> | <b>-3.46%</b> | <b>-0.13%</b> | <b>0.72%</b> |

<sup>(1)</sup> CAGR = Compound Annual Growth Rate

Total consumption in FY2010 decreased less than 1% compared to FY2009, as shown in Table 7-7. This reduction in consumption along with an increase in the total number of customers represents a decrease in the average billed consumption per account of approximately 2%, presented in Table 7-8. It should be noted that, as a result of the difficult economic conditions on the island, industrial consumption is declining at a much higher rate than other customer classes. In general, the reduction in consumption per account is one of the primary reasons for the FY2010 decline in service revenues when compared to FY2009.

**Table 7-7:  
Average Monthly Billed Consumption by Class FY2009 – FY2010  
(1,000 Cubic Meters)**

| Fiscal Year         | Customer Class |               |                |              | Total         |
|---------------------|----------------|---------------|----------------|--------------|---------------|
|                     | Residential    | Commercial    | Industrial     | Government   |               |
| FY 2009             | 20,267         | 3,475         | 1,126          | 2,652        | 27,520        |
| FY 2010             | 20,554         | 3,152         | 869            | 2,738        | 27,313        |
| <b>% Difference</b> | <b>1.41%</b>   | <b>-9.29%</b> | <b>-22.82%</b> | <b>3.26%</b> | <b>-0.75%</b> |

**Table 7-8:  
Average Monthly Consumption per Account FY2009 – FY2010  
(Cubic Meters)**

| Fiscal Year         | Customer Class |                |                |              | Total         |
|---------------------|----------------|----------------|----------------|--------------|---------------|
|                     | Residential    | Commercial     | Industrial     | Government   |               |
| FY 2009             | 17.11          | 56.36          | 879.95         | 234.86       | 21.86         |
| FY 2010             | 17.06          | 50.08          | 702.51         | 250.14       | 21.34         |
| <b>% Difference</b> | <b>-0.29%</b>  | <b>-11.14%</b> | <b>-20.16%</b> | <b>6.51%</b> | <b>-2.38%</b> |

Given the FY2010 results for service revenues, MPPR/Malcolm Pirnie believes the \$754M forecast period projections for service revenues is aggressive. MPPR/Malcolm Pirnie suggests using a more conservative assumption of \$741M in the Alternate Case over the

forecast period. Continued strain on the economy could cause further decline in the consumption patterns of PRASA customers, resulting in lower than projected revenues. Hence, FY2011 year-to-date (YTD) results should be closely monitored and projections for subsequent fiscal years shall be adjusted accordingly.

2. Rate Increases (Exhibit 1, line 4), Rate Adjustments (Exhibit 1, line 5), General Fund Special Contribution / Other Sources of Funds (Exhibit 1, line 6) – Currently, PRASA is not including any rate increases or rate adjustments in its Forecast. PRASA has included in its Forecast a General Fund Special Contribution / Other Sources of Funds revenue category (Exhibit 1, line 6).

For FY2011, PRASA received a special assignment of \$105M from the Central Government General Fund. However, it is important to note these contributions are a one-time occurrence to assist PRASA in paying operating expenses and/or debt service to help avoid a rate increase in times of economic hardship.

For FY2012 through FY2014, PRASA has projected approximately \$150M to \$160M in additional revenues in each fiscal year from Other Sources of Funds (Exhibit 1, line 6), which are yet to be identified. These other sources may include, but are not limited to, additional General Fund Special Contributions. Since future special assignments from the Central Government General Fund are unknown and uncertain at this time, MPPR/Malcolm Pirnie believes that PRASA's assumption of having no rate increase and adjustments during the forecast period is aggressive. As such, MPPR/Malcolm Pirnie has included in the Alternate Case the rate adjustments and increases that, in its opinion, would need to be implemented in FY2012 through FY2014 and has assumed that no revenues from the General Fund Special Contribution / Other Sources of Funds would be available.

3. Operational Initiatives (Exhibit 1, line 7) – PRASA is projecting additional revenue from the implementation of various operational initiatives as shown on Exhibit 1. The NRWRP (also referred to as the revenue optimization program) is the most significant (in terms of additional revenue potential) of these initiatives in FY2010 and FY2011. In FY2010 PRASA surpassed the \$34.9M of operational initiative revenues projected in the OS by almost double that amount. Starting in FY2012, PRASA has projected that the PPP Project will replace the NRWRP, as the activities performed in the NRWRP have been included in the scope of services of the PPP Project. As discussed in Section 4.8.5, under the PPP Project, PRASA aims to partner with the private sector to technologically transform PRASA's meter reading system and its commercial services in order to reduce commercial losses; an effort that PRASA has been addressing under the NRWRP. The PPP Project seeks to reduce the number of non-paying customers, theft, erroneous billing, and marginal or inaccurate meter performance; all of which adversely affect PRASA's ability to maximize revenues. As presently configured, the PPP Project has the potential to increase PRASA's revenues by as much as \$140M annually.

MPPR/Malcolm Pirnie is encouraged by the FY2009 and FY2010 Operational Initiative results, and believes PRASA has a strong commitment to its operational initiatives and to achieving the goals outlined for each initiative. It is reasonable to expect that the projected incremental revenues resulting from the Operational Initiatives in general, are attainable over the forecast period. Nonetheless, PRASA's assumption for the incremental revenues from Operational Initiatives relies on the effective and timely implementation of these initiatives and, in particular, of the implementation of the PPP Project as presently planned and described in Section 4.8.5.

4. Collections Lag and Uncollectibles Reserve (Exhibit 1, line 8) – PRASA's Base Case revenues include an adjustment for uncollectible accounts to get to the actual cash collection. Prior to the recent rate increases, uncollectible accounts were approximately 4% of all billings. Approximately 14% of these uncollectible are from the Government; the remaining uncollectible (86%) are from residential customers. In FY2007, the uncollectible level increased to 6.7%, which may have surged due to the rate increases, the change in rate structure, and/or the change to monthly billing. Subsequently, in FY2009, the rate of billings not collected during the year increased to 16%, which may have surged due to local economic conditions and the recent rise in unemployment. However, in FY2010 PRASA's rate of billings not collected during the year decreased from the 16% recorded in FY2009 to 9.2%; a value consistent with its FY2010 budget. This decrease can be attributed, in part, to PRASA's FY2010 increased effort to disconnect non-paying customers. PRASA is projecting a collection reserve of approximately 11.5% over the forecast period. This percentage is slightly lower than the FY2008 to FY2010 three-year average of 12.46%, but considering the current economic environment and the high unemployment rate in Puerto Rico<sup>18</sup>, MPPR/Malcolm Pirnie cautions that the rate for uncollectible accounts could increase. MPPR/Malcolm Pirnie finds the Forecast projection aggressive and, as such, has increased the uncollectible accounts percentage to 14% over the forecast period in the Alternate Case. MPPR/Malcolm Pirnie considers an uncollectible accounts percentage of 14% a more conservative estimate; one more closely aligned or consistent with the current economic conditions.
5. Reimbursements from Prior Years (Exhibit 1, line 9) – PRASA has projected it will not collect any of its aging uncollectible government accounts from prior years over the forecast period. Given recent history, this seems to be an overly conservative budgeting assumption – the historical three-year average annual government accounts collection amount is \$19M; collections totaled \$32.9M in FY2010, \$22.4M in FY2009 and \$4M in FY2008. In FY2010 PRASA received \$39.6M from pending reimbursements from SRF and PRIFA.

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<sup>18</sup> Based on the United States Bureau of Labor Statistics unemployment rate as of August 2010 the rate in Puerto Rico was 16.3% while the US average was 9.6%. Source: [www.stats.bls.gov/](http://www.stats.bls.gov/)

MPPR/Malcolm Pirnie finds the projection conservative for FY2011. As such, the prior year budget amount for FY2011 has been increased to \$19M in the Alternate Case. However, for FY2012-FY2014, PRASA's projection seems reasonable given that, starting in FY2012, any collection from prior years will be done through the PPP Project operational initiative and have, therefore, been accounted for under the operational initiatives revenue category (Exhibit 1, line 6.)

6. Subsidy (Exhibit 1, lines 10 and 11) – PRASA's Forecast includes a reduction in revenues to reflect the subsidy offered to customers who qualify for the Programa de Asistencia Nutricional (PAN Program) or residents under the Programa de Asistencia Temporal para Familias Necesitadas (TANF Program). The subsidy, approved in October of 2005 by PRASA's Board of Directors, provides a 35% base charge discount to PAN or TANF-eligible customers, i.e., qualifying seniors over 65 years of age, disabled persons, and families in need of temporary assistance.

PRASA has calculated the full impact of this subsidy to be approximately \$17M annually if all eligible customers apply for and meet the qualification criteria (estimated at 210,000 customers). However, PRASA does not expect all 210,000 eligible customers to apply for the subsidy and therefore does not forecast the subsidy to reach the \$17M level. For the last three fiscal years this subsidy has totaled approximately \$3.2M per year. The Forecast assumes the level of the subsidy at \$3.6M in FY2011 and to increase at a rate of 10% per year over the balance of the forecast period; from \$3.6M in FY2011 to \$4.8M in FY2014.

Also, in August of 2009 Puerto Rico's Legislative Assembly approved Act 69 which includes a partial subsidy for water and wastewater consumption costs for residents of public housing projects. PRASA originally projected that this new subsidy program could cost approximately \$16.2M in additional subsidy assistance offered to PRASA customers who qualify (estimated based on a full-year participation of the eligible customers). In FY2010 this subsidy totaled \$7M; the implementation of the program did not occur for the entire 12-month period. PRASA is projecting that in FY2011 it will grant approximately \$12M in assistance to qualified customers based on a full program year. For FY2012 through FY2014, PRASA projects subsidies to increase at a rate of approximately 3% per year.

While it is difficult to predict the impact that any new subsidy will have on PRASA's revenues, recent history has shown that subsidy participation is usually low. Hence, MPPR/Malcolm Pirnie believes that PRASA's subsidy estimate over the Forecast is reasonable but should be re-assessed on an annual basis in case participation is higher than expected.

7. Other Income (Exhibit 1, line 12) – PRASA receives revenue from other services including: theft penalties, reconnections, sale of water for construction, bulk water sales, and monthly fixed fees for sprinkler systems and private fire hydrants. Fines account for approximately

\$6.6M, bulk water sales are projected at \$0.4M, other miscellaneous revenues at \$2.8M and interest income at \$75,000 (all values represent annual amounts). Many of these fees were increased on July 1, 2006 at the same time as the increase in base charges and volume rates for service. Revenues from other services and sales are projected at approximately \$8M in each fiscal year of the Forecast. PRASA's projections, which are based on audited results from previous fiscal years, are conservative and seem reasonable.

8. Special Assessments (Exhibit 1, line 13) – PRASA collects revenues from new service installations. This fee is collected from developers and applies to new water and sewer connections to the System. The current fees are \$500 each for water and sewer connections (\$1,000 total per unit). Special Assessments depend on the fees paid by developers of new projects and it is expected that the current economic situation will continue to impact the local new housing market during the next few years. PRASA has projected \$7M in FY2011 and \$10.5M per year, for special assessments in FY2012, FY2013 and FY2014. However, PRASA generated \$6.5M in FY2010, half the amount generated in FY2008. This three-year downward trend is consistent with the current economic situation and its impact on the local housing market. The \$7M projection for special assessments, although lower than the most recent three-year average of \$10.8M, is approximately \$0.5M higher than the FY2010 results. This revenue source is exclusively dependent upon economic conditions and could be lower than the FY2010 level if the recession continues. PRASA's projections for the forecast period, which are based on audited results from previous fiscal years, are conservative and seem reasonable.
  
9. Interest Income (Exhibit 1, line 15) – The interest income projections assume a 0.75% annual interest earnings rate and an average cash balance of \$10M. PRASA is projecting zero additional revenue from interest income. MPPR/Malcolm Pirnie believes this to be a reasonable and conservative assumption for the Forecast.

### 7.3.2.2 Expenses

As defined in the MAT:

*“Current Expenses” shall mean the reasonable and necessary current expenses, incurred by the Authority in the ordinary course of business, calculated on an accrual basis, of maintaining, repairing and operating the properties constituting the Systems or causing said maintenance, repair and operation, which expenses shall exclude depreciation, reserves for allowances for doubtful accounts and other non-cash reserves or expenses. Notwithstanding any accounting treatment to the contrary, the amount of any termination or similar payment under any interest rate swap or similar hedge agreement shall, if payable by the Authority, not be taken into account in computing Current Expenses to the extent the same is paid by or on behalf of the Authority from the proceeds of any Indebtedness.*

PRASA's expenses projections, in accrual basis, and their respective assumptions are discussed below:

1. Payroll and Benefits (Exhibit 1, line 18) – PRASA has projected payroll and benefits expenses of \$270.6M for FY2011. The projection for FY2011 represents a 9.1% decrease from the FY2010 results of \$299.9M, established prior to the capitalization of project overhead costs. PRASA implemented a personnel reduction of 547 employees in FY2010 following a reduction of 266 employees in FY2009. These reductions were achieved mainly through an incentivized retirement program and permanent reduction in positions for temporary employees.

The Forecast reductions correspond to the savings expected from the planned net staff reductions listed in Table 7-9. PRASA is assuming average savings of approximately \$40,000 per each Full Time Equivalent (FTE) position eliminated; a conservative assumption considering that the FY2010 average salary per FTE was close to \$50,000. Projected reductions included in Exhibit 1 are based on FY2009's base of payroll expenses of \$318.6M.

**Table 7-9:  
Projected Employee Headcount Reductions**

| Fiscal Year <sup>1</sup> | Projected Annual Net Staff Reductions <sup>2</sup> |
|--------------------------|--|
| 2011                     | 250  |
| 2012                     | 1,123  |
| 2013                     | 234  |
| 2014                     | 50   |
| <b>Total</b>             | <b>1,657</b>                                       |

<sup>(1)</sup> PRASA had a staff of approximately 5,575 at the beginning of FY2010 and 5,001 at the beginning of FY2011. Average saving per employee is calculated at \$40,000 for a 12 month period.

<sup>(2)</sup> Net staff reduction = Staff reduced – new staff hired

PRASA is expecting to achieve these reductions through a variety of program/initiatives including: staff attrition, plants automation, possible early retirement programs, freezing vacant positions, and reclassifying positions, amongst others. PRASA is also budgeting additional reductions in overtime costs of \$3.5M in FY2011, \$5M in FY2012, and \$6M in both FY2013 and FY2014.

Given the number of initiatives that PRASA is implementing to achieve greater operating efficiencies, it is expected that there will be workforce reductions. However, how quickly PRASA will be able to achieve these reductions is not yet known. As such, the magnitude of the potential savings via such programs is not yet available. Therefore, MPPR/Malcolm Pirnie has included in its Alternate Case a more conservative staff reduction plan that assumes a slower and lower staff reduction rate than forecasted by PRASA as shown in Table 7-10. The reduction in overtime costs is reasonable based on the cost controls and reduction initiative implemented by PRASA in the last few years and that are to continue throughout the Forecast.



**Table 7-10:  
Alternate Case Projected Employee Headcount Reductions**

| Fiscal Year  | Alternate Case Projected Annual Net Staff Reductions <sup>1</sup> |
|--------------|---|
| 2011         | 100   |
| 2012         | 240   |
| 2013         | 400   |
| 2014         | 417   |
| <b>Total</b> | <b>1,157</b>  |

<sup>(1)</sup> Net staff reduction = Staff reduced – new staff hired.

2. Electricity (Exhibit 1, line 19) – PRASA has projected an electric power expense of \$138M for FY2011, \$132M for FY2012, \$129M for FY2013 and \$123M for FY2014. The amount projected for FY2011 represents a 1.5% decrease from FY2010 results. The FY2011 projection is based on an expectation that oil market prices experienced between July 2009 and June 2010 (an average of \$69.73 per barrel of oil) will continue throughout FY2011, and PRASA will implement energy conservation measures in selected facilities as planned through its Comprehensive Energy Management Program.

The average price per barrel of oil for the last six months of FY2010 (January 2010 to June 2010) was \$75.61. This average was 18% higher than the average of the last six months of FY2009 (January 2009 to June 2009) which was \$63. Due to this increase, PRASA’s average monthly cost of electric power for the last six months of FY2010 was \$12.2M, compared to \$9.8M in the same period for FY2009. PRASA is projecting average monthly costs of electric power for FY2011 of \$11.5M, lower than the results during the last six months of FY2010. The average prices per barrel of oil during the 1st, 2nd, 3rd and 4th quarters of 2010 were \$60, \$68, \$76 and \$75, respectively. Results through June 30, 2010 demonstrate PRASA’s electric power budget metrics have not been met. Electric costs as of June 30, 2010 are \$20.3M above budget, which represents a 17% deviation.

PREPA, in conjunction with the GDB, headlined the Puerto Rico Credit Conference in February 2010.<sup>19</sup> One of the most pertinent messages of the conference was the need to reduce energy cost and simultaneously protect the environment. Strategies used to achieve these objectives are listed below:

- Reduce operating expenses
- Increase efficiency
- Minimize energy theft
- Develop a proper fuel mix diversification
- Add renewable energy
- Maximize use of advance technology

<sup>19</sup> “Puerto Rico Electric Power Authority – Company Overview and Project Development”

Although the average price for a barrel of oil has increased from FY2009 to FY2010, implementation of the above strategies are expected to contribute to the lowering of electricity costs. PREPA's executive director Miguel Cordero publicly reiterated that fuel diversity, efficient operation of the system, and a reduction in operating costs will enable PREPA to lower energy costs in Puerto Rico<sup>20</sup>.

PRASA also has continued working on its Comprehensive Energy Management Program to implement demand side EPCs and supply side PPAs with suppliers other than PREPA. Results from EPC and PPA efforts, although originally scheduled to take effect in FY2011, are not expected until FY2012, at the earliest. Extended negotiations with selected proponents and PREPA's delay in the definition of wheeling rates have contributed to the delays in the implementation schedule for selected projects.

Even if energy consumption at PRASA's facilities is reduced as planned, if oil price increases continue at high rates throughout FY2011, PRASA's projections for energy costs could be compromised. PRASA projections do not include a contingency to address increases in energy costs resulting from global increases in oil prices. However, the actions set out by PREPA (summarized above) can ultimately result in lower energy costs. The fuel diversification plan has the potential to produce the largest impact in terms of energy savings. PREPA projects that units 5 and 6 of the Central South Coast will be converted to natural gas by the end of 2010, and units 1 through 4 will be replaced by a combined cycle facility by the end of 2012.

Given the uncertainty of potential diversification of project completion, strategies established to achieve specific energy and cost reduction objectives, and the YTD results of PRASA's electric power expenditures, MPPR/Malcolm Pirnie finds the projections aggressive and, as such, has increased the electricity budget in the Alternate Case over the forecast period using a more conservative scenario which assumes a cost for oil of \$85 per barrel for FY2011 and with 5% increases annually to account for inflation, and projected savings due to the Comprehensive Energy Management Program of \$6M in FY2012, \$10M in FY2013, and \$13M in FY2014.

3. Chemicals (Exhibit 1, line 20) – PRASA has projected \$27.7M for chemical expenses in FY2011 and is forecasting annual 1% increases in each year of the Forecast thereafter. The FY2011 projection represents an increase of approximately 5% compared to PRASA's results for FY2010 of \$26.2M. Chemical costs are usually affected by inflation and worldwide demand as they are mostly commodities. PRASA plans to continue its proactive chemical management program to maintain chemical consumption and cost levels similar to or below FY2010. As of June 30, 2010, results for chemical costs show PRASA was 8% lower than the

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<sup>20</sup> In an article posted on July 16, 2010 by Primerahora.com.

FY2010 budget amount for chemical costs. However, the annual rate of increase from FY2012 through FY2014 is premised on the success of the following initiatives:

- Use of alternative products and process control changes.
- More training for employees for the correct use of chemicals.
- The closing and consolidation of smaller, less efficient facilities.
- Expected results from current chemicals procurement process (discussed in Section 4).

Although PRASA is committed to proactively continuing its chemical management and procurement program to maintain chemical consumption and cost levels similar or below to those of FY2010 and it has included in its projections a 1% annual adjustment to account for inflation, MPPR/Malcolm Pirnie believe this percentage to be aggressive. As such, the annual adjustment has been increased to 3% in the Alternate Case, which is a more conservative assumption.

4. Superaqueduct Service Contract (Exhibit 1, line 21) – PRASA is forecasting a 5% increase from FY2010 to FY2011 for expenses associated with the operation of the Superaqueduct. Thereafter, PRASA is forecasting annual increases of 1% for expenses associated with the operation of the Superaqueduct. The Superaqueduct facilities are managed and operated by Thames-Dick Superaqueduct Partners (Thames-Dick) under contract with PRASA. The facilities include the following:

- A 100 MGD water treatment plant located in the North Region.
- A transmission line from the plant to the municipality of Bayamón (Metro Region).
- Several points of connection to the Superaqueduct, including tanks, pumping stations, and other assets.

PRASA's contract with Thames-Dick includes an annual fixed fee component (approximately one-third of the annual expense) and pass-through cost, with caps in certain instances, for such O&M expense items as power and fuel, chemicals, and insurance. In September of 2006, PRASA issued a notice of renewal effective through September of 2013. PRASA has the option of terminating the agreement without cause on the third anniversary of the extension (September 2011), provided prior notice is given to Thames-Dick at least 30 days prior to the termination date. Thames-Dick continues to operate the Superaqueduct under the contract terms provided in certain change orders dated March 1, 2004. PRASA plans to enter into contract negotiations with Thames-Dick in FY2011.

The Thames-Dick contract with PRASA and the corresponding payment provisions are consistent with generally accepted industry practices. However, because Superaqueduct electricity costs are entirely passed through to PRASA it is important to note that this Forecast could be negatively impacted if oil prices in the future increase, resulting in

increases of electricity costs. Also, the Metro Region Executive Director has indicated that sometime between FY2011 and FY2012 the Superaqueduct sludge lagoons will have to be cleaned, a costs that has not been considered in the Forecast. Hence, MPPR/Malcolm Pirnie believes that the 1% annual increase is aggressive. As such, the annual adjustment has been increased to 3% in the Alternate Case, which is a more conservative assumption.

5. Insurance (Exhibit 1, line 22) – Between FY2006 and FY2007, insurance expenses increased 35%. Between FY2007 and FY2008, PRASA’s insurance expenses decreased 5%. However, between FY2008 and FY2009 these expenses increased once again by 32%. The increase experienced in FY2009 was driven mainly by PRASA’s restructuring of its insurance program which consisted of adjusting its insurance coverage, deductibles, and other applicable components. Results for insurance expenses in FY2010 were approximately \$9.4M, or 27% lower than the budgeted amount. PRASA continues to work with its insurance brokers to reduce/maintain its insurance costs, while sustaining adequate and acceptable levels of coverage. PRASA has projected \$12.3M for insurance expenses in FY2011, \$12.6M in FY2012, and a 3% annual rate increase in each fiscal year thereafter. These Forecast projections seem reasonable.
  
6. Other Expenses (Exhibit 1, lines 23) –As of June 30, 2010 these expenses were \$152.8M, a 3% decrease compared to the FY2010 budget amount. Overall, the Other Expenses budget over the forecast period includes decreases in FY2011 through FY2013 as shown in Table 7-11. These decreases are mainly due to the reduction in costs related to maintenance and repair activities. PRASA reduced some of these Other Expenses from what was budgeted and from the previous year actual results, including: professional services, security, treatment of residuals and rentals.

**Table 7-11:  
Other Expenses Assumptions  
(in Thousands)**

|                | FY2010<br>(Budgeted) | FY2010<br>(Results) | FY2011    | FY2012    | FY2013    | FY2014    |
|----------------|----------------------|---------------------|-----------|-----------|-----------|-----------|
| Other Expenses | \$158,275            | \$152,801           | \$150,616 | \$142,609 | \$136,587 | \$140,685 |
| % Difference   | -                    | -3.5%               | -1.4%     | -5.3%     | -4.2%     | 3.0%      |

Although projected reductions in Other Expenses categories such as maintenance and repair, material and supplies, contingencies and fines, water transport, and chemical and bacterial analysis seem to be slightly aggressive, MPPR/Malcolm Pirnie finds these projections reasonable when compared to actual results in previous years. The monitoring of results should continue.

PRASA continues its plan to reduce the NRWRP budget from the \$16M included in FY2010 to zero (\$0) by FY2013. This projected reduction combined with the 3% cost increase in other categories of other expenses cause an overall reduction of 1% in FY2011, 5% in

FY2012, and 4% in FY2013. Since costs associated with the NRWRP are expected to decrease as the program progresses, these projected reductions are reasonable. Since no further cost reductions are projected for the NRWRP in FY2014, PRASA's projections show a slight increase in its other expenses category in this fiscal year, as shown below. These projections also seem reasonable since all categories are being increased by a reasonable 3% adjustment factor. Given PRASA's achieved cost reductions in the last two fiscal years, the number of other expenses that are at contract or fixed prices, and the savings anticipated from System improvements, it is reasonable to expect that PRASA will be able to hold these projections.

7. Operational Initiatives (Exhibit 1, line 24) – PRASA has included a new expense item in the Forecast for the operational costs of the PPP Project. PRASA is projecting these costs to range from \$80M in FY2012 up to \$89M in FY2014. These costs have been obtained from the financial model projections of the PPP Project developed in part by PRASA's consultant (MPPR/Malcolm Pirnie). The PPP Project's financial model uses as a base PRASA's current costs to provide commercial services and includes certain assumptions related to staffing, O&M, contractor's profit margin, etc. Assuming the PPP Project is implemented as described in Section 4.8.5, PRASA's Forecast is reasonable. However, upon completion of the PPP Project procurement process, PRASA should revise its Forecast projections to include the costs as negotiated and included in the PPP Project's contract terms.
  
8. Capitalized Expenses (Exhibit 1, line 25) – PRASA projects 5% of Operational Expenses will be capitalized every year (shown as a reduction to projected expenses in Exhibit 1). Capitalized expenses include payroll and indirect costs associated with development and implementation of the CIP, renewal and replacement and major planned repairs of fixed assets which may be combined with implementation of the CIP, and allocation of staff expenses associated with construction management and oversight of the CIP. This capitalization rate is approximately 1.5% lower than the rate used in previous years (6.5%) based on more conservative PRASA-revised estimates. In FY2010, PRASA's capitalization rate was revised from 7% to 6% (values rounded) by PRASA's consultant in the 2009 report update of its 2007 Asset Capitalization Report. Hence, PRASA's projection is conservative. MPPR/Malcolm Pirnie has not reviewed this estimation in detail and, as such, is not providing an opinion. The capitalization percent may change from year-to-year depending on the organizational structure and volume of capital improvements. Given the level of the CIP and the support provided by an external consultant's report for the current capitalization figure, the Forecast of a 5% capitalization rate is reasonable.

### 7.3.3 Consultant's Forecast Adjustments

MPPR/Malcolm Pirnie's Alternate Case, included as Exhibit 2, incorporates the following adjustments to the Forecast prepared by PRASA in order to provide a sensitive analysis of PRASA's projections using more conservative assumptions:

1. Decrease in Base Fee and Service Charges (Service Revenues) in FY2011 through FY2014 (Exhibit 2, line 2) – The Alternate Case assumes \$741M in revenues generated from the Base Fees and Service Charges in each fiscal year. This Alternate Case is based on FY2010 actual results.
2. Implementation of Rate Increase and Rate Adjustments, and Decreased General Fund Special Contribution / Other Sources of Funds (Exhibit 2, lines 3, 4 and 5) – In PRASA's OS, both Management's (PRASA's) Base Case and the Alternate Case Scenarios included rate increases to be implemented starting in FY2010, as shown in Table 7-11. Because no increase was implemented in FY2010, and no increase has been budget by PRASA in FY2011, the calculated revenue increase for FY2012 is higher than those originally projected in both scenarios. The Alternate Case assumes zero General Fund Special Contributions over the forecast period. It includes revenue increases as detailed in Table 7-12.

**Table 7-12:  
Annual Percent Increase in Revenues from Rates**

| Fiscal Year | Official Statement Management Base Case | 2008 Official Statement Alternate Case | Updated Revenue Increase Projection |
|-------------|---|--|-------------------------------------|
| 2010        | 4.5%                                    | 11.0%                                  | -                                   |
| 2011        | 4.5%                                    | 4.5%                                   | -                                   |
| 2012        | 4.5%                                    | 4.5%                                   | 32.0%                               |
| 2013        | 4.5%                                    | 6.0%                                   | 4.5%                                |
| 2014        | 4.5%                                    | 4.5%                                   | -                                   |

3. Increase Reserve for Uncollectible Accounts (Exhibit 2, line 8) – The Alternate Case assumes an increase of two percentage points from the 12% included in PRASA's FY2011 Annual Budget up to 14% of Service Revenues over the forecast period.
4. Increase in Reimbursements from Prior Years (Exhibit 2, line 9) – The Alternate Case assumes an increase of \$19M in reimbursement, or collections, from prior years in FY2011. This Alternate Case is based on the three-year average for FY2008, FY2009, and FY2010, of \$19M per year.
5. Increase in Payroll and Benefits Costs (Exhibit 2, line 18) – The Alternate Case assumes an increase in each fiscal year based on the employee headcount reductions listed in Table 7-13.

**Table 7-13:  
Alternate Case Projected Employee Headcount Reductions**

| Fiscal Year  | PRASA Projected Annual Net Staff Reductions <sup>1</sup> | Alternate Case Projected Annual Net Staff Reductions | Increase in Alternate Case Payroll and Related Cost Projections <sup>2</sup> |
|--------------|--|--|--|
| 2011         | 250  | 100  | \$4.5M   |
| 2012         | 1,123  | 240  | \$51.5M  |
| 2013         | 234  | 400  | \$52.0M  |
| 2014         | 50   | 417  | \$36.1M  |
| <b>Total</b> | <b>1,657</b>   | <b>1,157</b>   | -  |

<sup>(1)</sup> Net staff reduction = Staff reduced – new staff hired.

<sup>(2)</sup> Calculated as the difference between PRASA's Payroll and Benefits costs forecast and Alternate Case Payroll and Benefits costs.

6. Increased Electric Power Allowance (Exhibit 2, line 19) – The Alternate Case assumes a \$7M increase in electric power costs in FY2011. It also includes a 5% adjustment factor to account for inflation in each fiscal year thereafter. It includes the same PRASA projected savings to be achieved from the Comprehensive Energy Management Program. This case represents a more conservative scenario which assumes a cost for oil of \$85 per barrel for FY2011.
7. Increase in Chemical Expenses (Exhibit 2, line 20) – The Alternate Case assumes a 3% annual adjustment factor, each year, starting on FY2012. This is a 2% increase over PRASA's Forecast assumption of 1%.
8. Increase in Superaqueduct Fee (Exhibit 2, line 21) – The Alternate Case assumes a 3% annual adjustment factor, each year, starting on FY2012. This is a 2% increase over PRASA's Forecast assumption of 1%.
9. Increase in Capitalized Expenses (Exhibit 2, line 25) – As a result of the increase in expenses previously discussed, the calculated Capitalized Expenses included in the Alternate Case should also be adjusted.

### 7.3.4 Forecast Projected Debt Service Coverage

Table 7-14 summarizes the projected DSC over the forecast period for PRASA's Base Case Forecast (included as Exhibit 1). Based on the anticipated debt service obligations over the forecast period, PRASA would meet its DSC requirements. This is contingent upon PRASA being able to secure the General Fund Special Contributions, continuing with the implementation of its operational initiatives, reducing its staffing levels, and controlling its operational expenses as projected.

**Table 7-14:  
FY2010 – FY2014 Debt Service Coverage Calculation  
PRASA’s Base Case**

| Debt Service Level  | FY2010 | FY2011 | FY2012 | FY2013 | FY2014 |
|---|--------|--------|--------|--------|--------|
| <b>Senior Debt</b><br>Coverage Required = 1.20                          | 2.95   | 1.83   | 1.90   | 1.42   | 1.45   |
| <b>Senior Subordinate Debt</b><br>Coverage Required = 1.10              | 2.55   | 1.69   | 1.88   | 1.42   | 1.45   |
| <b>Subordinate Debt</b><br>Coverage Required = 1.00                     | 2.55   | 1.69   | 1.88   | 1.42   | 1.45   |
| <b>Commonwealth Guaranteed Indebtedness</b><br>Coverage Required = 1.00 | 1.23   | 1.14   | 1.12   | 1.06   | 1.08   |
| <b>Commonwealth Supported Obligations</b><br>Coverage Required = 1.00   | 1.05   | 1.01   | 1.01   | 1.02   | 1.02   |

Table 7-15 summarizes the projected DSC for the Forecast including the Forecast adjustments recommended by MPPR/Malcolm Pirnie, or the Alternate Case (included as Exhibit 2). Based on the anticipated debt service obligations over the forecast period, PRASA would meet its DSC requirements in each fiscal year of the Forecast, with the exception of FY2011 where net revenues available for debt service could fall short by approximately \$9.6M. For FY2012 through FY2014, meeting the DSC requirements is contingent upon PRASA implementing the Rate Increases and Rate Adjustments included in the Alternate Case Forecast, and continuing with the implementation of its operational initiatives, reducing its staffing levels, and controlling its operational expenses as planned and projected.

**Table 7-15:  
FY2010 – FY2014 Debt Service Coverage Calculation  
Consultant’s Alternate Case**

| Debt Service Level  | FY2010 | FY2011 | FY2012 | FY2013 | FY2014 |
|---|--------|--------|--------|--------|--------|
| <b>Senior Debt</b><br>Coverage Required = 1.20                          | 2.95   | 1.74   | 1.91   | 1.41   | 1.48   |
| <b>Senior Subordinate Debt</b><br>Coverage Required = 1.10              | 2.55   | 1.61   | 1.90   | 1.41   | 1.48   |
| <b>Subordinate Debt</b><br>Coverage Required = 1.00                     | 2.55   | 1.61   | 1.90   | 1.41   | 1.48   |
| <b>Commonwealth Guaranteed Indebtedness</b><br>Coverage Required = 1.00 | 1.23   | 1.08   | 1.13   | 1.05   | 1.11   |
| <b>Commonwealth Supported Obligations</b><br>Coverage Required = 1.00   | 1.05   | 0.96   | 1.02   | 1.01   | 1.05   |

## 7.4 Operating Reserve Fund

In accordance with the MAT, an Operating Reserve Fund must be established in the amount of \$150M until March 1, 2013, and thereafter:

- (i) if there is a line of credit on deposit in the reserve fund, the reserve shall mean for the term of line of credit an amount equal to at least ninety (90) days of current expenses



- determined on the first day of the fiscal year in which such line of credit is delivered or renewed as set forth in the annual budget for such fiscal year; or
- (ii) if the reserve fund is funded from revenues, the reserve shall mean an amount equal to not less than ninety (90) days of current expenses determined annually based on the current expenses relating to the fiscal year of such calculation as set forth in the annual budget for such fiscal year.

PRASA has established a line of credit on deposit to maintain the Operating Reserve Fund to be in compliance with the MAT requirements.

## 7.5 Capital Improvement Fund

In accordance with the MAT, a Capital Improvement Fund must be established and funded for each fiscal year, in an amount equal to the greater of:

- (i) the amount set forth in the annual budget for such fiscal year, and
- (ii) the amount recommended by the Consulting Engineer.

Equal monthly deposits over the fiscal year must be deposited to the Fund to make the balance of the Fund equal to the requirement. In addition, the following must also be credited to the Fund:

- (i) the proceeds of any condemnation awards,
- (ii) proceeds of insurance (other than use and occupancy insurance),
- (iii) the proceeds of sales of property constituting a part of the Systems, and
- (iv) the proceeds of any termination or similar payment received by PRASA under any interest rate swap or similar hedge agreement.

Given PRASA's current financial situation, PRASA has not included deposits to the Capital Improvement in the FY2011 Annual Budget, nor in the rest of the forecast period. As recommended in PRASA's FY2010 Budget Review, MPPR/Malcolm Pirnie recommends that PRASA develop formal capital financing policies and begin funding the Capital Improvement Fund in accordance with the MAT. Policies would set forth the types of capital projects for which long-term debt would be the preferred funding source, compared to the use of pay-as-you-go or cash financing. Many utilities rely on debt funding for long-lived assets such as water and wastewater treatment plants. For regularly recurring projects such as water distribution and wastewater collection system replacements, a specific amount can be included in rate revenue requirements to produce the cash needed for the annual funding of this type of project or initiative. The annual funding amount could then form the basis for projecting a required balance of the Capital Improvement Fund in the future.

## 7.6 Rate Stabilization Account

In accordance with the MAT, a Rate Stabilization Account, the balance of which is determined in the annual budget, must be established. This account is established within the Surplus Fund which contains any remaining moneys after all the required deposits are made. Equal monthly

deposits over the fiscal year must be deposited to the account to make the balance in the Fund equal to the balance set forth in the annual budget. Given PRASA's current financial situation, PRASA has not projected for a Rate Stabilization Account balance in the Forecast.

## 7.7 Funding of Capital Improvement Program

The CIP developed by PRASA estimates an expenditure of \$1.2B from FY2011 through FY2014. In FY2010, PRASA expended \$299.2M in CIP, which represents a \$54.2M reduction from the CIP Budget projection included in the 2009 CER. Table 7-16 provides a summary of the projected CIP sources and uses of funds for FY2010 and the Forecast.

**Table 7-16:  
CIP Sources and Uses of Funds  
(in Thousands)**

|   | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|------------------|----------------------|----------------------|----------------------|
| <b>USES OF FUNDS</b>                          |                                  |                  |                      |                      |                      |
| Repair & Replacement of Fixed Assets          | \$9,403                          | \$30,094         | \$38,491             | \$51,738             | \$56,444             |
| CIP Infrastructure Projects                   | 289,841                          | 331,231          | 343,497              | 156,217              | 143,012              |
| <b>Total Uses</b>                             | <b>\$299,243</b>                 | <b>\$361,325</b> | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |
| <b>SOURCES OF FUNDS</b>                       |                                  |                  |                      |                      |                      |
| Federal Funds – Rural Development Bonds / LOC | \$20,190                         | \$12,810         | \$12,000             | \$12,000             | \$12,000             |
| Federal Funds – State Revolving Funds         | 34,320                           | 35,000           | 35,000               | 35,000               | 35,000               |
| Federal Economic Stimulus – Grants            | 14,381                           | 30,409           | 16,825               | -                    | -                    |
| Federal Economic Stimulus – Loans             | 2,701                            | 6,705            | 10,446               | 2,100                | -                    |
| Local Stimulus                                | 2,147                            | 4,271            | 5,016                | 1,002                | -                    |
| Interim Financing                             | 225,504                          | 272,130          | -                    | -                    | -                    |
| Bond Proceeds (Subsequent Issues)             | -                                | -                | 302,701              | 157,854              | 152,456              |
| <b>Total Sources</b>                          | <b>\$299,243</b>                 | <b>\$361,325</b> | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |

Of the sources of funds identified over the five-year forecast period, 77% are projected to come from interim financings and/or bond proceeds; 22% are projected to come from Federal Funds (State Revolving Fund, Rural Development bonds, American Recovery and Reinvestment Act, and other matching sources); and 1% is projected to come from local economic stimulus funds. Given current market conditions and PRASA's fiscal situation, it is possible that the projected future bond issuances will not occur as projected. In such case, PRASA would have to continue

to work with the GDB in order to secure the necessary interim funding to continue its CIP implementation.

## 7.8 Conclusions

The purpose of this section is to provide MPPR/Malcolm Pirnie's conclusions regarding the reasonableness of PRASA's forecasts for the fiscal years from July 1, 2010 through June 30, 2014.

PRASA's Base Case financial forecast includes results from operational initiatives that have been described throughout this report and assumptions regarding the future cost of payroll, electricity and chemicals. The financial forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/Malcolm Pirnie's conclusions regarding the Base Case and adjustments made to the initiatives for the Alternate Case assume the framework and execution of the operational initiatives will not materially change; any changes could significantly alter the findings contained and presented in this CER.

Compliance with the MAT's Rate Covenant and DSC requirement is contingent upon PRASA obtaining special assignments from the Commonwealth's Central Government General Fund in each fiscal year in the amount of \$150M to \$160M. In the case that the Central Government is unable to provide said special assignment in any given year, PRASA would have to implement rate increases and adjustments that would generate sufficient revenues to meet its DSC requirements. Assuming that all adjustments presented in the Alternate Case take place, the required rate increase could be as much as 32% in FY2012. PRASA has made a dedicated commitment to implement the initiatives described in this report. However, while PRASA is committed to the initiatives, there is a possibility that the projected results and, more specifically, the timing of those results will not be achieved. This possibility is reflected in MPPR/Malcolm Pirnie's Alternate Case, which includes more conservative assumptions in select revenue and expense categories.

Based on the aforementioned review, MPPR/Malcolm Pirnie has concluded the following with regards to the forecast period:

1. PRASA should continuously monitor the results of its existing operational initiatives and measure its progress.
2. PRASA should also focus on achieving the implementation of all of its planned revenue enhancing and cost reducing initiatives as they have been planned on a timely manner. PRASA's projections greatly depend on the successful implementation of such initiatives.
3. If PRASA cannot secure special assignments from the Central Government General Fund, PRASA should increase its water and sewer service rates to a level that will provide sufficient revenue for it to meet all of its obligations as defined in the MAT, rather than depend on one-

time sources that may or may not be available in the future. Any possible rate increase should follow the basic Bonbright principles considered when the previous rate increases were authorized in October 2005. These principles include: revenue stability and predictability, simplicity and public acceptance, fairness to all customer groups, defensibility, and conservation.<sup>21</sup> Although PRASA can approve an automatic 4.5% rate adjustment as stipulated in the 2005 Rate Resolution, any increase above this amount must follow the due process established in Law #21 of May 1985, Law #170 of August 1988, and corresponding amendments.

4. PRASA should also review its current collections processes and practices to establish effective procedures that can lead to a reduction in the existing rate of uncollectibles. An analysis of key accounts should be completed.
5. PRASA should develop capital financing policies that provide direction and guidance regarding the use of debt and cash funding of its CIP. Based on these policies, PRASA should, begin funding the Capital Improvement Fund and Rate Stabilization Account as per MAT requirements.

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<sup>21</sup> James C. Bonbright, Albert L. Danielson, and David R. Kammerschen, *Principles of Public Utility Rates* (Public Utilities Reports Inc.) 2<sup>nd</sup> ed. 1989.

Section 7  
System Assets and Financial Analysis

**EXHIBIT 1**

| PRASA BASE CASE<br>(\$, Thousands) |  | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|------------------------------------|--|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| 1                                  | <b>REVENUES</b>  |                                  |                            |                      |                      |                      |
| 2                                  | Base Fee and Service Charges                                       | \$740,993                        | \$754,000                  | \$754,000            | \$754,000            | \$754,000            |
| 3                                  | Average Annual Growth/(Decrease)                                   | -                                | -                          | -                    | -                    | -                    |
| 4                                  | Rate Increases   | -                                | -                          | -                    | -                    | -                    |
| 5                                  | Rate Adjustments   | -                                | -                          | -                    | -                    | -                    |
| 6                                  | General Fund Special Contribution / Other Sources of Funds         | 27,240                           | 105,000                    | 150,000              | 160,000              | 150,000              |
| 7                                  | Operational Initiatives (Includes NRWRP & Commercial Contracting)  | 67,330                           | 65,000                     | 68,654               | 85,113               | 119,456              |
| 8                                  | Collections Lag and Uncollectibles Reserve                         | (100,147)                        | (98,280)                   | (98,719)             | (100,694)            | (104,815)            |
| 9                                  | Reimbursements from Prior Years                                    | 72,543                           | -                          | -                    | -                    | -                    |
| 10                                 | Subsidy  | (3,533)                          | (3,630)                    | (3,993)              | (4,392)              | (4,832)              |
| 11                                 | Subsidy to Public Housing (Includes recommended subsidy reduction) | (7,000)                          | (12,000)                   | (12,360)             | (12,731)             | (13,113)             |
| 12                                 | Other Income   | 7,692                            | 10,000                     | 8,000                | 8,000                | 8,000                |
| 13                                 | Special Assessments  | 6,502                            | 7,000                      | 7,500                | 8,000                | 8,500                |
| 14                                 | Interest Income  | -                                | -                          | -                    | -                    | -                    |
| 15                                 | <b>Total Operating Revenues, Net</b>                               | <b>\$811,620</b>                 | <b>\$827,090</b>           | <b>\$873,082</b>     | <b>\$897,296</b>     | <b>\$917,196</b>     |
| 16                                 |  |                                  |                            |                      |                      |                      |
| 17                                 | <b>OPERATING EXPENSES</b>  |                                  |                            |                      |                      |                      |
| 18                                 | Payroll and Benefits (Includes staff reductions through attrition) | \$299,948                        | \$270,584                  | \$200,364            | \$194,302            | \$186,458            |
| 19                                 | Electric Power   | 140,131                          | 138,000                    | 132,000              | 128,600              | 123,030              |
| 20                                 | Chemicals  | 26,264                           | 27,703                     | 27,980               | 28,260               | 28,542               |
| 21                                 | Superaqueduct Service Contract                                     | 22,800                           | 24,000                     | 24,240               | 24,482               | 24,727               |
| 22                                 | Insurance  | 9,443                            | 12,280                     | 12,648               | 13,028               | 13,419               |
| 23                                 | Other Expenses   | 152,801                          | 150,616                    | 142,609              | 136,587              | 140,685              |
| 24                                 | Operational Initiatives (PPP Project)                              | -                                | -                          | 80,802               | 84,332               | 89,199               |
| 25                                 | Capitalized Operating Expenses                                     | (42,340)                         | (37,391)                   | (31,032)             | (30,480)             | (30,303)             |
| 26                                 | <b>Total Operating Expenses, Net</b>                               | <b>\$609,047</b>                 | <b>\$585,792</b>           | <b>\$589,611</b>     | <b>\$579,111</b>     | <b>\$575,757</b>     |
| 27                                 |  |                                  |                            |                      |                      |                      |
| 28                                 | <b>OTHER FINANCING SOURCES</b>                                     |                                  |                            |                      |                      |                      |
| 29                                 | Surplus Funds & Non-Cash Adjustments                               | -                                | -                          | -                    | -                    | -                    |
| 30                                 | Other Sources of Fund (\$150M Facility)                            | -                                | -                          | -                    | -                    | -                    |
| 31                                 |  |                                  |                            |                      |                      |                      |
| 32                                 | <b>TOTAL NET REVENUES AVAILABLE FOR DEBT SERVICE</b>               | <b>\$202,573</b>                 | <b>\$241,298</b>           | <b>\$283,471</b>     | <b>\$318,185</b>     | <b>\$341,439</b>     |
| 33                                 |  |                                  |                            |                      |                      |                      |
| 34                                 | <b>TOTAL DEBT SERVICE (Includes CSO)</b>                           | <b>\$192,307</b>                 | <b>\$239,572</b>           | <b>\$281,025</b>     | <b>\$312,977</b>     | <b>\$335,276</b>     |
| 35                                 |  |                                  |                            |                      |                      |                      |
| 36                                 | <b>TOTAL (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>            | <b>\$10,266</b>                  | <b>\$1,726</b>             | <b>\$2,446</b>       | <b>\$5,208</b>       | <b>\$6,163</b>       |
| 37                                 | <b>CUMULATIVE (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>       | <b>\$10,266</b>                  | <b>\$11,992</b>            | <b>\$14,438</b>      | <b>\$19,646</b>      | <b>\$25,809</b>      |

| <b>DEBT SERVICE COVERAGE</b>                |  |                  |                  |                  |                  |                  |
|---|--|------------------|------------------|------------------|------------------|------------------|
| <b>Senior</b>                               |  | \$68,756         | \$132,158        | \$149,310        | \$223,683        | \$236,121        |
| Coverage Required = 1.20                    |  | 2.95             | 1.83             | 1.90             | 1.42             | 1.45             |
| <b>Senior Subordinated</b>                  |  | \$10,751         | \$10,853         | \$1,309          | -                | -                |
| Coverage Required = 1.10                    |  | 2.55             | 1.69             | 1.88             | 1.42             | 1.45             |
| <b>Subordinated</b>                         |  | -                | -                | -                | -                | -                |
| Coverage Required = 1.00                    |  | 2.55             | 1.69             | 1.88             | 1.42             | 1.45             |
| <b>Commonwealth Guaranteed Indebtedness</b> |  | \$85,561         | \$69,324         | \$102,692        | \$75,854         | \$78,882         |
| Coverage Required = 1.00                    |  | 1.23             | 1.14             | 1.12             | 1.06             | 1.08             |
| <b>Commonwealth Supported Obligations</b>   |  | \$27,240         | \$27,237         | \$27,714         | \$13,441         | \$20,273         |
| Coverage Required = 1.00                    |  | 1.05             | 1.01             | 1.01             | 1.02             | 1.02             |
| <b>Total Debt Service</b>                   |  | <b>\$192,307</b> | <b>\$239,572</b> | <b>\$281,025</b> | <b>\$312,977</b> | <b>\$335,276</b> |

\*Numbers may not add up due to rounding

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**EXHIBIT 1**

| (\$, Thousands)                               | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>USES OF FUNDS</b>                          |                                  |                            |                      |                      |                      |
| Repair & Replacement of Fixed Assets          | \$9,403                          | \$30,094                   | \$38,491             | \$51,738             | \$56,444             |
| CIP Infrastructure Projects                   | 289,841                          | 331,231                    | 343,497              | 156,217              | 143,012              |
| <b>Total Uses</b>                             | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |
| <b>SOURCES OF FUNDS</b>                       |                                  |                            |                      |                      |                      |
| Federal Funds – Rural Development Bonds / LOC | \$20,190                         | \$12,810                   | \$12,000             | \$12,000             | \$12,000             |
| Federal Funds – State Revolving Funds         | 34,320                           | 35,000                     | 35,000               | 35,000               | 35,000               |
| Federal Economic Stimulus – Grants            | 14,381                           | 30,409                     | 16,825               | 0                    | 0                    |
| Federal Economic Stimulus – Loans             | 2,701                            | 6,705                      | 10,446               | 2,100                | 0                    |
| Local Stimulus                                | 2,147                            | 4,271                      | 5,016                | 1,002                | 0                    |
| Interim Financing                             | 225,504                          | 272,130                    | 0                    | 0                    | 0                    |
| Bond Proceeds (Subsequent Issues)             | 0                                | 0                          | 302,701              | 157,854              | 152,456              |
| <b>Total Sources</b>                          | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |

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Section 7  
System Assets and Financial Analysis

EXHIBIT 2

| ALTERNATE CASE<br>(\$, Thousands)                                     | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>1 REVENUES</b>   |                                  |                            |                      |                      |                      |
| 2 Base Fee and Service Charges  | \$740,993                        | \$741,000                  | \$741,000            | \$974,415            | \$1,018,264          |
| 3 Average Annual Growth/(Decrease)                                    | -                                | -                          | -                    | -                    | -                    |
| 4 Rate Increases  | -                                | -                          | 200,070              | -                    | -                    |
| 5 Rate Adjustments  | -                                | -                          | 33,345               | 43,849               | -                    |
| 6 General Fund Special Contribution / Other Sources of Funds          | 27,240                           | 105,000                    | -                    | -                    | -                    |
| 7 Operational Initiatives (Includes NRWPR & Commercial Contracting)   | 67,330                           | 65,000                     | 68,654               | 85,113               | 119,456              |
| 8 Collections Lag and Uncollectibles Reserve                          | (100,147)                        | (104,780)                  | (103,740)            | (136,418)            | (142,557)            |
| 9 Reimbursements from Prior Years                                     | 72,543                           | 19,000                     | -                    | -                    | -                    |
| 10 Subsidy  | (3,533)                          | (3,630)                    | (3,993)              | (4,392)              | (4,832)              |
| 11 Subsidy to Public Housing (Includes recommended subsidy reduction) | (7,000)                          | (12,000)                   | (12,360)             | (12,731)             | (13,113)             |
| 12 Other Income   | 7,692                            | 10,000                     | 8,000                | 8,000                | 8,000                |
| 13 Special Assessments  | 6,502                            | 7,000                      | 7,500                | 8,000                | 8,500                |
| 14 Interest Income  | -                                | -                          | -                    | -                    | -                    |
| <b>15 Total Operating Revenues, Net</b>                               | <b>\$811,620</b>                 | <b>\$826,590</b>           | <b>\$938,476</b>     | <b>\$965,835</b>     | <b>\$993,718</b>     |
| <b>16 OPERATING EXPENSES</b>  |                                  |                            |                      |                      |                      |
| 17 Payroll and Benefits (Includes staff reductions through attrition) | \$299,948                        | \$275,084                  | \$251,444            | \$246,347            | \$222,537            |
| 19 Electric Power   | 140,131                          | 145,000                    | 146,250              | 149,863              | 154,856              |
| 20 Chemicals  | 26,264                           | 27,703                     | 28,534               | 29,390               | 30,272               |
| 21 Superaqueduct Service Contract                                     | 22,800                           | 24,000                     | 24,720               | 25,462               | 26,225               |
| 22 Insurance  | 9,443                            | 12,280                     | 12,648               | 13,028               | 13,419               |
| 23 Other Expenses   | 152,801                          | 150,616                    | 142,609              | 136,587              | 140,685              |
| 24 Operational Initiatives (PPP Project)                              | -                                | -                          | 80,802               | 84,332               | 89,199               |
| 25 Capitalized Operating Expenses                                     | (42,340)                         | (38,081)                   | (34,350)             | (34,250)             | (33,860)             |
| <b>26 Total Operating Expenses, Net</b>                               | <b>\$609,047</b>                 | <b>\$596,602</b>           | <b>\$652,657</b>     | <b>\$650,757</b>     | <b>\$643,333</b>     |
| <b>27 OTHER FINANCING SOURCES</b>                                     |                                  |                            |                      |                      |                      |
| 29 Surplus Funds & Non-Cash Adjustments                               | -                                | -                          | -                    | -                    | -                    |
| 30 Other Sources of Fund (\$150M Facility)                            | -                                | -                          | -                    | -                    | -                    |
| <b>32 TOTAL NET REVENUES AVAILABLE FOR DEBT SERVICE</b>               | <b>\$202,573</b>                 | <b>\$229,988</b>           | <b>\$285,819</b>     | <b>\$315,078</b>     | <b>\$350,385</b>     |
| <b>34 TOTAL DEBT SERVICE (Includes CSO)</b>                           | <b>\$192,307</b>                 | <b>\$239,572</b>           | <b>\$281,025</b>     | <b>\$312,977</b>     | <b>\$335,276</b>     |
| <b>36 TOTAL (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>            | <b>\$10,266</b>                  | <b>(\$9,584)</b>           | <b>\$4,794</b>       | <b>\$2,101</b>       | <b>\$15,109</b>      |
| <b>37 CUMULATIVE (DEFICIENCY) / SURPLUS - OPERATIONAL FUNDS</b>       | <b>\$10,266</b>                  | <b>\$682</b>               | <b>\$5,476</b>       | <b>\$7,577</b>       | <b>\$22,686</b>      |

| <b>DEBT SERVICE COVERAGE</b>                |                  |                  |                  |                  |                  |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Senior</b>                               | \$68,756         | \$132,158        | \$149,310        | \$223,683        | \$236,121        |
| Coverage Required = 1.20                    | 2.95             | 1.74             | 1.91             | 1.41             | 1.48             |
| <b>Senior Subordinated</b>                  | \$10,751         | \$10,853         | \$1,309          | -                | -                |
| Coverage Required = 1.10                    | 2.55             | 1.61             | 1.90             | 1.41             | 1.48             |
| <b>Subordinated</b>                         | -                | -                | -                | -                | -                |
| Coverage Required = 1.00                    | 2.55             | 1.61             | 1.90             | 1.41             | 1.48             |
| <b>Commonwealth Guaranteed Indebtedness</b> | \$85,561         | \$69,324         | \$102,692        | \$75,854         | \$78,882         |
| Coverage Required = 1.00                    | 1.23             | 1.08             | 1.13             | 1.05             | 1.11             |
| <b>Commonwealth Supported Obligations</b>   | \$27,240         | \$27,237         | \$27,714         | \$13,441         | \$20,273         |
| Coverage Required = 1.00                    | 1.05             | 0.96             | 1.02             | 1.01             | 1.05             |
| <b>Total Debt Service</b>                   | <b>\$192,307</b> | <b>\$239,572</b> | <b>\$281,025</b> | <b>\$312,977</b> | <b>\$335,276</b> |

\*Numbers may not add up due to rounding

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**EXHIBIT 2**

| (\$, Thousands)                               | FY2010<br>PRELIMINARY<br>RESULTS | FY2011<br>ANNUAL<br>BUDGET | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION |
|---|----------------------------------|----------------------------|----------------------|----------------------|----------------------|
| <b>USES OF FUNDS</b>                          |                                  |                            |                      |                      |                      |
| Repair & Replacement of Fixed Assets          | \$9,403                          | \$30,094                   | \$38,491             | \$51,738             | \$56,444             |
| CIP Infrastructure Projects                   | 289,841                          | 331,231                    | 343,497              | 156,217              | 143,012              |
| <b>Total Uses</b>                             | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |
| <b>SOURCES OF FUNDS</b>                       |                                  |                            |                      |                      |                      |
| Federal Funds – Rural Development Bonds / LOC | \$20,190                         | \$12,810                   | \$12,000             | \$12,000             | \$12,000             |
| Federal Funds – State Revolving Funds         | 34,320                           | 35,000                     | 35,000               | 35,000               | 35,000               |
| Federal Economic Stimulus – Grants            | 14,381                           | 30,409                     | 16,825               | 0                    | 0                    |
| Federal Economic Stimulus – Loans             | 2,701                            | 6,705                      | 10,446               | 2,100                | 0                    |
| Local Stimulus                                | 2,147                            | 4,271                      | 5,016                | 1,002                | 0                    |
| Interim Financing                             | 225,504                          | 272,130                    | 0                    | 0                    | 0                    |
| Bond Proceeds (Subsequent Issues)             | 0                                | 0                          | 302,701              | 157,854              | 152,456              |
| <b>Total Sources</b>                          | <b>\$299,243</b>                 | <b>\$361,325</b>           | <b>\$381,988</b>     | <b>\$207,956</b>     | <b>\$199,456</b>     |

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# 8 Conclusions and Recommendations

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## 8.1 Considerations and Assumptions

In preparation of this report and the conclusions contained herein, MPPR/Malcolm Pirnie has relied on certain assumptions and information provided by PRASA with respect to the conditions which may exist or events which may occur in the future. MPPR/Malcolm Pirnie believes the information and assumptions are reasonable, but has not independently verified information provided by PRASA and others. To the extent that actual future conditions differ from those assumed herein or provided to us by others, the actual results will vary from those forecast.

In the preparation of this report, MPPR/Malcolm Pirnie has made a number of principal considerations and assumptions (as provided throughout this report); some of the most notable are as follows:

1. MPPR/Malcolm Pirnie has made no determination as to the validity and enforceability of any contracts, agreement, existing law, rule, or regulation applicable to PRASA and its operations. However, for purposes of this report, MPPR/Malcolm Pirnie has assumed that all such contracts, agreements, laws, rules and regulations will be fully enforceable in accordance with their terms.
2. PRASA will generally continue the current policies of employing qualified and competent personnel; properly operating and maintaining the System in accordance with generally accepted industry practices; and of operating the System in a prudent and sound businesslike manner.
3. The proposed CIP reflects the general needs of the System, and the CIP will be largely implemented as planned and reflected in this report.

## 8.2 Conclusions and Recommendations

Set forth below are the principal opinions which MPPR/Malcolm Pirnie has reached regarding the review of PRASA's water and wastewater system. For a complete understanding of the assumptions upon which these opinions are based, this report should be read in its entirety.

1. PRASA's overall staff levels have been historically high compared to industry standards, although some individual facilities and PRASA departments have staffing shortages. Also, as a result of recent staff reductions, PRASA's performance regarding meter readings and effectiveness in repairing leaks and overflows in a timely manner have fallen. As such, PRASA could benefit from a utility-wide organizational assessment to identify staffing needs, and opportunities for staff reductions and position consolidations where surplus staff is identified.

2. Although PRASA's training record since FY2006 has improved considerably, the staff needs additional training to improve effectiveness and increase safe work practices. PRASA recognizes this need and has continued providing a comprehensive training program which provided an average of 21 hours of training per employee in FY2010 compared to an average of 13 hours per employee in FY2006, 16 hours in FY2007, and 14 hours in FY2008. Between FY2009 and FY2010 the training hours were reduced from 29 to 21 hours. With the new facilities automation process and chemical reduction efforts, it is recommended to PRASA to increase or at least maintain the training hours for the next fiscal year. As this program continues, the capabilities and performance of staff working at PRASA is expected to improve over time.
3. The condition of the facilities visited varied from new to those requiring capital upgrades. The condition of most facilities with implemented CIP projects improved from FY2009 to FY2010. However, certain facilities are operating out of compliance with discharge permit limits and drinking water standards. Despite these compliance problems, the facilities are generally producing and delivering potable water and conveying and treating wastewater to a level of competency. PRASA demonstrates a thorough understanding of the System shortcomings and continues to work towards correcting them.
4. PRASA must continue to maintain its commitment for the implementation of the Integrated Preventive Maintenance Plan (IPMP). In addition, PRASA must continue a focused corrective maintenance and R&R program in order to improve fallen metrics, to maintain and improve the condition of the System, and to provide a program for the long-term preservation of the System assets. PRASA has included in its CIP provisions for the continuous implementation of the IPMP. Additionally, PRASA has budgeted, on average, approximately \$47M annually from FY2011 through FY2015 for R&R. However, PRASA should evaluate and adjust its R&R budget to improve its performance metrics.
5. PRASA should review its performance metrics and standardize the way these metrics are calculated to facilitate their interpretation and application including, but not limited to, how the data is collected, how it is reported, and how it is used by PRASA management.
6. A review of PRASA's commercial services showed that PRASA has significant opportunities to reduce its current volume of NRW and commercial losses, and to improve its billing procedures and collections. In MPPR/Malcolm Pirnie's opinion, PRASA is losing significant amounts of revenue due to:
  - Water theft
  - Non-optimal collection practices
  - Poor customer billing database management
  - High levels of estimation
  - Reading bi-monthly instead of monthly
  - Malfunctioning and obsolete customer meters

PRASA should review its current collections efforts in order to establish effective and proactive procedures that can lead to a reduction in its uncollectibles. An analysis of key accounts should be completed so that collection efforts target higher value customers.

7. With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are generally in alignment with the System needs. No additional CIP needs at plant facilities were identified for this CER, although improvements to ancillary facilities are required. Those improvements could be addressed through PRASA's R&R program, included within the CIP. Hence, an analysis of PRASA's R&R needs and budget is recommended to develop a sound R&R program that will allow PRASA to improve and extend the useful life of its System. Because PRASA has not budgeted contributions to the Capital Improvement Fund, the planned capital improvements for FY2010 (\$299M) were paid from the proceeds of Federal funding and Interim Financing Loans. Facilities that underwent upgrades or improvements through the CIP showed overall improvement. Review of PRASA's CIP showed that most of the WTPs and WWTPs that were considered unacceptable in terms of compliance currently have CIP projects identified to either rehabilitate or close the facility, thus addressing existing compliance problems. Once implemented as planned, these initiatives are expected to result in significant improvements in the performance of the System, including substantial advances towards complying with existing regulatory requirements.
8. The full impact of future regulations on the water treatment and supply system are not known at this time. In some cases, future regulations are expected to require minor process changes (such as moving the point of chlorination within a facility) and in other cases major capital improvements, such as construction of new treatment plants. Although, the existing CIP does not include projects specifically to address future regulations, PRASA is making allowances in its new designs to improve capabilities to meet certain future regulations. As the impact of future regulations becomes more defined, PRASA may need to modify its CIP to accommodate resulting needs.
9. PRASA's insurance program has reasonable insurance policies to meet PRASA's insurable risks and exposures. Insured amounts and values are reasonable to meet or exceed industry standards. PRASA has in place a risk management and loss prevention regime that reasonably addresses the pro-active process of avoiding losses and accidents in all its operations in accordance with modern industry standards.
10. Although PRASA's financial Forecast is, for the most part, reasonable, it depends on revenue sources that for FY2012 through FY2014 are yet to be identified. Currently, PRASA's Forecast does not include rate adjustments or rate increases. However, PRASA continues to implement operational initiatives to help improve its financial situation. While PRASA is committed to the initiatives, there is a possibility that the results projected to be achieved and more specifically, the timing of those results, will not be achieved. This possibility is

reflected in the adjustments and recommendations made by MPPR/Malcolm Pirnie in select revenue and expense categories and conclusions presented herein. In the event that PRASA is unable to secure future special assignments from the Central Government General Fund or generate sufficient revenues to meet their operational and debt service obligation in FY2012 through FY2014, in FY2012 PRASA would have to increase its rates by as much as 32%.

Respectfully Submitted,

**MP ENGINEERS OF PUERTO RICO, P.S.C.**

/s/ Guillermo Marxuach, P.E.  
President



# Puerto Rico Aqueduct and Sewer Authority



**MP ENGINEERS**  
of PUERTO RICO

and its subcontractor

**MALCOLM  
PIRNIE**

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Puerto Rico Aqueduct and Sewer Authority

FINAL REPORT

# Consulting Engineer's Supplemental Report to the FY2010 Consulting Engineer's Report in connection with the Puerto Rico Aqueduct and Sewer Authority's 2012 Bond Issue



January 2012

**MP ENGINEERS**  
of PUERTO RICO and its subcontractor

**MALCOLM  
PIRNIE**

**ARCADIS**

The Water Division of ARCADIS



**Puerto Rico Aqueduct and Sewer Authority**

#604 Barbosa Ave. • Hato Rey, Puerto Rico 00918

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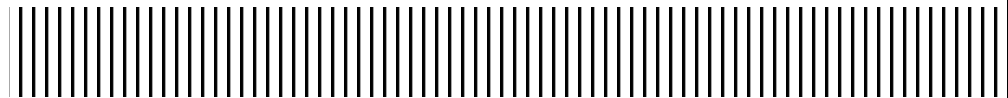
## **FINAL REPORT**

# **Consulting Engineer's Supplemental Report**

**to the FY2010 Consulting Engineer's Report**

**in Connection with the Puerto Rico Aqueduct  
and Sewer Authority's 2012 Bond Issue**

January 2012



Report Prepared By:

**MP Engineers of Puerto Rico, PSC  
and its subcontractor  
Malcolm Pirnie**





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## Acronyms

Capitalized and abbreviated terms contained in this report are defined below. The terms listed below appear in multiple sections of this report, and are thus defined here for reference.

| <b>Acronym</b> | <b>Definition</b>                           |
|----------------|---|
| ABT            | Additional Bonds Test                       |
| AOP            | Advanced Oxidation Processes                |
| APU            | Alternate Power Unit                        |
| AWWA           | American Water Works Association            |
| CAA            | Coefficient of Annual Adjustment            |
| CAB            | Annual Base Coefficient                     |
| CBA            | Collective Bargaining Agreement             |
| CD             | Coefficient of Deficiency                   |
| CER            | Consulting Engineer's Report                |
| CIP            | Capital Improvement Program                 |
| CWA            | Clean Water Act                             |
| DBP            | Disinfection Byproduct                      |
| DBPR           | Disinfection Byproduct Rule                 |
| DMR            | Discharge Monitoring Report                 |
| DSC            | Debt Service Coverage                       |
| EDC            | Endocrine Disrupting Compounds              |
| EPC            | Energy Performance Contract                 |
| EQB            | Puerto Rico Environmental Quality Board     |
| FOA            | Fiscal Oversight and Support Agreement      |
| FY             | Fiscal Year                                 |
| GDB            | Government Development Bank for Puerto Rico |
| GIS            | Geographic Information System               |
| gpm            | Gallons per minute                          |
| GWR            | Groundwater Rule                            |

| <b>Acronym</b> | <b>Definition</b>   |
|----------------|---|
| HAA            | Haloacetic Acid   |
| HIEPAAA        | Hermanidad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados |
| IPMP           | Integrated Preventive Maintenance Program   |
| kWh            | Kilowatt-Hour   |
| LOC            | Line of Credit  |
| LRAA           | Locational Running Annual Average   |
| LT2 ESWTR      | Long Term 2 – Enhanced Surface Water Treatment Rule   |
| M              | Million   |
| MAT            | Master Agreement of Trust   |
| MCL            | Maximum Contaminant Level   |
| M-DBP          | Microbial and Disinfection Byproducts Rules   |
| MW             | Megawatts   |
| MG             | Millions of Gallons   |
| MGD            | Million Gallons per Day   |
| MPPR           | MP Engineers of Puerto Rico, PSC  |
| NDMA           | N-nitrosodimethylamine  |
| NF             | Nano Filtration   |
| NPDES          | National Pollutant Discharge Elimination System   |
| NRW            | Non-Revenue Water   |
| NRWRP          | Non-Revenue Water Reduction Program   |
| NTU            | Nephelometric Turbidity Units   |
| O&M            | Operations and Maintenance  |
| PAN            | Programa de Asistencia Nutricional  |
| PAP            | Proyectos Apremiantes (“Urgent Projects”)   |
| PM             | Preventive Maintenance  |
| PMC            | Program Management Consultant   |
| PPA            | Power Purchase Agreement  |
| ppb            | Parts Per Billion   |
| PPCP           | Pharmaceuticals and Personal Care Products  |
| PRASA          | Puerto Rico Aqueduct and Sewer Authority  |
| PRDOH          | Puerto Rico Department of Health  |
| PREPA          | Puerto Rico Electric Power Authority  |
| RFP            | Request for Proposals   |
| RFQ            | Request for Qualifications  |
| R&R            | Renewal and Replacement   |
| SAP            | Systems, Applications, and Products in Data Processing  |

| <b>Acronym</b> | <b>Definition</b>   |
|----------------|---|
| SAP-ISU        | Systems, Applications, and Products in Data Processing Industry Specific Solution for Utilities |
| SDWA           | Safe Drinking Water Act   |
| STS            | Sludge Treatment System   |
| SRF            | State Revolving Fund  |
| SWTR           | Surface Water Treatment Rule  |
| TANF           | Programa de Asistencia Temporal para Familias Necesitadas                                       |
| TOC            | Total Organic Carbon  |
| TTHM           | Total Trihalomethane  |
| UIA-AAA        | Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados                   |
| U.S.           | United States   |
| USEPA          | United State Environmental Protection Agency  |
| WPS            | Water Pump Station  |
| WTP            | Water Treatment Plant   |
| WWPS           | Wastewater Pump Station   |
| WWTP           | Wastewater Treatment Plant  |
| YTD            | Year-to-Date  |

## Executive Summary

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### E.1. Introduction

MP Engineers of Puerto Rico, PSC and its subcontractor Malcolm Pirnie, Inc (MPPR/Malcolm Pirnie) have been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in the preparation of a Supplemental Report to the fiscal year (FY) 2010 Consulting Engineer's Report CER) to enable it to issue revenue bonds and incur other indebtedness to mainly repay and refinance existing debt and to partially finance its five-year Capital Improvement Program (CIP) that runs from FY2012 through FY2016.

This Supplemental Report documents material changes in PRASA that may have taken place since the completion of the FY2010 CER which covered the period from July 1, 2009 through June 30, 2010. Where possible, an independent opinion is provided regarding the following:

- Condition of PRASA's water and wastewater (sewer) systems (collectively, the System)
- Operations and management (O&M) practices and operational initiatives
- Planned CIP and compliance with regulatory requirements
- Financial forecast for fiscal years 2012 through 2016

### E.2. Condition of System

PRASA owns a large variety of assets, including land, buildings, dams, wells, water and wastewater treatment facilities and pump stations, ocean outfalls, buried infrastructure, vehicles, equipment, and water meters. In FY2010, MPPR/Malcolm Pirnie has assessed the condition of PRASA's System by inspecting a sample of the major elements of the System. The purpose of these inspections was to identify the overall condition of the facilities and to determine if they are being operated and maintained in a manner consistent with their operating goals. The assessment also provided an opportunity to verify PRASA's CIP alignment with System needs.

The evaluation criteria used in the facility inspections were: compliance, operations / process control, equipment / maintenance, and staffing / training. An overall facility rating was then determined based on the calculation of a weighted average of the ratings for each criterion. The condition of the facilities visited varied from new to those requiring significant capital upgrades. Compliance with discharge permit limits and drinking water standards varied depending on the plant age, condition and experience of operators. Facility conditions averaged an adequate rating overall.

Despite some operational compliance issues, the treatment facilities are generally producing and delivering potable water and conveying and treating wastewater adequately. PRASA has shown that with the implementation of several initiatives that include O&M improvements and the

establishment of a planned CIP, among others, the overall conditions rating for these facilities continues to improve as shown in Table ES-1.

**Table ES-1:  
Asset Condition Ratings by Category**

| Asset Category              | Overall Condition Ratings |          |          | Change 2008 vs. 2010 |         | Change 2009 vs. 2010 |         |
|-----------------------------|---------------------------|----------|----------|----------------------|---------|----------------------|---------|
|                             | 2008 CER                  | 2009 CER | 2010 CER | Overall Score        | Percent | Overall Score        | Percent |
| Regulated Dams              | Adequate                  | Adequate | Adequate | 0.0                  | 0%      | 0.2                  | 10%     |
| Water Treatment Plants      | Adequate                  | Adequate | Adequate | 0.1                  | 5%      | -0.1                 | -4%     |
| Wastewater Treatment Plants | Adequate                  | Adequate | Adequate | 0.1                  | 5%      | 0.0                  | 0%      |
| Wells                       | Adequate                  | Adequate | Adequate | 0.1                  | 5%      | 0.2                  | 11%     |
| Water Pump Stations         | Adequate                  | Adequate | Adequate | 0.1                  | 5%      | 0.1                  | 5%      |
| Water Storage Tanks         | Adequate                  | Adequate | Adequate | -0.3                 | -16%    | 0.0                  | 0%      |
| Wastewater Pump Stations    | Adequate                  | Adequate | Adequate | 0.3                  | 18%     | 0.0                  | 0%      |

Although buried infrastructure was not inspected, in FY2010 MPPR/Malcolm Pirnie analyzed the data collected by PRASA on water leaks and sewer overflows. Reported active leaks and sewer overflows remain at very high levels when compared to other utilities in the United States (U.S.) and Canada. Also, PRASA's unaccounted-for water, or non-revenue water (NRW), percentage continued at 64% in FY2010. Based on a comparison to other utilities in the U.S. and Canada, PRASA's NRW is extremely high. In a recent utility survey, the median unaccounted for water for all survey participants ranged from 8.5% to 9.9% (*Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report*, AWWA 2008).

Notwithstanding the above, PRASA has embarked on the development of a strategic NRW management and reduction plan. For this, in late 2011, PRASA retained the services of Miya Puerto Rico LLC (Miya) a local subsidiary of Miya Luxemburg Holdings S.a.r.l., a world-renowned NRW consultant. The objective of this strategic NRW management and reduction plan is to provide PRASA with the necessary information to embark on a comprehensive and cost-effective long-term NRW management program.

Since the completion and issuance of the FY2010 CER, PRASA reports no material changes in the condition of the System. Additionally it reports that significant improvements have been made regarding the leaks and overflow repair metrics; although the occurrence of these continues to be high when compared to U.S. benchmarks.

### **E.3. O&M Practices and Operational Initiatives**

PRASA's O&M practices are adequate. One recurring finding in the facility inspections is the need for facility-specific O&M plans or manuals for treatment plants. Also, there is an identified need of standardized processes for prioritizing and scheduling preventive, corrective and routine maintenance activities. However, with the objective of developing a model operating standard for



its plant facilities, PRASA began the development of the “Ideal Plant” initiative in FY2012. Based on the results of comprehensive audits at each facility, through this initiative PRASA looks to identify and cost-effectively address facility-specific shortcomings in areas including, but not limited to: infrastructure, compliance, staff and training, operations and process controls, risk management and safety, and documentation (i.e., O&M plans).

The American Water Works Association (AWWA) has collected benchmarking data from water and wastewater utilities throughout the U.S. and Canada. Table ES-2 provides a comparison of PRASA’s metrics to several key O&M benchmark performance indicators. Although in FY2010 PRASA experienced a slight reduction in its water and wastewater O&M cost metrics when compared to FY2009 results, PRASA’s costs metrics increased again in FY2011. The increase was mainly caused by higher electricity, maintenance and repair costs, and other expenses such as professional services, materials and supplies.

**Table ES-2:  
PRASA Metrics vs. Water/Wastewater Utilities Benchmarks<sup>1</sup>**

| Benchmark Category                           | Utility Category | Top Quartile | Median  | Bottom Quartile | PRASA   |
|--|------------------|--------------|---------|-----------------|---|
| Water O&M Cost per Account <sup>2</sup>      | Serve > 500,000  | \$163        | \$233   | \$319           | FY2009: \$294<br>FY2010: \$292<br>FY2011: \$309       |
|  | Combined W & WW  | \$134        | \$247   | \$411           |   |
|  | All Utilities    | \$148        | \$258   | \$374           |   |
| Water O&M Cost per MG Processed              | Serve > 500,000  | \$885        | \$1,320 | \$1,665         | FY2009: \$1,585<br>FY2010: \$1,555<br>FY2011: \$1,702 |
|  | Combined W & WW  | \$863        | \$1,431 | \$2,089         |   |
|  | All Utilities    | \$942        | \$1,459 | \$2,114         |   |
| Wastewater O&M Cost per Account <sup>2</sup> | Serve > 500,000  | \$120        | \$209   | \$303           | FY2009: \$216<br>FY2010: \$214<br>FY2011: \$225       |
|  | Combined W & WW  | \$114        | \$209   | \$291           |   |
|  | All Utilities    | \$127        | \$213   | \$306           |   |
| Wastewater O&M Cost per MG Processed         | Serve > 500,000  | \$906        | \$1,500 | \$1,859         | FY2009: \$1,984<br>FY2010: \$1,949<br>FY2011: \$2,067 |
|  | Combined W & WW  | \$1,200      | \$2,022 | \$3,044         |   |
|  | All Utilities    | \$1,148      | \$2,022 | \$2,986         |   |

<sup>1</sup>Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008)

<sup>2</sup>Includes total operation and maintenance costs, less depreciation and costs related to customer (commercial) services. PRASA reported values include payroll and related, power, chemicals, Superaqueduct service contract, insurance and other expenses, less capitalized operating expenses.

PRASA is currently implementing five key operational initiatives that target O&M optimization, cost reductions and revenue enhancements. These are:

- Non-Revenue Water (NRW) Reduction Program
- Comprehensive Energy Management Program
- Integrated Preventive Maintenance Program

- Treatment Plant Automation Program
- Customer Geodatabase and AMR/AMI Systems for Large Meter Customers

These operational initiatives represent significant operational and financial improvement opportunities for PRASA.

#### **E.4. Capital Improvement Program and Regulatory Compliance**

PRASA's CIP has a comprehensive listing of projects and budgets for the five fiscal years ending on June 30, 2016. In FY2011, PRASA's capital expenditures were approximately \$338.5 million (M). PRASA's FY2012-2016 CIP includes \$1,558.7M, of which approximately \$634.7M correspond to capital expenditures for mandatory (compliance-driven) projects.

There are 647 projects currently included in the CIP for the period FY2012 – FY2016. Projects included in the CIP cover major capital improvements identified throughout PRASA's five Operational Regions (North, South, East, West and Metro), as well as island-wide initiatives such as technological advancements, telemetry, preventive maintenance, meter replacement, and renewal and replacements (R&R) to the System.

PRASA's CIP addresses the requirements of the 2006 United States Environmental Protection Agency (USEPA) Wastewater Consent Decree (2006 Consent Decree, or the "Mega" Consent Decree), the 2006 Puerto Rico Department of Health (PRDOH) Drinking Water Settlement Agreement (PRDOH Agreement), and the 2010 USEPA Sludge Treatment Systems (STS) Consent Decree. Review of PRASA's CIP showed that all of the WTP and WWTP facilities that were considered unacceptable in terms of compliance currently have CIP projects identified to either rehabilitate or close the facility, thus addressing existing compliance problems.

The planned CIP along with the O&M initiatives are generally in alignment with the System needs. However, there may be additional R&R and CIP needs to address: 1) buried infrastructure improvements including, but not limited to, additional wastewater collection system repair improvements that PRASA may be required to implement to bring these into compliance, and 2) future regulations that may impact PRASA's System. Based on the condition assessment and CIP review completed by MPPR/Malcolm Pirnie, PRASA has an adequate CIP implementation program that, if well managed, it is expected to meet PRASA's needs. The existing CIP includes a contingency to address future regulations and any other regulatory requirements that PRASA may need to comply with. However, the impact of these may require significant operational and capital investments, which may not be covered by these contingencies. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs.

## **E.5. Financial Analysis**

In the preparation of this Supplemental Report, MPPR/Malcolm Pirnie reviewed the PRASA-prepared FY2012 through FY2016 financial forecast (the Forecast) shown in Exhibit 1 (enclosed at the end of this section). MPPR/Malcolm Pirnie opined on the reasonableness of this forecast and provided recommendations to PRASA. The purpose of MPPR/Malcolm Pirnie's review was to assess the adequacy of the revenues and expense categories that make up PRASA's Forecast. Additionally, the Forecast illustrates the anticipated debt service coverage (DSC) for the five fiscal years from July 1, 2011 through June 30, 2016 (the forecast period).

The Forecast presents PRASA's estimate of the expected results of operations and DSC for the forecast period. Thus, the Forecast reflects PRASA's judgment, based upon present circumstances, as to the most likely set of conditions and course of action. However, there will usually be differences between forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

Although PRASA experienced a reduction in service revenues of approximately \$27M from FY2010 to FY2011 (mostly due to one-time prior years' service charge adjustments that were recorded in FY2011, which had no impact on cash collections for the year), its collection rate significantly improved over previous years' results. Also, based on the results for FY2009 (\$11.8M), FY2010 (\$67.3M) and FY2011 (\$74.6M), PRASA continued to successfully implement its operational initiatives which to date have generated approximately \$155M in additional revenue for PRASA. In terms of expenses, PRASA has continued to reduce some of its operational costs, achieving reductions in several expense categories, with significant recorded reductions in the payroll and benefits expense category. However, while PRASA's energy consumption remains stable, electricity costs continue to increase.

In connection with the 2012 bond issue, on January 24, 2012 PRASA's Board of Directors authorized the execution of an amended and restated Master Agreement of Trust (2012 MAT) by and between PRASA and Banco Popular de Puerto Rico as Trustee, and an amended and restated Fiscal Oversight Agreement (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the Government Development Bank for Puerto Rico (GDB). PRASA's Forecast has been structured considering the requirements of both the 2012 MAT and the 2012 FOA including:

1. Change from a net revenue pledge to a gross revenue pledge for Senior, Senior Subordinated, and Subordinated lien levels.
2. Updated Rate Covenant requirements.
3. Creation of a Budgetary Reserve Fund to be held by the GDB in trust for PRASA that will hold the Budgetary Reserve Requirement to the extent funded by Commonwealth appropriations or other sources of funding.
4. Additional fiscal oversight requirements to be met by PRASA.

The Operating Revenues (presented on a cash basis) include service revenues (net of uncollectibles and subsidies), revenues from operational initiatives, as well as other sources of revenues such as interest income, developer fee contributions, and funds from the Rate Stabilization account. Operating Revenues exclude funds from the Budgetary Reserve Fund or special assignments from the Central Government. Upon review of the Operating Revenues, MPPR/Malcolm Pirnie found these to be reasonable.

Additionally, PRASA has included in its Forecast additional sources of revenue from the Budgetary Reserve Fund and Other Measures yet to be identified (also presented on a cash basis). These, combined with the Operating Revenues, make up the Authority Revenues. PRASA is projecting draws from the Budgetary Reserve Fund in amounts of \$95M and \$145M in fiscal years 2012 and 2013, respectively. These amounts shall be funded with bonds proceeds. The Forecast shows that PRASA projects funding deficits in the amount of \$330M, \$385M, and \$420M for FY2014, FY2015, and FY2016, respectively. PRASA is projecting that these deficits will be covered with additional transfers from the Budgetary Reserve Fund, from the implementation of changes in the rate structure (which may include rate increases), from other measures to increase revenues and/or reduce costs, or from a combination of these measures. MPPR/Malcolm Pirnie agrees that these projected deficits are accurate.

While PRASA's financial forecast does not specify how the Budgetary Reserve Fund will be funded once its initial funding has been depleted, the 2012 FOA clearly states that PRASA shall be obligated to implement revenue enhancing and/or cost reducing measures, revise its rates and fees, or implement a combination of these actions, in the case the Commonwealth fails to seek or receive an appropriation to satisfy the Budgetary Reserve Requirement. Also, even though PRASA has not raised rates in recent years due to the local economic situation in Puerto Rico, the Commonwealth has provided the necessary funding to cover deficits in FY2010, FY2011 and FY2012. As such, it is MPPR/Malcolm Pirnie's opinion that it is reasonable to assume that support from the Commonwealth will continue if it is needed at some time during the forecast period.

PRASA's Current Expenses projections (presented on an accrual basis) are also reasonable. Payroll and Benefits expenses take into consideration PRASA's recently negotiated and approved collective bargaining agreement conditions with its largest union (the UIA-AAA, by its Spanish acronym) and provides for additional salary increase in the future. Other expense projections such as electricity, chemicals, and maintenance and repair, include provisions to account for inflation over the forecast period. Conservatively, PRASA's Forecast does not include the potential additional cost savings resulting from PRASA's Comprehensive Energy Management Program. Year-to-date (YTD) results shall be closely monitored and projections shall be adjusted based on those results.

Finally, as shown Tables ES-3 and ES-4, the financial forecast also adequately addresses the DSC and Additional Bonds Test (ABT) requirements as defined in the 2012 MAT. Debt service



requirements in PRASA’s Forecast include current debt and projected future bond issuances that are expected to be necessary to finance the CIP. PRASA projects that it will meet the DSC targets as required by the MAT. If the DSC requirement is not met, the MAT outlines specific actions, remedies, and timetables for PRASA to comply with the MAT. The projected DSC results for the forecast period have been calculated using the Rate Covenant requirements as included in the 2012 MAT and the new definitions of Operating Revenues and Authority Revenues. Based on the anticipated annual debt service obligations over the forecast period and the projected Operating Revenues and Authority Revenues, PRASA would meet its DSC requirements. This is contingent upon PRASA being able to secure the necessary additional cash inflows resulting from changes in its rate structure, from the implementation of rate increases, and/or other measures; continuing with the successful implementation of its operational initiatives; maintaining its billings and collections performance; and controlling its operational expenses as projected.

**Table ES-3:  
FY2012 – FY2016 Projected Debt Service Coverage**

| Debt Service Level   | DSC Requirement | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 |
|--|-----------------|--------|--------|--------|--------|--------|
| Senior Debt  | 2.50            | 8.15   | 7.79   | 2.81   | 2.56   | 2.55   |
| Senior Subordinate Debt                                      | 2.00            | 7.59   | 7.79   | 2.81   | 2.56   | 2.46   |
| Subordinate Debt   | 1.50            | 7.59   | 7.79   | 2.81   | 2.56   | 2.46   |
| Authority Revenues / All Operating Expenses and Debt Service | 1.00            | 1.00   | 1.00   | 1.01   | 1.01   | 1.01   |

For ABT purposes, Operating Revenues are divided by the maximum annual debt service for any fiscal year. Table ES-3 summarizes PRASA’s projected ABT compliance over the forecast period (as shown in Exhibit 1). The projected ABT results for the forecast period have been calculated using the modified requirements as included in the 2012 MAT.

**Table ES-4:  
FY2012 – FY2016 Projected ABT Calculation**

| Debt Service Level      | Requirement <sup>1</sup> | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 |
|-------------------------|--------------------------|--------|--------|--------|--------|--------|
| Senior Debt             | 2.5/1.5                  | 3.20   | 2.77   | 2.60   | 2.54   | 2.55   |
| Senior Subordinate Debt | 2.0/1.5                  | 3.20   | 2.77   | 2.60   | 2.45   | 2.36   |
| Subordinate Debt        | 1.5                      | 3.20   | 2.77   | 2.60   | 2.45   | 2.36   |

<sup>1</sup> Two tests apply to future debt. The first test is Operating Revenues divided by existing and proposed debt service (at the existing lien level); the second test is Operating Revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

## **E.6. Conclusions**

In preparation of this report and the conclusions contained herein, MPPR/Malcolm Pirnie has relied on certain assumptions and information provided by PRASA with respect to the conditions which may exist or events which may occur in the future. MPPR/Malcolm Pirnie believes the information and assumptions are reasonable, but has not independently verified information provided by PRASA and others. To the extent that actual future conditions differ from those assumed herein or provided to us by others, the actual results will vary from those forecast.

Set forth below are the principal opinions which MPPR/Malcolm Pirnie has reached regarding the review of PRASA's System, CIP and financial projections; for a complete understanding of the assumptions upon which these opinions are based, this report should be read in its entirety:

1. The condition of the facilities visited varied from new to those requiring capital upgrades. The condition of most facilities with implemented CIP projects improved from FY2009 to FY2010. However, a number of treatment facilities are operating out of compliance with discharge permit limits and drinking water standards. Despite these compliance problems, the facilities are generally producing and delivering potable water and conveying and treating wastewater to a level of competency. PRASA reports that no material changes regarding the System condition have occurred since FY2010.
2. PRASA's O&M practices are adequate. However, there is a need for standardization of O&M practices across regions and the need for facility-specific O&M plans or manuals for facilities. Also, there is an identified need of standardized processes for prioritizing and scheduling preventative, corrective and routine maintenance activities.
3. PRASA's operational initiatives are well developed and address critical aspects of PRASA's operation such as energy costs and non-revenue water. The Revenue Optimization Program and Staff Reduction Program have provided significant benefits to PRASA in the form of increased revenues and cost reductions, respectively. Once implemented as planned, PRASA's operational initiatives could provide substantial additional economic and operational benefits to PRASA in the future.
4. PRASA must continue to maintain its commitment for the implementation of the IPMP. In addition, PRASA must continue a focused corrective maintenance and R&R program in order to improve leaks and overflow metrics, to maintain and improve the condition of the System, and to provide a program for the long-term preservation of the System assets. PRASA has included provisions for the continuous implementation of the IPMP in its CIP and O&M financial projections.

5. With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are generally in alignment with the System needs. Some additional needs at select plant facilities have been identified by PRASA in recent months.
6. On average, PRASA has included in its CIP approximately \$44.6M in each year of the Forecast for R&R. Given PRASA's high rate of leaks and overflows, and continuing aging infrastructure, PRASA should consider increasing its annual R&R program funding and accelerating its R&R program. For this, an analysis of PRASA's R&R needs and budget is recommended in order to develop a sound R&R program that will allow PRASA to improve and extend the useful life of its System.
7. The CIP adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies. The full impact of future regulations and other regulatory requirements on PRASA's System are not known at this time. In some cases, future regulations and additional regulatory requirements are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes and intensive repair programs. In general, the existing CIP does not include projects intended solely to address future regulations or additional regulatory requirements that may be imposed on PRASA. Although, the existing CIP includes a contingency to address future regulations and any other regulatory requirements that PRASA may need to comply with, the impact of these may require significant operational and capital investments. PRASA continues to make allowances in its new designs to improve capabilities to meet certain future regulations. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs.
8. Overall, PRASA's revenues and expenses included in its Forecast for fiscal years 2012 through 2016 (included in Exhibit 1) are reasonable based on recent historical performance. Based on this Forecast, PRASA's should be able to comply with the Rate Covenant and the ABT requirements stipulated in the 2012 MAT. However, the probability of achieving this Forecast is conditioned on the following assumptions:
  - PRASA's ability to maintain its service revenues in a very challenging economic environment – Continued uncertainty and strain on the economy could cause further decline in the consumption patterns of PRASA customers and collections, resulting in further reductions in projected revenues. Hence, the YTD results for FY2012 should be closely monitored and projections for subsequent fiscal years shall be adjusted accordingly.
  - PRASA's ability to continue to successfully implement all of its operational initiatives – PRASA's financial forecast includes results from operational initiatives that have been described throughout this report. The financial forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/Malcolm Pirnie's conclusions regarding the Forecast assume the framework and execution of the

operational initiatives will not materially change; any changes could significantly alter the findings contained and presented in this report. Although PRASA has made a dedicated commitment to implement the initiatives described in this report, there is a possibility that the projected results and, more specifically, the timing of those results will not be achieved.

- PRASA’s ability to secure other sources of revenue beyond FY2013 (after the initial funding of the Budgetary Reserve Fund has been depleted) – Starting in FY2014, compliance with the Rate Covenant and DSC requirements included in the 2012 MAT is contingent upon PRASA obtaining additional sources of revenues from the Budgetary Reserve Fund, as a result of future replenishments from the Central Government Fund or other sources of funding, or from the implementation of changes in its rate structure. The additional revenue requirements projected for FY2013, FY2014 and FY2015 amount to approximately \$330M, \$385M, and \$420M, respectively. In the event the Budgetary Reserve Fund is depleted and not replenished with additional funding (i.e., with additional Central Government appropriations or other sources of funding), PRASA would be required to implement revenue enhancing and/or cost reduction measures, rate structure changes, or a combination of these actions, that would generate sufficient revenues to meet its DSC requirements. These additional measures would have to provide an equivalent percent increase in revenues of approximately 45% in FY2014, with additional increases of, approximately, 5% in FY2015, and 3% in FY2016.



**FINAL REPORT**  
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**EXHIBIT 1**

| PRASA FINANCIAL PROJECTIONS PRO FORMA<br>(\$, Thousands)                                      | FY2012<br>PROJECTION | FY2013<br>PROJECTION | FY2014<br>PROJECTION | FY2015<br>PROJECTION | FY2016<br>PROJECTION |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| <b>OPERATING REVENUES</b>   |                      |                      |                      |                      |                      |
| 1 Service Collections   |                      |                      |                      |                      |                      |
| 2 Base Fee and Service Charges  | \$740,000            | \$730,000            | \$730,000            | \$730,000            | \$730,000            |
| 3 Operational Initiatives - Additional Billings   | 35,000               | 40,000               | 40,000               | 40,000               | 40,000               |
| 4 Operational Initiatives - Collections from Prior Years                                      | 25,000               | 20,000               | 20,000               | 4,000                | 5,000                |
| 5 Reserve for Uncollectible Accounts  | (54,309)             | (75,190)             | (75,190)             | (75,190)             | (75,190)             |
| 6 PAN/TANF Subsidy  | (4,000)              | (4,000)              | (4,000)              | (4,000)              | (4,000)              |
| 7 Subsidy to Public Housing   | (12,000)             | (12,000)             | (12,000)             | (12,000)             | (12,000)             |
| 8 Miscellaneous Income  | 4,000                | 4,000                | 4,000                | 4,000                | 4,000                |
| 9 Special Assessments   | 5,000                | 3,000                | 3,000                | 3,000                | 3,000                |
| 10 Transfer from/(to) Rate Stabilization Account  | -                    | -                    | -                    | -                    | -                    |
| 11 <b>Total Operating Revenues</b>  | <b>\$738,691</b>     | <b>\$705,810</b>     | <b>\$705,810</b>     | <b>\$689,810</b>     | <b>\$690,810</b>     |
|   |                      |                      |                      |                      |                      |
| 12 Other Sources of Revenue   |                      |                      |                      |                      |                      |
| 13 Transfer from Budgetary Reserve Fund   | \$95,000             | \$145,000            | -                    | -                    | -                    |
| 14 General Fund Contributions   | 70,264               | -                    | -                    | -                    | -                    |
| 15 Additional External Support/Other Measures/Rate Increases                                  | -                    | -                    | 330,000              | 385,000              | 420,000              |
| 16 <b>Total Other Sources of Revenue</b>  | <b>\$165,264</b>     | <b>\$145,000</b>     | <b>\$330,000</b>     | <b>\$385,000</b>     | <b>\$420,000</b>     |
| 17 <b>Total Authority Revenues (Line 11 + Line 15)</b>  | <b>\$903,955</b>     | <b>\$850,810</b>     | <b>\$1,035,810</b>   | <b>\$1,074,810</b>   | <b>\$1,110,810</b>   |
|   |                      |                      |                      |                      |                      |
| <b>OPERATING EXPENSES</b>   |                      |                      |                      |                      |                      |
| 18 Payroll and Related  | \$283,493            | \$292,123            | \$296,819            | \$301,474            | \$307,954            |
| 19 Electric Power   | 175,000              | 180,250              | 185,658              | 191,227              | 196,964              |
| 20 Maintenance and Repair   | 42,652               | 43,932               | 45,250               | 46,607               | 48,005               |
| 21 Chemicals  | 30,000               | 30,900               | 31,827               | 32,782               | 33,765               |
| 22 Superaqueduct Service Contract   | 26,900               | 27,169               | 27,441               | 27,715               | 27,992               |
| 23 Insurance  | 12,410               | 12,782               | 13,166               | 13,561               | 13,968               |
| 24 Other Expenses   | 125,522              | 129,288              | 133,166              | 137,161              | 141,276              |
| 25 Special Projects Reserve   | 10,484               | -                    | -                    | -                    | -                    |
| 26 Capitalized Operating Expenses   | (39,422)             | (40,837)             | (41,800)             | (42,780)             | (43,886)             |
| 27 <b>Total Operating Expenses</b>  | <b>\$667,039</b>     | <b>\$675,607</b>     | <b>\$691,527</b>     | <b>\$707,747</b>     | <b>\$726,038</b>     |
|   |                      |                      |                      |                      |                      |
| 28 Total Senior Debt Service (S + SSUB + SUB)   | \$97,296             | \$90,600             | \$251,268            | \$269,606            | \$280,731            |
| 29 Revenues Available for Operating Expenses and Other Debt Service After Senior Debt Service | \$806,659            | \$760,210            | \$784,542            | \$805,204            | \$830,079            |
| 30 Total Commonwealth Debt Service (CGI & CSO)  | \$137,363            | \$80,934             | \$84,593             | \$88,890             | \$95,495             |
| 31 <b>Net Authority Revenues After Operating Expenses and All Debt Service Obligations</b>    | <b>\$2,257</b>       | <b>\$3,669</b>       | <b>\$8,422</b>       | <b>\$8,567</b>       | <b>\$8,546</b>       |
|   |                      |                      |                      |                      |                      |
| <b>DEBT SERVICE</b>   |                      |                      |                      |                      |                      |
| Senior (S)  | \$90,600             | \$90,600             | \$251,268            | \$269,606            | \$271,421            |
| Senior Subordinated (SSUB)  | 6,696                | -                    | -                    | -                    | 9,310                |
| Subordinated (SUB)  | -                    | -                    | -                    | -                    | -                    |
| Commonwealth Guaranteed Indebtednes (CGI)   | 109,649              | 80,934               | 84,593               | 87,296               | 86,496               |
| Commonwealth Supported Obligations (CSO)  | 27,714               | -                    | -                    | 1,594                | 8,999                |
| <b>Total Debt Service</b>   | <b>\$234,659</b>     | <b>\$171,534</b>     | <b>\$335,861</b>     | <b>\$358,496</b>     | <b>\$376,226</b>     |

\*Numbers may not add up due to rounding

**FINAL REPORT**  
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**EXHIBIT 1**

**PRASA FINANCIAL PROJECTIONS PRO FORMA  
DEBT SERVICE COVERAGE AND ADDITIONAL BOND TESTS  
(\$, Thousands)**

|  | <b>FY2012<br/>PROJECTION</b> | <b>FY2013<br/>PROJECTION</b> | <b>FY2014<br/>PROJECTION</b> | <b>FY2015<br/>PROJECTION</b> | <b>FY2016<br/>PROJECTION</b> |
|--|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 1 Operating Revenues   | \$738,691                    | \$705,810                    | \$705,810                    | \$689,810                    | \$690,810                    |
| 2 Other Sources of Revenue   | 165,264                      | 145,000                      | 330,000                      | 385,000                      | 420,000                      |
| 3 Authority Revenues (Line 1 + Line 2)   | <b>\$903,955</b>             | <b>\$850,810</b>             | <b>\$1,035,810</b>           | <b>\$1,074,810</b>           | <b>\$1,110,810</b>           |
| 4 Operating Expenses   | \$667,039                    | \$675,607                    | \$691,527                    | \$707,747                    | \$726,038                    |
| <b>Senior Debt</b>   |                              |                              |                              |                              |                              |
| 5 <b>Senior</b>  |                              |                              |                              |                              |                              |
| 6 Annual Debt Service  | \$90,600                     | \$90,600                     | \$251,268                    | \$269,606                    | \$271,421                    |
| 7 DS Coverage Required = 2.50  | 8.15                         | 7.79                         | 2.81                         | 2.56                         | 2.55                         |
| 8 Maximum Annual Debt Service  | \$230,792                    | \$254,711                    | \$271,422                    | \$271,422                    | \$271,422                    |
| 9 ABT Coverage Required = 2.50   | 3.20                         | 2.77                         | 2.60                         | 2.54                         | 2.55                         |
| 10 <b>Senior &amp; Senior Subordinated</b>   |                              |                              |                              |                              |                              |
| 11 Annual Debt Service   | \$97,296                     | \$90,600                     | \$251,268                    | \$269,606                    | \$280,731                    |
| 12 DS Coverage Required = 2.00   | 7.59                         | 7.79                         | 2.81                         | 2.56                         | 2.46                         |
| 13 Maximum Annual Debt Service   | \$230,792                    | \$254,711                    | \$271,422                    | \$281,024                    | \$292,747                    |
| 14 ABT Coverage Required = 2.0   | 3.20                         | 2.77                         | 2.60                         | 2.45                         | 2.36                         |
| 15 <b>Senior, Subordinated Subordinated &amp; Subordinated</b>                             |                              |                              |                              |                              |                              |
| 16 Annual Debt Service   | \$97,296                     | \$90,600                     | \$251,268                    | \$269,606                    | \$280,731                    |
| 17 DS Coverage Required = 1.50   | 7.59                         | 7.79                         | 2.81                         | 2.56                         | 2.46                         |
| 18 Maximum Annual Debt Service   | \$230,792                    | \$254,711                    | \$271,422                    | \$281,024                    | \$292,747                    |
| 19 ABT Coverage Required = 1.50  | 3.20                         | 2.77                         | 2.60                         | 2.45                         | 2.36                         |
| 20 Net Authority Revenues  | \$806,659                    | \$760,210                    | \$784,542                    | \$805,204                    | \$830,079                    |
| 21 Total Operating Expenses  | 667,039                      | 675,607                      | 691,527                      | 707,747                      | 726,038                      |
| 22 Net Authority Revenues Available for Other Debt   | <b>\$139,620</b>             | <b>\$84,603</b>              | <b>\$93,015</b>              | <b>\$97,457</b>              | <b>\$104,041</b>             |
| <b>Other Debt</b>  |                              |                              |                              |                              |                              |
| 23 <b>Commonwealth Guaranteed Indebtedness</b>   |                              |                              |                              |                              |                              |
| 24 Annual Debt Service   | 109,649                      | 80,934                       | 84,593                       | 87,296                       | 86,496                       |
| 25 DS Coverage Required = 1.00   | 1.27                         | 1.05                         | 1.10                         | 1.12                         | 1.20                         |
| 26 <b>Commonwealth Supported Obligations</b>   |                              |                              |                              |                              |                              |
| 27 Annual Debt Service   | 27,714                       | -                            | -                            | 1,594                        | 8,999                        |
| 28 DS Coverage Required = 1.00   | 1.02                         | 1.05                         | 1.10                         | 1.10                         | 1.09                         |
| 29 Total Annual Debt Service   | \$234,659                    | \$171,534                    | \$335,861                    | \$358,496                    | \$376,226                    |
| 30 <b>Net Authority Revenues After Operating Expenses and All Debt Service Obligations</b> | <b>\$2,257</b>               | <b>\$3,669</b>               | <b>\$8,422</b>               | <b>\$8,567</b>               | <b>\$8,546</b>               |
| 31 <b>Total Authority Revenues / All Obligations (Operating Expenses + Debt Service)</b>   | <b>1.00</b>                  | <b>1.00</b>                  | <b>1.01</b>                  | <b>1.01</b>                  | <b>1.01</b>                  |

\*Numbers may not add up due to rounding

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# 1 Introduction

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## 1.1 Introduction

MP Engineers of Puerto Rico, PSC and its subcontractor Malcolm Pirnie, Inc. (MPPR/Malcolm Pirnie), as Consulting Engineer of the Puerto Rico Aqueduct and Sewer Authority (PRASA), has been retained to prepare this Supplemental Report in support of PRASA's 2012 issuance of new debt. The proceeds of the 2012 issuance will be used by PRASA to mainly (i) refinance certain lines of credits (LOCs) and bond anticipation notes (BANs), (ii) fund a portion of the cost of its Capital Improvement Program (CIP), (iii) provide initial funding for the Budgetary Reserve Fund, (iv) establish a deposit for capitalized interests, (v) pay for expenses related to the issuance of the Senior Lien Revenue Bonds, and (vi) provide additional financial liquidity to PRASA.

Since 2008, MPPR/Malcolm Pirnie have been retained by PRASA to assist in satisfying several requirements of the 2008 Master Agreement of Trust (2008 MAT) between PRASA and the Trustee with bondholders. MPPR/Malcolm Pirnie understands that PRASA entered into the 2008 MAT to enable it to issue revenue bonds and incur other indebtedness to partially finance its CIP and to repay and refinance existing debt. MPPR/Malcolm Pirnie prepared a Consulting Engineer's Report (CER) on January of 2008 (2008 CER) to document and assess technical, operational and financial issues and related matters of PRASA's water and wastewater systems (the System). The 2008 CER was included in PRASA's Official Statement (OS) related to its March 2008 bond issuance.

MPPR/Malcolm Pirnie, as the Consulting Engineer, prepared a CER for fiscal years 2009 and 2010 to document the condition and changes, if any, in PRASA's operation and the performance of the System, a requirement of the 2008 MAT. In March of 2010, MPPR/Malcolm Pirnie issued the 2009 CER, which covered the period from July 1, 2008 to June 30, 2009. Subsequently, the 2010 CER, which covers the period from July 1, 2009 to June 30, 2010, was issued in February of 2011.

This Supplemental Report presents MPPR/Malcolm Pirnie's opinion with respect to the technical, operational and financial issues and related matters of PRASA's System through November 30, 2011. Any statements in this CER involving estimates or matters of opinion, whether or not so specifically designated, are intended as such, and not as representations of fact. MPPR/Malcolm Pirnie has not independently verified the accuracy of the reports and other information indicated as being provided by PRASA for the conduct of this assignment. To the extent that the information provided to MPPR/Malcolm Pirnie by PRASA is not accurate, the conclusions and recommendations contained in this CER may vary and are subject to change. Changed conditions occurring or becoming known after the issuance of or beyond the period covered by this Supplemental Report could affect the material presented to the extent of such changes.

MPPR/Malcolm Pirnie has no responsibility for updating this report for changes that occur beyond the date of its issuance.

## **1.2 Conventions**

PRASA's fiscal year begins on July 1<sup>st</sup> and ends June 30<sup>th</sup>. Throughout this Supplemental Report, fiscal year is identified as "FY" followed by the calendar year in which the fiscal year ends, i.e., FY2012 is the fiscal year from July 1, 2011 through June 30, 2012.

## **1.3 Acronyms**

A listing of acronyms or abbreviations of terms used in this report is included in the Table of Contents.

## 2 Condition of System

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### 2.1 Introduction

PRASA is a public utility responsible for the production and distribution of potable water and collection, treatment, and disposal of a large portion of domestic and industrial pretreated wastewaters in Puerto Rico. PRASA serves a population of approximately 3.7 million residents<sup>1</sup> plus approximately 5 million visitors annually<sup>2</sup>. PRASA can be considered a monopoly since it is the only water and wastewater utility in Puerto Rico, providing water and wastewater service to about 97% and 59% of Puerto Rico's population, respectively. While this is positive in terms of sales of services it also makes PRASA a critical entity for the wellbeing of Puerto Rico. The effective operation of this vital public service is essential to the health and economic prosperity of Puerto Rico and its citizens.

PRASA provides water and wastewater service throughout the island, which has an approximate area of 3,535 square miles. Due to the fact that Puerto Rico is an island with varied topography, isolated demographic distributions, and a diverse mix of users, PRASA has a somewhat fragmented and localized system of water sources, treatment systems and delivery systems. As a result, PRASA has many more treatment facilities than most utilities serving a similar number of customers. This results in a higher degree of diversity in PRASA's assets in terms of size, treatment technologies, and age when compared to systems in the United States (U.S.) and Canada, which tend to have more centralized systems with larger regional facilities. These facts add complexity to the management of the System and contribute to higher operation and maintenance (O&M) costs compared to other utilities serving similar populations. At the time of this assessment and based on PRASA's updated Geographic Information System (GIS) database, as of FY2011 PRASA operates eight regulated dams, 126 water treatment plants (WTPs), 54 wastewater treatment plants (WWTPs), 1,182 water pump stations (WPSs), 1,004 wastewater pumping stations (WWPSs), 299 wells, and 1,723 water storage tanks.

### 2.2 FY2010 Asset Condition Results

In FY2010, MPPR/Malcolm Pirnie assessed the condition of PRASA's System through an inspection program of a sample that included the major elements of PRASA's System. The purpose of these inspections was to identify the overall condition of the facilities to determine if they are being operated and maintained in a manner to achieve their operating goals and to evaluate if PRASA's CIP is aligned with identified needs. These inspections were performed from January 28, 2010 through March 16, 2010.

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<sup>1</sup> 2010 United States Census

<sup>2</sup> Source: Puerto Rico Tourism Company statistics for fiscal years 2004 through 2009.

Tables 2-1 and 2-2 present the categories of PRASA’s assets that were inspected as part of this CER, along with the total quantity of PRASA assets, number of facilities inspected, and percent of total facilities inspected. The quantity of PRASA assets included in the tables below is based on the latest data obtained from PRASA’s GIS database. These numbers vary from those reported in previous years given that PRASA continues to digitize and incorporate both existing and new infrastructure data. As it is expected from any GIS, this information will fluctuate from year to year as a result of its further development and expansion, and the deletions and additions of assets to the System.

As shown in Table 2-1, all regulated dams were inspected, due to the value of these individual assets. Approximately 50% of the WTPs and WWTPs were inspected. Those inspected were facilities that served a considerable amount of clients and/or that had a lower rating in previous inspections conducted for and reported in the 2008 and 2009 CERs. The remaining 50% was not inspected since in the two previous inspections they had good or adequate ratings. As shown in Table 2-2, only a portion of the wells, pump stations and storage tanks (minor facilities) were inspected because of their lower individual facility value.

**Table 2-1:  
Large Value Assets (Major Facilities) Inspected by Asset Category**

| Asset Category              | Total PRASA Facilities | Inspections Performed |         |
|-----------------------------|------------------------|-----------------------|---------|
|                             |                        | Quantity              | Percent |
| Regulated Dams              | 8                      | 8                     | 100%    |
| Water Treatment Plants      | 127                    | 67                    | 53%     |
| Wastewater Treatment Plants | 60                     | 30                    | 50%     |
| Total                       | 195                    | 105                   | 54%     |

**Table 2-2:  
Lower Value Assets (Minor Facilities) Inspected by Asset Category**

| Asset Category           | Total PRASA Facilities | Inspections Performed |         |
|--------------------------|------------------------|-----------------------|---------|
|                          |                        | Quantity              | Percent |
| Wells                    | 299                    | 39                    | 13%     |
| Water Pump Stations      | 1,182                  | 52                    | 4%      |
| Water Storage Tanks      | 1,723                  | 54                    | 3%      |
| Wastewater Pump Stations | 1,004                  | 51                    | 5%      |
| Total                    | 4,208                  | 196                   | 5%      |

In total, 301 inspections were performed out of a total of 4,403 facilities. Furthermore, it should be noted that no inspections were performed on the following assets: small dams and weirs, buried infrastructure, meters, ocean outfalls, buildings, land, and other ancillary facilities.

### 2.2.1 Inspections Methodology

Inspections were performed throughout PRASA’s five operational Regions. To ensure consistency between inspections performed in 2008, 2009 and 2010, MPPR/Malcolm Pirnie utilized the same inspection forms used for the 2008 and 2009 CERs with some minor modifications. To standardize documentation and ratings, new inspectors were trained by MPPR/Malcolm Pirnie’s water and wastewater experts who also participated in the 2009 CER.

An attempt was made to obtain a representative sampling of the minor facilities by inspecting a large number of facilities within several focused Operational Areas across the island. The Operational Areas selected were those with a greater number of clients (Caguas, Ponce, Arecibo, Mayagüez, and San Juan). As the specific assets to be inspected were not pre-determined, this approach provided some assurance that MPPR/Malcolm Pirnie would not be inspecting only the best assets in an Operational Area. Upon arrival to a specific Operational Area, PRASA representatives guided inspectors to a selection of the minor facilities within their Operational Area.

Table 2-3 shows the number of facilities inspected within each Region. Because the Metro Region has fewer, but larger, WTPs and WWTPs (100% of which were inspected) compared to the other Regions, the total number of inspections in the Metro Region is less than in the other Regions. However, the Metro Region was inspected to an overall level consistent with the other Regions.

**Table 2-3:  
Summary of Inspections by Region**

| <i>Higher Value/Major Facilities</i>    |             |              |              |              |             |              |
|---|-------------|--------------|--------------|--------------|-------------|--------------|
| <b>Asset Category</b>                   | <b>East</b> | <b>Metro</b> | <b>North</b> | <b>South</b> | <b>West</b> | <b>Total</b> |
| Regulated Dams                          | 3           | 2            | 1            | 1            | 1           | <b>8</b>     |
| Water Treatment Plants                  | 15          | 5            | 16           | 16           | 15          | <b>67</b>    |
| Wastewater Treatment Plants             | 7           | 3            | 6            | 7            | 7           | <b>30</b>    |
| <b>Subtotal Higher Value Facilities</b> | <b>25</b>   | <b>10</b>    | <b>23</b>    | <b>24</b>    | <b>23</b>   | <b>105</b>   |
| <i>Lower Value/Minor Facilities</i>     |             |              |              |              |             |              |
| <b>Asset Category</b>                   | <b>East</b> | <b>Metro</b> | <b>North</b> | <b>South</b> | <b>West</b> | <b>Total</b> |
| Wells                                   | 1           | 0            | 17           | 11           | 10          | <b>39</b>    |
| Water Pump Stations                     | 11          | 10           | 12           | 10           | 9           | <b>52</b>    |
| Water Storage Tanks                     | 10          | 11           | 13           | 11           | 9           | <b>54</b>    |
| Wastewater Pump Stations                | 11          | 9            | 11           | 10           | 10          | <b>51</b>    |
| <b>Subtotal Lower Value Facilities</b>  | <b>33</b>   | <b>30</b>    | <b>53</b>    | <b>42</b>    | <b>38</b>   | <b>196</b>   |
| <b>Total Inspected Facilities</b>       | <b>58</b>   | <b>40</b>    | <b>76</b>    | <b>66</b>    | <b>61</b>   | <b>301</b>   |

As in previous CERs, each category of asset was inspected using an inspection form, criteria, and criteria weighting customized to that specific asset category. The evaluation criteria were chosen from the following list for each asset inspection.

- Compliance– degree to which the performance of the asset is in compliance with its permit limits and regulatory requirements.
- Equipment / Maintenance – assessment of the adequacy of the maintenance practices and the condition of the facility.
- Operations / Process Control – degree to which asset condition and features allow it to be operated and controlled to meet its performance objectives.
- Staffing / Training – assessment of the adequacy of facility staffing coverage and training.

Within each of the evaluation criteria, the asset inspected was assigned a numerical rating between zero and three (“0-3”). An overall facility rating was then determined based on the calculation of a weighted average of the ratings for each criterion. The numerical ratings are described below:

| <u>Rating</u>  | <u>Range</u> |
|--|--------------|
| ■ Good (Most of the criteria are adequately addressed)             | 2.5 – 3.0    |
| ■ Adequate (Many of the criteria are adequately addressed)         | 1.5 – 2.4    |
| ■ Poor (Many of the criteria are not adequately addressed)         | 0.5 – 1.4    |
| ■ Unacceptable (Most of the criteria are not adequately addressed) | 0.0 – 0.4    |

A summary of the inspection results for each asset category is discussed below.

### **2.2.2 Inspection Results**

Based on the most recent facility inspections performed between January and March of 2010, the condition of the facilities visited varied from new to those requiring capital upgrades. The following facilities, particularly, required immediate attention from PRASA, as outlined in the 2010 CER:

- Isabela Regulator Lake required maintenance of the geomembrane liner to avoid a potential reduced lifespan for the facility.
- Three WTPs were rated poor in overall condition (San Germán, Cedro Arriba and Caguas Norte), mainly due to compliance violations (CFE Turbidity, Total Coliform and HAA) and lack of sludge treatment.
- Five WWTPs (Vega Baja, Guayama, Ponce, Yauco and Sabana Grande) out of 30 were rated poor due to issues associated with compliance and Operations/Process Control; Vega Baja received the lowest rating (1.1); the facility has three treatment process trains and needs improvement in the operational strategy for process control.



PRASA’s operations and infrastructure personnel have indicated that they have defined new projects or actions to address the majority of these issues. These are expected to be addressed either through PRASA’s CIP (with existing or future projects) or directly by the Operational Regions through the O&M improvement program.

Compliance with discharge permit limits and drinking water standards varied greatly depending on the plant age and condition, and experience of the operators. A number of PRASA’s WTPs and WWTPs are included in the 2006 United States Environmental Protection Agency (USEPA) Consent Decree and the 2010 Puerto Rico Department of Health (PRDOH) Agreement, and some of these facilities are either scheduled for closure (through consolidation to regional facilities) or have ongoing or planned capital improvements to address compliance problems and/or increase treatment capacity.

Despite some compliance problems, the System is producing and delivering potable water and conveying and treating wastewater. The condition of many facilities is not entirely unexpected, due to historically insufficient commitment of capital and operational resources (prior to FY2006). The planned capital programs along with the O&M improvements are generally in alignment with the System needs, although the needs of PRASA’s buried infrastructure (i.e. water and sewer pipelines) must be assessed to better identify measures to improve performance. Annual results for leak and overflow metrics show that PRASA should look into the causes of its high reported frequency and duration of these events so that corrective measures can be implemented and performance is improved. The table below offers a comparison of the average result for each facility type for each fiscal year in which facility inspections were performed; for additional information please refer to the 2010 CER.

**Table 2-4:  
Summary of Inspections by Facility Type**

| Fiscal Year | Facility Type (Score) |      |       |       |     |       |      |
|-------------|-----------------------|------|-------|-------|-----|-------|------|
|             | Dams                  | WTPs | WWTPs | Wells | WPS | Tanks | WWPS |
| 2008        | 2.3                   | 2.2  | 1.9   | 2.0   | 2.2 | 1.9   | 1.7  |
| 2009        | 2.1                   | 2.4  | 2.0   | 1.9   | 2.2 | 1.6   | 2.0  |
| 2010        | 2.3                   | 2.3  | 2.0   | 2.1   | 2.3 | 1.6   | 2.0  |

### 2.2.3 Buried Infrastructure

Although buried infrastructure (i.e. water mains, buried valves, sewer mains, manholes, etc.) was not inspected, the following sections provide some discussion regarding indirect indicators of the condition of these assets. PRASA continues to update its GIS database as infrastructure projects are completed and as additional information is obtained regarding existing infrastructure. Furthermore, PRASA has used this data to conduct hydraulic models of specific service areas in the Metro, East and West Regions to identify optimization opportunities in the System. PRASA

continues with its buried infrastructure renovation and replacement (R&R) program. Pipe R&R, which targets pipe break and leak-prone areas, are identified by PRASA’s Operational Areas and prioritized according to severity of the problem. PRASA plans to continue replacing and repairing piping in order to bring the System to optimal operating conditions.

**2.2.3.1 Non-Revenue Water**

Non-Revenue Water (NRW) is water that has been produced but is not billed to customers. NRW consists of two main components: commercial (apparent) losses and physical (real) losses as shown in the water balance summary presented in Figure 2-1. For purposes of this report, NRW is defined as follows:

$$NRW = \frac{(\text{volume produced} - \text{volume billed})}{\text{volume produced}}$$

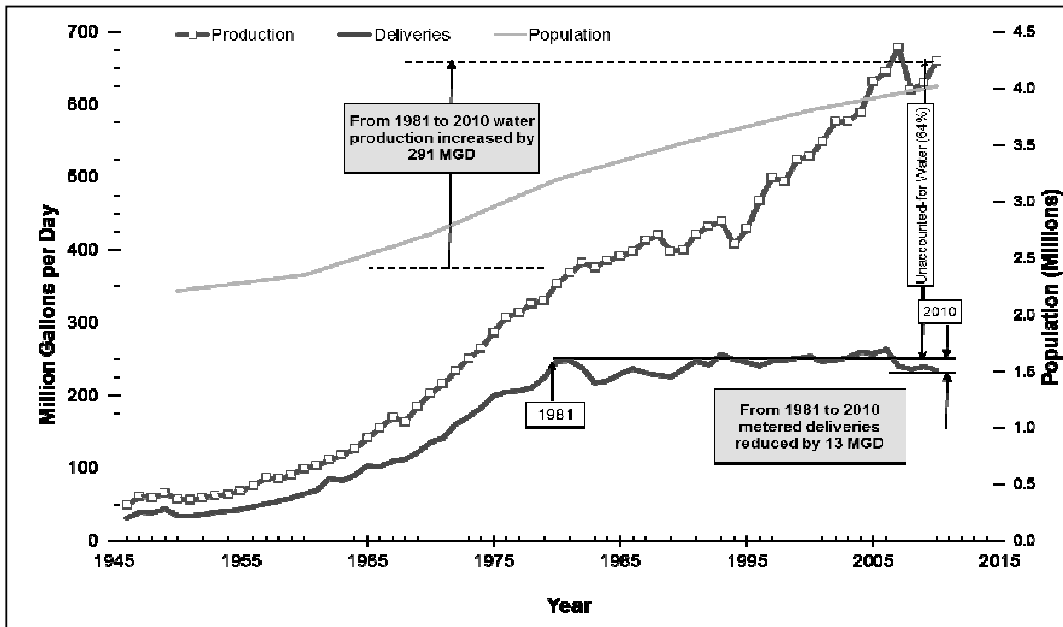
**Figure 2-1: Water Balance Summary**

|  |                        |  |                                  |                     |                       |                   |
|--|------------------------|--|----------------------------------|---------------------|-----------------------|-------------------|
| System Input Volume (Dispatched Water) | Authorized Consumption | Billed Authorized Consumption          | Billed Metered Consumption       | Accounted for Water | Revenue Water         |                   |
|  |                        |  | Billed Unmetered Consumption     |                     |                       |                   |
|  |                        | Unbilled Authorized Consumption        | Unbilled Metered Consumption     |                     | Unaccounted for Water | Non-Revenue Water |
|  |                        |  | Unbilled Unmetered Consumption   |                     |                       |                   |
|  | Water Losses           | Commercial Losses<br>(Apparent Losses) | Unauthorized Consumption (theft) |                     |                       |                   |
|  |                        |  | Customer Metering Inaccuracies   |                     |                       |                   |
|  |                        |  | Data Handling (Billing) Errors   |                     |                       |                   |
|  |                        | Physical Losses<br>(Real Losses)       | Main Line Leakage                |                     |                       |                   |
|  |                        |  | Storage Tank Overflows           |                     |                       |                   |
|  |                        |  | Service Connection Leakage       |                     |                       |                   |

Source: American Water Works Association and International Water Association

Historically, PRASA’s NRW has increased as water production has increased. As illustrated in Figure 2-2 below, PRASA’s NRW has dramatically increased over the past 25 years.

Figure 2-2: PRASA Production and Delivery of Water



As summarized in Table 2-5 below, for the past seven fiscal years PRASA has annually billed, on average, over 330 million cubic meters of water to customers. This amount represents approximately 39% of PRASA’s annual water production. The remaining water produced is NRW, which has varied from 62% in FY2007 to 64% in FY2011. Based on the water consumptions calculated by CDM Caribe in the report titled “Update of Puerto Rico Water Demand Forecast”, it was estimated that 15% of produced water is NRW due to commercial losses, whereas the other 49% is due to physical losses. The commercial losses are the difference between the water consumption estimated by CDM and the water consumption invoiced by PRASA. The physical losses are the difference between the water production and the consumption estimated by CDM.

Table 2-5:  
Water Sales and NRW

| Fiscal Year    | Water Sales by Client Type (m <sup>3</sup> ) |            |            |            |             | Estimated Total Water Produced (m <sup>3</sup> ) | Non-Revenue Water (m <sup>3</sup> ) | Volume NRW as Percentage of Total Water Production |
|----------------|--|------------|------------|------------|-------------|--|-------------------------------------|--|
|                | Residential                                  | Commercial | Industrial | Government | Total       |  |                                     |  |
| 2007           | 263,088,570                                  | 42,712,379 | 11,858,269 | 32,653,127 | 350,312,345 | 934,019,760                                      | 583,707,415                         | 62%  |
| 2008           | 244,623,520                                  | 41,160,542 | 11,952,555 | 28,867,287 | 326,603,904 | 857,109,800                                      | 530,505,896                         | 62%  |
| 2009           | 246,561,753                                  | 41,628,183 | 11,575,856 | 31,058,569 | 330,824,361 | 893,225,775                                      | 562,401,414                         | 63%  |
| 2010           | 244,324,000                                  | 38,284,000 | 9,807,000  | 32,757,000 | 325,172,000 | 910,487,463                                      | 585,315,463                         | 64%  |
| 2011           | 236,658,000                                  | 40,204,000 | 13,837,000 | 33,459,000 | 324,159,000 | 892,569,179                                      | 568,410,179                         | 64%  |
| 5-Year Average | 243,041,818                                  | 40,797,821 | 11,806,136 | 31,758,997 | 331,414,322 | 897,482,395                                      | 566,068,073                         | 64%  |

Source: PRASA customer and billing database. Numbers may not add up due to rounding

Based on a comparison to other utilities in the U.S. and Canada, PRASA's NRW volume is extremely high. In the most recent utility survey available at the time this CER was being prepared, the distribution system water losses median for all survey participants ranged from 8.5% to about 9.9%<sup>3</sup>.

As indicated above, PRASA's NRW falls well outside the normal range for this performance metric. PRASA management recognizes this amount of NRW is unacceptable and has designated this as a top improvement priority. PRASA also recognizes that if it can reduce NRW, it will increase revenue, reduce O&M expenses, and reduce the need for capital improvements to increase water supply. Therefore, PRASA is developing and implementing a series of actions to address the primary contributors of these water losses. These initiatives are further described in Section 3 of this Supplemental Report.

### **2.2.3.2 Leaks and Overflows**

Annual results for leak and overflow metrics show that PRASA should look into the causes of its high reported frequency and duration of these events so that corrective measures can be implemented and performance is improved. Possible adjustments to PRASA's buried infrastructure R&R budget, as well as an evaluation of available staff resources to perform repairs, may be necessary to improve performance levels regarding number and duration of leaks and overflows. Also, PRASA should evaluate and revise its data processing and collection practices regarding reported and repaired leaks and overflows.

## **2.3 Year-to-Date System Condition Status**

In connection with the intended 2012 bond issuance, MPPR/Malcolm Pirnie performed interviews with PRASA's Operational Regional Directors in order to obtain information regarding any material changes that may have occurred since the last facility inspections were conducted. As of November 30, 2011, PRASA reports no material changes on the condition of the System. Overall, PRASA reports that the System continues to adequately produce and distribute water, and convey, treat and discharge wastewater.

Although no material changes are reported, PRASA reports that the following facilities/systems have been identified as needing immediate repairs/rehabilitation:

- Carolina Regional WWTP – Requires general equipment improvements and/or rehabilitation.
- Caguas Regional WWTP – Several additional improvement needs have been identified including: rehabilitation or replacement of degritters, blowers, and emergency generators.
- Mayagüez WWTP – Requires additional improvements and equipment rehabilitation

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<sup>3</sup> Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, published by the AWWA (2008).

PRASA's operations and infrastructure personnel have indicated that they have defined new projects or actions to address the majority of these issues. These are expected to be addressed either through PRASA's CIP (with existing or future projects) or directly by the Operational Regions through the O&M improvement program. This information has not been independently validated by the Consulting Engineer.

PRASA reports to having improved its leaks and overflow metrics. Additionally, PRASA operations personnel indicated concerns with several recent wastewater trunk sewer collapses. These collapses have occurred mostly during high rain events on aging infrastructure (concrete piping installed over 25 years ago). As part of its R&R program, PRASA has allocated budget to the replacement of certain trunk sewers; however, the required budgeted amount in future years may need to increase as the buried infrastructure continues to age.

### **2.3.1 Conclusions**

The condition of the facilities visited for the 2010 CER varied from new to those requiring capital upgrades. The condition of most facilities with implemented CIP projects improved from FY2009 to FY2010. However, certain facilities were operating out of compliance with discharge permit limits and drinking water standards. Despite these compliance problems, the facilities are generally producing and delivering potable water and conveying and treating wastewater to a level of competency. PRASA demonstrates a thorough understanding of the System shortcomings and continues to work towards correcting them.

With the exception of certain facilities that require equipment rehabilitation or replacement, through November 30, 2011, PRASA reports no material changes to the condition of the System reported in the 2010 CER. MPPR/Malcolm Pirnie has not independently validated this information through facility inspections.

## 3 O&M Practices and Operational Initiatives

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### 3.1 Introduction

As detailed in the 2010 CER, MPPR/Malcolm Pirnie assessed the adequacy of PRASA's O&M practices based on compliance with regulatory requirements, interviews with PRASA personnel and facility observations by field inspectors, etc. As concluded, based on the information evaluated for the 2010 CER, PRASA's O&M practices are adequate. However, two key findings of these facility inspections identified the need for facility-specific O&M plans or manuals for treatment plants and for standardized process for prioritizing, scheduling, and executing preventive, corrective and routine maintenance activities.

With the objective of developing a model operating standard for its plant facilities, PRASA began the development of the "Ideal Plant" initiative in FY2012. Based on the results of comprehensive audits at each facility, PRASA looks to identify and cost-effectively address facility-specific shortcomings in the following areas:

- Infrastructure
- Compliance
- Staff and training
- Operations and process controls
- Risk management and safety
- Documentation (i.e., O&M plans)

As of the date of this report, PRASA has conducted facility audits in six WWTPs and three WTPs (completed in December of 2011). Of the nine audited facilities, PRASA has selected four WWTPs (Caguas, Fajardo, Humacao and Aguadilla) to develop detailed optimization plans. These plans are expected to be completed by March of 2012 and their corresponding implementation, with the exception of any capital intensive improvements that may be required, is expected to be completed by September of 2012. PRASA expects to replicate the process in all of its treatment facilities in order to develop and implement optimization plans over the next five years.

Although PRASA has made an effort to reduce its O&M costs (as demonstrated through its reduction in payroll and benefits, later discussed), PRASA experienced an increase of approximately \$28M in FY2011 over FY2010 results due to higher costs in electricity, maintenance and repair, and other expenses such as professional services and materials and

supplies. For FY2012, PRASA budgeted O&M expenses for the water and wastewater system (combined) in the order of \$583M<sup>4</sup>. PRASA estimates that approximately 70% of its O&M budget is allocated for the water service system and the remaining 30% to the wastewater service system. Hence, approximately \$408M is allocated for the water system and the remaining \$175M to the wastewater system. Estimated costs per million gallons and per customer account are summarized in the table below.

**Table 3-1:  
PRASA FY2012 O&M Budget Metrics**

| Metric  | Water System |                        | Wastewater System |                        |
|---|--------------|------------------------|-------------------|------------------------|
|   | PRASA        | Benchmark <sup>1</sup> | PRASA             | Benchmark <sup>1</sup> |
| Total FY2012 Budget                                     | \$408M       | -                      | \$175M            | -                      |
| Cost per Account <sup>2</sup>                           | \$316.20     | \$258.00               | \$230.41          | \$213.00               |
| Cost per MG produced <sup>3</sup> /treated <sup>4</sup> | \$1,731.00   | \$1,459.00             | \$2,101.93        | \$2,022.00             |

<sup>1</sup>Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, AWWA (2008).

<sup>2</sup>Based on number of accounts at the end of FY2011 of 1,290,800.

<sup>3</sup>Based on FY2011 total production and distribution of approximately 646 million gallons per day (MGD) of potable water.

<sup>4</sup>Based on FY2011 total treatment of approximately 228 MGD of wastewater.

When compared to the median values for utilities in the U.S., these operational and cost metrics seem to be higher than average. However, this is not a surprising result considering the size and complexity of the System; PRASA’s high staffing levels, which translate into high payroll and benefits costs; and high electricity costs.

PRASA has continued to undertake numerous operational initiatives designed to enhance revenues and reduce O&M costs. MPPR/Malcolm Pirnie has reviewed these initiatives in order to understand their current status and validate how their corresponding results will impact PRASA’s financial projections for FY2012 through FY2016, later discussed.

### 3.2 Non-Revenue Water Reduction Program (Revenue Optimization Program)

In May 2008, PRASA began to implement a comprehensive Non-Revenue Water (NRW) Reduction Program to reduce water losses (apparent and real), increase revenue, reduce operational costs, and minimize water infrastructure capital investments. Reducing non-revenue water continues to be a high priority goal. As part of the NRW Reduction Program, PRASA’s

<sup>4</sup> Excludes approximately \$70M related to commercial activities and provision of customer services, including but not limited to: staffing and operation of customer service offices island-wide; meter reading; connection and disconnection services; invoice preparation, printing and distribution; customer service call centers; and water meter purchases, amongst others.

strategy has focused mostly on revenue optimization (enhancing) initiatives, which target apparent losses related to its commercial operation. These initiatives, which together make up the Revenue Optimization Program, have resulted in significant additional revenue for PRASA over the past three fiscal years.

As shown in the figure below, both in FY2010 and FY2011 PRASA exceeded its budgeted amount for operational initiatives. In FY2011 PRASA collected approximately \$74.6 million (M) in operational initiatives, 14.8% higher than the FY2011 approved budget amount of \$65M. In FY2010, PRASA collected \$67.3M through its NRW Reduction Program, \$19.3M more than the budgeted amount.

**Figure 3-1: Revenue Optimization Program Results FY2009-FY2011 (\$, Millions)**

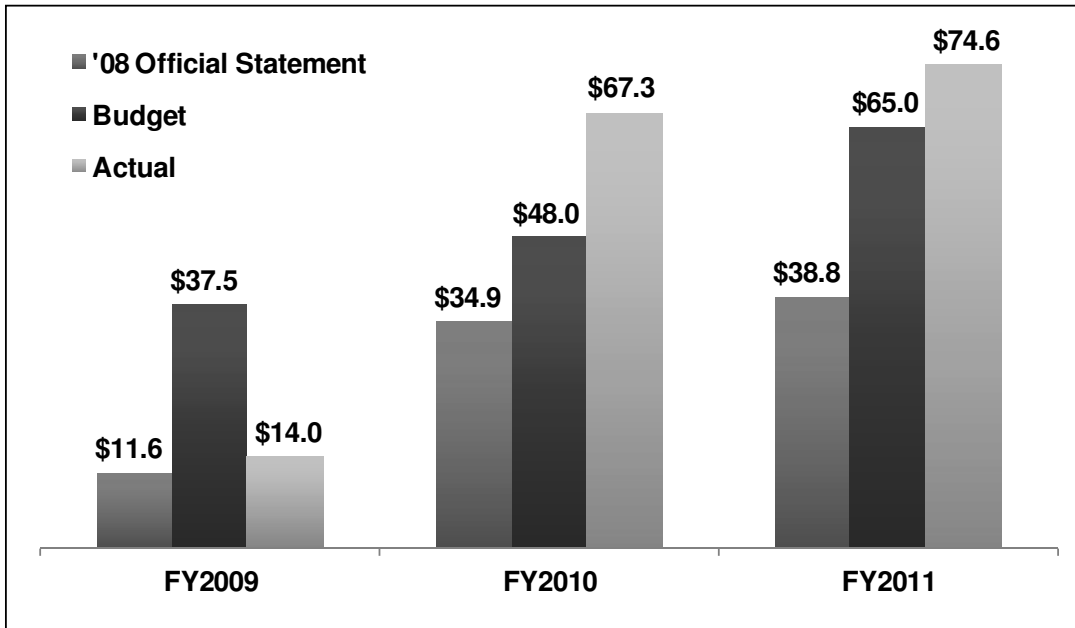


Table 3-2 presents a breakdown of the Revenue Optimization Program initiatives, their respective revenue impact budgeted for FY2012 and estimated annual benefits for FY2013 through FY2016.



**Table 3-2:  
Revenue Optimization Program Initiatives –  
FY2011 – FY2016 (\$, Thousands)**

| Initiative                         | FY 2011 Results | FY 2012 Budget  | FY2013 Projection | FY2014 Projection | FY2015 Projection | FY2016 Projection |
|------------------------------------|-----------------|-----------------|-------------------|-------------------|-------------------|-------------------|
| Small Meters                       | \$21,798        | \$27,285        | \$31,318          | \$33,574          | \$34,431          | \$35,216          |
| Degradation                        | (7,000)         | (7,000)         | (7,000)           | (7,000)           | (7,000)           | (7,000)           |
| Large Meters                       | 14,118          | 7,467           | 7,801             | 7,011             | 6,433             | 5,813             |
| Theft and Tx <sup>1</sup> Accounts | 16,801          | 7,902           | 8,715             | 7,729             | 3,661             | 3,661             |
| Sprinklers                         | 1,564           | 1,406           | 1,549             | 882               | 882               | 882               |
| Collection Management              | 1,956           | 1,250           | 625               | 625               | -                 | -                 |
| Disconnections                     | 20,090          | 15,950          | 13,750            | 11,550            | -                 | -                 |
| Inactive Accounts                  | 768             | 320             | 320               | -                 | -                 | -                 |
| Class Correction                   | 399             | 2,372           | 2,488             | 2,488             | 2,488             | 2,488             |
| Condominiums                       | 1,006           | 2,037           | 2,037             | 2,037             | 2,037             | 2,037             |
| Miscellaneous                      | 3,114           | 1,353           | 1,353             | -                 | -                 | -                 |
| <b>Total</b>                       | <b>\$74,613</b> | <b>\$60,341</b> | <b>\$62,956</b>   | <b>\$58,896</b>   | <b>\$42,932</b>   | <b>\$43,097</b>   |

<sup>1</sup> Inactive customer accounts with consumption.

A description of each of the NRW Operational Initiatives, and underlying assumptions regarding their projected revenue impact is discussed below.

- 1) **Small Meters:** This operational initiative consists of replacing meters less than 1- inch in diameter that are more than 10 years old, as these meters lose precision and account for less water than is delivered. By replacing them, PRASA increases billed consumption and improves revenues. Every year there is a cumulative revenue effect from meters previously changed as well as a revenue loss due to the slow degradation of an aging meter’s accuracy. This degradation is accounted for in the calculation of the operational initiatives revenues.

PRASA staff informed the Consulting Engineer that approximately 120,000 meters were replaced in FY2009, 138,000 in FY2010, and 48,000 in FY2011. The FY2011 revenues (minus adjustment for degradation) collected from this initiative were \$14.8M. PRASA estimates 90,000 small meters will be replaced in FY2012 at a capital cost of approximately \$10M. For future fiscal years, PRASA is projecting annual small meter replacements of approximately 70,000 each year, at a capital cost of approximately \$8M to \$10M in each year.

MPPR/Malcolm Pirnie finds this projection reasonable based on the number of meters already replaced and past performance of this initiative. The average additional monthly revenue per meter for the December 2010 to May 2011 period was approximately \$7.85 per meter, which is \$0.60 higher than the average of \$7.25 assumed by PRASA. MPPR/Malcolm

Pirnie recommends that the collection rate assumed in this operational initiative be closely monitored.

- 2) **Large Meters:** This operational initiative consists of replacing meters with a diameter equal to or greater than 1-inch. This initiative generates revenues from the additional billed consumption due to better accuracy of the meters and retroactive fines assessed to customers that present abnormally higher consumption than the average previous to the replacement of the meter.

Over the last three fiscal years PRASA has replaced a total of 1,915 large meters: 908 in FY2009, 517 in FY2010, and 845 in FY2011. In FY2011, PRASA had additional billed revenues from this initiative of \$14.1M. The average additional monthly revenue per meter for the December 2010 to June 2011 period was approximately \$284.91 per meter, which is \$5.91 higher than the average assumed by PRASA of \$279.00. In FY2012, PRASA estimates 600 large meters will be replaced. The total projected additional revenue from these meter replacements, combined with the revenues from the meter replacements performed in FY2009 through FY2011 amounts to \$7.5M. PRASA estimates that an additional 1,600 large meters will be replaced between FY2013 and FY2016. MPPR/Malcolm Pirnie finds these projections reasonable based on the number of meters already replaced and past performance of this initiative.

- 3) **Theft:** The intervention of theft accounts initiative focuses on converting connected and non-paying customers into paying customers. This includes: 1) Tx accounts (inactive accounts with consumption), which specifically targets customer accounts currently included in PRASA's database categorized as inactive with recorded consumption (also referred to as water theft in inactive accounts); and 2) active accounts with irregularities (i.e., direct connections and meter tampering). This initiative leverages a database desktop exercise to target the potential customers that are currently benefiting from PRASA's services but are not paying for them.

PRASA visited 45,000 targeted customers in FY2010 of which 7,503 (17%) were found to be using service without paying. PRASA activated these accounts and assessed a penalty of \$1,200 per Tx account. In FY2010, PRASA collected \$11M in revenues related to theft of water, \$1M above the budgeted amount. In FY2011 PRASA visited 80,000 accounts, of which approximately 10,500 were normalized and are now billed on a regular basis. This represented approximately \$16.8M in additional revenues collected by PRASA through this initiative. In FY2012, PRASA has included in its budget additional revenues from this initiative in the amount of \$7.9M. Also, PRASA included in the Forecast additional revenues from this initiative that start at \$8.7M in FY2013 and reduce down to \$3.7M in FY2016. The reduction is mainly due to the fact the number of Tx accounts diminishes on an annual basis, until there are no more significant opportunities within this program. MPPR/Malcolm Pirnie finds these projections reasonable.

- 4) **Fire Protection and Sprinkler Initiative:** PRASA currently provides fire protection sprinkler service to only 820 accounts. PRASA has targeted commercial customers required by coding specification to have a sprinkler system that are not paying for the service. In FY2009 and FY2010, PRASA visited 3,429 targeted customers, of which 604 accounts were found to be out of compliance. Of these accounts, PRASA fined 389 customers \$10,000 per account, collecting revenues of \$3.7M. PRASA visited 264 additional targeted customers in FY2011, which represent additional revenues in the amount of \$1.6M. This amount is slightly below the \$2.4M target included in the FY2011 budget. This difference is mainly due to slower than expected collections and implementation of this initiative. However, PRASA is expecting to ramp up the implementation during FY2012.

In FY2012 and FY2013, PRASA plans to visit 150 customers each year and is expecting to collect approximately \$1.4M in additional revenue each year. PRASA is targeting chain stores, local supermarket chains, and restaurants, amongst others.

- 5) **Collection Management and Disconnections:** These initiatives focus on reducing uncollected accounts and ensuring customers pay on time. In a proactive approach, collection management consists of contacting residential, commercial, industrial and government customers with past due bills; disconnection consists of shutting-off service once a customer's bill is 60 days past due.

Disconnections have been the major factor contributing to revenues collected under these initiatives. PRASA collected approximately \$35M in disconnection revenue by the end of FY2010, over three times the budget amount for that fiscal year. In FY2011 PRASA collected \$22M. In FY2012, PRASA is projecting \$17.1M in additional revenues. In FY2013 and FY2014 the revenue opportunity reduces to approximately \$625,000 each year. After that, PRASA is assuming that no additional revenues will be generated through this program.

- 6) **Other miscellaneous operational initiatives include:** rate classification/categorization (class and meter size) corrections, condominium service connection fees and charges, and other miscellaneous efforts. In FY2011, PRASA collected \$4.5M of the \$7.8M budgeted. In FY2012, PRASA is budgeting additional revenues in the amount of \$4.7M. In FY2013 through FY2016, PRASA is projecting additional revenues, on average, of \$4.5M each year.

The FY2011 difference in the rate classification/categorization initiative is due in part to slower than expected implementation of this initiative, which targets water and wastewater customers who are incorrectly categorized in PRASA's database. PRASA has already identified the accounts to be intervened and, therefore, expects to ramp up this initiative in FY2012. The difference in the condominium service connection fees and charges is due to an

overestimation of the number of condominiums that were not being billed by PRASA. PRASA has corrected this, and has identified 301 condominiums that are currently not being billed consistently by PRASA. PRASA has assigned personnel to ensure that all condominiums are billed consistently.

### 3.3 Staff Reduction Program

Historically, PRASA's ratio of number of customers to staff has been low in comparison to industry standards. At the end of FY2011, PRASA had a total staff of 4,919 with 1,290,800 total accounts: 1,290,800 water accounts and 759,169 wastewater accounts; resulting in a ration of about 417 customer accounts per employee (up from 405 at end of FY2010, 360 at end of FY2009 and 340 at the end of FY2009). Current industry averages typically range from 390 to 780, with a median of approximately 550 customer accounts per employee<sup>5</sup>. Given the large number of PRASA facilities and wide geographic distribution of facilities, PRASA's comparatively low ratio of accounts to employees is not surprising; however, it is MPPR/Malcolm Pirnie's opinion that there are opportunities to improve PRASA's organization and make it more efficient.

PRASA's existing staff is categorized into five primary categories described below:

- **Appointed Employees:** This category includes: the executive staff, deputy directors, area directors and administrative assistants that provide support to key management personnel of the utility.
- **Management Employees:** These employees manage the day-to-day operations of the utility. They hold management positions both in the central and regional offices.
- **HIEPAAA Employees (Hermandad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados):** These employees are the unionized professional staff that includes accountants, engineers, insurance specialists, project inspections, and surveyors.
- **UIA-AAA Employees (Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados):** These employees are mainly the unionized plant and system operators, maintenance and support staff, meter readers, customer service specialists, and administrative assistants.
- **Temporary Employees:** These employees are those that are hired and classified as temporary until formally assigned to a position. New hires are placed in a 90-day probationary period.

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<sup>5</sup> Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report, American Water Works Association (2008). Note that a customer with water and sewer service is counted as two accounts for the purpose of this benchmark. Benchmarks reported for "all utilities" category.

They do not have full benefits during the probationary period. If still employed after probationary period, they either become full-time employees or remain temporary employees pending position confirmation.

Table 3-3 shows the staff levels by staff category over the last five fiscal years. Since FY2009, PRASA is utilizing methods for reductions of staff, such as an incentivized retirement program, re-training existing staff from overstaffed positions to reduce the need for new hires, and using staff attrition as a means to reduce staff levels. It should be noted that approximately 316 employees retired through PRASA’s incentivized retirement program.

**Table 3-3:  
Staff Levels**

| End of FY | Appointed Employees | Management Employees | HIEPAAA Employees | UIA-AAA Employees | Temporary Employees | Total Employees |
|-----------|---------------------|----------------------|-------------------|-------------------|---------------------|-----------------|
| 2007      | 156                 | 940                  | 190               | 4,046             | 509                 | 5,841           |
| 2008      | 167                 | 991                  | 178               | 3,814             | 690                 | 5,840           |
| 2009      | 165                 | 1029                 | 182               | 3,663             | 536                 | 5,575           |
| 2010      | 161                 | 960                  | 171               | 3,391             | 318                 | 5,001           |
| 2011      | 159                 | 938                  | 167               | 3,490             | 165                 | 4,919           |

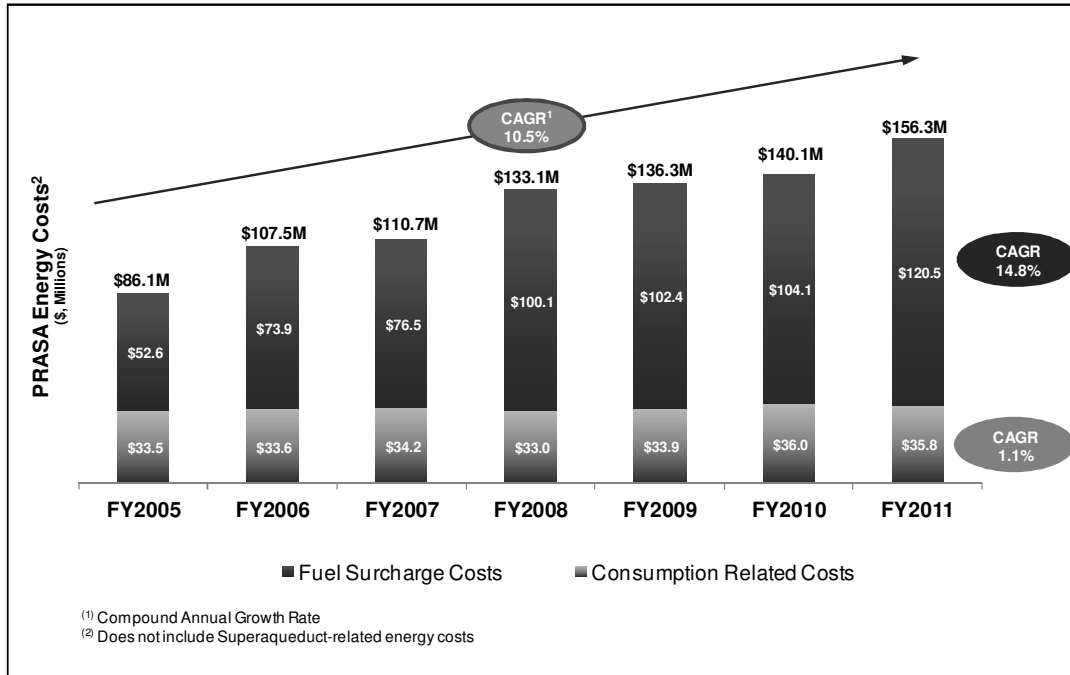
As shown above, PRASA has been consistently reducing its headcount through attrition. From FY2009 through FY2011 PRASA has had a net reduction of 922 employees. However, for FY2012 PRASA is reducing the cost of contracted services used to provide support on the Customer Services Department and will contract some employees to cover these tasks at a lower cost. The new temporary employees will have the right to the labor benefits as stipulated per law.

PRASA intended to continue its personnel reduction initiative in future years, as programmed. However, given the current economic situation and high unemployment rate of Puerto Rico, PRASA’s administration determined that it was in the best interest of Puerto Rico’s citizens and overall economy to delay its staff reduction plan to future years.

### **3.4 Comprehensive Energy Management Program**

PRASA’s energy costs have increased in the last seven fiscal years at an average rate of 10.5% per year as shown in Figure 3-2. PRASA’s energy cost is the second largest cost behind payroll and makes up approximately 22% of its total operational costs. As shown in Figure 3-2, PRASA’s consumption costs have stayed more or less steady over since FY2005. The increase in electricity costs is mainly due to increases of the Puerto Rico Electric Power Authority (PREPA) fuel surcharges and adjustments costs which are passed through to its customers. As also shown in the figure, fuel surcharge costs have continued to increase at an annual rate of approximately 14.8% per year.

**Figure 3-2: PRASA Annual Energy Costs FY2005-FY2012**



The average price per barrel of oil for the last six months of FY2011 (January 2011 to June 2011) was \$107. This average was 40.7% higher than the average of the last six months of FY2010 (January 2010 to June 2010) which was \$76. Due to this increase, PRASA’s average monthly cost of electric power for the last six months of FY2011 was \$13.0M, compared to \$12.2M in the same period for FY2010. PRASA is projecting average monthly costs of electric power for FY2012 of \$14.6M. The average prices per barrel of oil during the 1st, 2nd, 3rd and 4th quarters of 2011 were \$74, \$83, \$100 and \$114 per barrel, respectively<sup>6</sup>. FY2011 results demonstrate that PRASA’s electric power budget metrics were not met; results were approximately \$18M over budget.

PREPA continues to work in the implementation of the energy reduction strategies presented in the Puerto Rico Credit Conference in February 2010<sup>7</sup>. These strategies include the following:

- Reduce operating expenses
- Increase efficiency
- Minimize energy theft

<sup>6</sup> Source: [http://www.eia.gov/dnav/pet/pet\\_pri\\_wco\\_k\\_w.htm](http://www.eia.gov/dnav/pet/pet_pri_wco_k_w.htm)

<sup>7</sup> “Puerto Rico Electric Power Authority – Company Overview and Project Development”

- Develop a proper fuel mix diversification
- Add renewable energy
- Maximize use of advance technology

Although the average price for a barrel of oil increased from FY2010 to FY2011, implementation of the above strategies are expected to contribute to the lowering of electricity costs. However, the timing of implementation and more importantly the impact of these strategies is uncertain at this time.

Additionally, in order to reduce these costs and reduce its dependency on PREPA, PRASA has undertaken two separate procurement processes to engage the private sector in investing in energy related projects, discussed below. These are:

1. Demand Side Projects through Energy Performance Contracts (EPCs)
2. Supply Side Projects through Power Purchase Agreements (PPAs)

However, results from the EPCs and PPAs efforts are not expected until FY2012, at the earliest. PRASA's financial projections, later discussed, do not include potential savings that would result from these initiatives.

Finally, PRASA and PREPA are currently in negotiations to transfer all hydroelectric facilities currently owned and operated by PREPA to PRASA. Once the transfer and transition phases are completed, this effort could represent significant additional net cost savings to PRASA. However, conservatively, PRASA has not included benefits from this effort in its financial projections.

### **3.4.1 Demand Side Projects through Energy Performance Contracts**

PRASA has already conclude the procurement of the services and investments from private sector firms interested in entering into EPCs designed to reduce energy consumption at PRASA's facilities. The objective of this initiative is to have Energy Service Companies (also referred to as ESCOs) perform assessments and guarantee savings obtained by installing equipment and implement activities designed to reduce energy consumption. There are two important benefits for PRASA in employing this type of performance contract. First, PRASA's operations benefit from improvements guaranteed by the ESCOs and as such it does not have to place additional burden to its CIP. Second, the EPCs are structured so that payments to ESCOs are only made by realizing measured and verifiable savings, placing most of the risk with the ESCOs (ESCOs guarantee savings to PRASA) and aligning the desired outcomes of both parties. The positive financial impact of this initiative for PRASA is limited by the fact that savings are guaranteed by the ESCOs until the investment is recovered and earned their agreed payments.

Through a Request for Qualifications (RFQ) process, PRASA selected 17 companies as eligible to submit EPC proposals. PRASA developed and issued four different RFPs to the selected companies for: buildings, plants, ancillary facilities (i.e., pump stations), and the North Coast Superaqueduct System. A total of 15 proposals were received and evaluated. The procurement process included a qualification phase, followed by a proposal phase. Also, it was divided into four main types of projects: buildings, plants, Superaqueduct system, and ancillary facilities (i.e., pump stations, wells, tanks). Seventeen (17) companies were qualified through the qualification process. Five of these companies presented proposals. The proposed projects vary in complexity, investment, and projected savings. So far, PRASA has proceeded with four projects, of which three have already commenced their Investment Grade Energy Audit (IGEA) phase (this is a requirement prior to entering into the final EPC). Expected annual savings (compared to current costs) are estimated at \$5M. The table below provides a status summary of this initiative.

**Table 3-4:  
PRASA EPCs**

| <b>Proponent</b> | <b>Facility Type</b>       | <b>Number of Facilities to be Intervened</b> | <b>Status</b>                             |
|------------------|----------------------------|--|---|
| Omega-Wendell    | Buildings <sup>1</sup>     | 8  | IGEA Completed<br>In Contract Development |
| Omega-Wendell    | Plants <sup>2</sup>        | 4  | IGEA Completed<br>In Contract Development |
| Honeywell        | Plants <sup>2</sup>        | 6  | IGEA Completed<br>In Contract Development |
| Honeywell        | Superaqueduct <sup>3</sup> | 10   | In Contract Development                   |

<sup>1</sup> Includes Headquarters (central office), 6 operations offices, and 1 laboratory.

<sup>2</sup> Includes top four water and top six wastewater treatment plant facilities.

<sup>3</sup> Includes the water treatment plant and nine water distribution pump stations.

### 3.4.2 Supply Side Projects through Power Purchase Agreements

PRASA is also undertaking a parallel process in which it is procuring companies who are interested in providing independent energy supply services through PPAs. The objective is to secure one or more PPAs for lower energy unit costs per kilowatt-hour (kWh) than what PRASA currently pays to PREPA. PRASA developed and issued a Request for Proposals (RFP) for these services in August of 2009. PRASA received 19 proposals from interested parties in response to the RFP. The proposals that were received included different types of energy sources including: wind, solar, waste-to-energy, hydroelectric, and ocean-thermal technologies. After a thorough evaluation of the proposals, PRASA selected seven companies to pursue further negotiations to possibly enter into PPAs. However, thus far only three of the seven negotiations carried out by PRASA resulted in a successful agreement between the parties. The table below provides a status summary. Expected annual savings (compared to current costs) are estimated at \$20M once all projects are implemented.



**Table 3-5:  
PRASA PPAs**

| <b>Proponent</b>            | <b>Technology</b> | <b>Status</b>   |
|-----------------------------|-------------------|-----------------|
| Aspenall Energies           | Wind              | Contract Signed |
| Renewable Power Development | Waste-to-Energy   | Contract Signed |
| Windmar Renewable Energy    | Solar             | Contract Signed |

If successfully implemented, these supply side initiatives should be able to provide larger savings to PRASA than the demand side initiatives in the order of approximately \$20M annually (after all are implemented). Additionally, there are other proposals still under evaluation (including non-solicited proposals received by PRASA), which may provide further benefits to this initiative. However, it must be noted that supply side projects, in general, take longer to complete than demand side projects. This is because permitting for and building new plants and facilities for the provision of alternate energy (e.g., wind or solar energy facilities) usually take significantly longer than replacing equipment in existing facilities. Another item that affects the implementation of certain projects that require the use of PREPA’s grid is the wheeling regulation that will establish the real costs that PREPA will charge to the independent energy suppliers to use its grid.

### **3.4.3 Transfer of PREPA Hydroelectric Facilities**

As of the date of this report, PRASA and PREPA intend to transfer the hydroelectric and irrigation system infrastructure currently owned and operated by PREPA to PRASA. The number of hydroelectric systems intended to be transferred is 10 with a total of 37 generating units. A total of three irrigation systems would also be transferred (please note that the actual number of facilities to be transferred may vary depending on the final transfer agreement signed between the parties). At this time, resolutions have been approved by both the PRASA<sup>8</sup> and PREPA<sup>9</sup> boards of directors, authorizing the agencies to move forward with this process. PRASA expects that the first phase of the transfer process will be completed by the end of FY2012; while the second phase should be completed in FY2013. PRASA is currently evaluating the possibility of operating these facilities through a Special Purpose Entity (SPE); Act 228 was approved on November 21, 2011 to allow PRASA to do so. Nonetheless, it is expected that PRASA will initially contract with PREPA to continue status quo operation to assure a smooth transition.

PRASA currently estimates annual net savings, after O&M expense, in the order of \$30M<sup>10</sup>. This cost saving is based on an annual production of approximately 180 million kWh, which was the

<sup>8</sup> Board Resolution No. 2657

<sup>9</sup> Board Resolution No. 3861

<sup>10</sup> Savings do not include potential additional costs related to the dredging of certain water reservoirs, which may be required in order to increase water capacity and availability for the operation of the hydroelectric facilities.

same level of energy generation achieved by PREPA in FY2011. This estimate includes the associated operational and maintenance costs of the facilities as well as a wheeling cost of \$0.02. According to the preliminary results of the *Hydroelectric System Evaluation Summary Report* prepared by the CSA Group for PRASA (dated December of 2011), there may be potential for significant additional savings if the generation capacity of these facilities is increased. In order to do so, PRASA would need to implement a capital and operational improvement and upgrade program that may amount to approximately \$65M. Assuming that these improvements are implemented and that there is sufficient water available to operate the facilities for a significant portion of the time (no additional information on water availability and estimated operating schedules for the hydroelectric facilities is available at this time), PRASA has preliminarily estimated that production could potentially be increased to 380 million kWh (43 MW) which, in turn, could generate considerable additional electricity cost savings to PRASA in the future. MPPR/Malcolm Pirnie has not validated PRASA's additional generation estimations, nor has it validated CSA Group's report.

### **3.5 Integrated Preventive Maintenance Program (IPMP) Progress**

The 2006 and 2010 Consent Decrees with EPA and the 2006 Transactional Agreement with PRDOH require that PRASA implement and continue to develop a comprehensive integrated preventive maintenance program, the IPMP, to ensure the proper operation and maintenance of its plants and other critical facilities, including WWPSs. Through the IPMP, PRASA is establishing a plan to enable programmed and continuous maintenance to plants, pump stations, vehicles, and equipment to provide for more reliable service, improve client satisfaction, and achieve long-term operational cost savings through preservation of assets. PRASA currently finances part of the IPMP through its CIP (costs associated with the necessary R&R prior to the integration of the facilities into the IPMP) and the rest (the actual maintenance costs) through its O&M budget.

To date, PRASA has expended over \$100M in the development and implementation of the IPMP. Additionally, PRASA plans to spend an additional \$23M of R&R in fiscal years 2012 and 2013 to complete the development and implementation of the program, ahead of the schedule required by Regulatory Agencies. In FY2014 and beyond, all the operating costs associated to the preventive maintenance will continue to be included in PRASA's annual O&M budget as a regular operational expense.

Some of the benefits highlighted by PRASA regarding the IPMP include the following:

- Creation of PRASA's first centralized inventory of assets (equipment and instruments), which includes historical information regarding maintenance.

- Implementation of a robust maintenance program that integrates and centralizes procedures, systems, documentation, metrics, and technical and cost information of PRASA’s fixed assets.
- Improved planning and management of fixed assets maintenance.
- Compliance with regulatory agency consent decrees and agreements.

Because the IPMP is a dynamic and flexible program, it has allowed PRASA to make adjustments throughout the development and implementation of the program in order to optimize it and further reduce costs associated with its implementation. To date, PRASA reports that there are 1,096 facilities in the IPMP. PRASA projects that by FY2013 all WTPs, WWTPs, WWPS, and Dams, and select water ancillary facilities will be included in the IPMP. Approximately 3,332 facilities are projected to be included in the IPMP by FY2013. Furthermore, PRASA has coordinated the IPMP implementation with the Treatment Plant Automation Program (discussed in the following section), in order to better align and optimize its program implementation efforts for both initiatives.

### **3.6 Treatment Plant Automation Program**

PRASA has continued the development and implementation of the Treatment Plant Automation Program, which consists in the installation of the necessary equipment and the development of the O&M and system protocols to automatically and remotely operate its WTPs. The project scope includes the procurement and installation of automation control equipment (capital investment is estimated at approximately \$400,000 per facility). A total of 121 WTPs will be integrated in under the program (the remaining five facilities are either scheduled for closure in the next few years or it is not feasible/cost effective to automate). In turn, these 121 WTPs will be organized in clusters (a total of 24) that will be operated and monitored from a Regional Operational Center.

At the end of FY2011, the status of the program is the following:

- All designs for facilities to be automated have been completed.
- Construction of 12 WTPs has been completed.
- 59 WTPs are currently in the construction phase.
- 18 WTPs are pending notice to proceeds for construction.
- Construction works for 30 WTPs will be bidded out in FY2013.
- PRASA’s Treatment Plant Automation Program consultant is working closely with PRASA’s human resources department for the development of the training plan for operators, supervisors, and managers, and in the development of the necessary policies for the development of clusters.

- PRASA and its consultant continue to coordinate with PRDOH, who is yet to provide an approval of the proposed modified plant cluster structure.

Due to PRASA's fiscal situation, the implementation phase program was delayed. Hence, during FY2012, PRASA plans to complete the automation of 36 WTPs (down from 60 originally planned) and the creation of seven clusters. The full program implementation is expected to be completed in FY2014. As such, PRASA plans to complete the automation of 53 facilities (ten clusters) and 32 facilities (seven clusters) during FY2013 and FY2014, respectively. Once all facilities are automated and the clusters are formed, PRASA estimates that the annual cost savings could be as much as \$21M. However, since the majority of the savings projected to be obtained through this initiative are payroll-related, the achievement of these projected benefits assumes that the necessary staff reductions will take place. Given the current uncertainty regarding future staff reductions, PRASA has not included these potential savings in its financial projections.

### **3.7 Select Initiatives from the Postponed Public-Private Partnership (PPP) Project**

As a result of an evaluation of PRASA's commercial services, it was found that there is significant room for improvement regarding the performance of the customer services. In turn, this situation is negatively affecting PRASA's finances as a significant amount of revenue is unbilled and uncollected.

Subsequently, a research study was conducted to determine the feasibility of PRASA entering into Public-Private Partnerships (PPP) with one or more contractors to improve its meter reading infrastructure and commercial practices and services as a whole. As part of this assessment, PRASA's consultant researched what other utilities have done around the world as it relates to engaging the private sector in this operational scope. The main findings highlight that multiple utilities around the world have retained the services of private firms to help them reduce its volume of NRW and provide more effective commercial services.

As such, in 2010 PRASA submitted a proposed PPP project to the PPP Authority<sup>11</sup> for consideration and inclusion in its project inventory. PRASA's proposed project was selected by the PPP Authority as a potential project for a PPP and was included in the PPP Authority's inventory of projects. The Desirability and Convenience Study, a requirement of the PPP Authority process, was completed in May of 2010. Upon receipt and acceptance by the PPP Authority, the Board of Directors approved the publication of the RFQ to begin the procurement process.

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<sup>11</sup> The *Public-Private Partnership Act* (the Act) was approved on June 8, 2009. The Act created the PPP Authority as a public corporation of the Commonwealth affiliated to the Government Development Bank for Puerto Rico. Additional information related to Puerto Rico's PPP Program can be found on the PPP Authority's website <http://www.p3.gov.pr>.

The RFQ was published on June 15, 2010. The qualifications process was completed on August 15, 2010 when 13 companies, or teams of companies, submitted Statements of Qualification (SOQs) for the project. Of these, seven were shortlisted to continue in the procurement process.

The RFP and draft Service Contract were completed in August of 2010. However, these documents underwent extensive and numerous revisions from August of 2010 through February of 2011. As a result of its ongoing collective bargaining negotiations with the UIA-AAA and changes to the Central Government's public policy, PRASA modified the structure and scope of work of the Project.

In February of 2011 the PPP Authority BOD requested that the PPP Authority in collaboration with PRASA conduct market sounding meetings with Shortlisted Proponents. The purpose of these meetings was to gauge Shortlisted Proponents' interest in the re-defined Project and in continuing the procurement process under the revised Project approach. All seven Shortlisted Proponents confirmed their attendance and participated in a group presentation. After the presentation, individual meetings were held with each Shortlisted Proponent team to obtain their feedback and concerns regarding the proposed scope. The feedback obtained from most teams was similar and could be summarized as follows:

- Original scope was more attractive to Proponents, allocated risk better between the parties, and was better suited to meet the Project objectives and obtain PRASA's desired results.
- Extend the service contract time (some teams mentioned five year minimums).
- Reduce the time in the financing terms to match the time for the service contract.
- Consider including commercial operation activities.
- Include some form of performance-based incentives and penalties.
- Project scope seemed too aggressive for the two-year period proposed.
- Concerns about the likelihood of achieving significant reductions in NRW with the current approach.
- Concerns regarding payment guarantees.

After evaluating the questions, comments, and concerns presented by the Shortlisted Proponents, and obtaining additional feedback from legal counsel, the PPP Authority and PRASA determined it was not in their best interest to continue to pursue the Project as re-defined. On March 18, 2011, the PPP Authority Director, PRASA's Executive President and its Executive Director for Infrastructure, presented a summary of the feedback received from Shortlisted Proponents during the market sounding meetings and gave their recommendation to cancel the procurement process to the PPP Authority BOD. The PPP Authority BOD agreed with this recommendation and, as such, the procurement process was cancelled and the project implementation was postponed. Shortlisted Proponents were informed.

Notwithstanding the above, PRASA has embarked on the development of a strategic NRW management and reduction plan. For this, in late 2011, PRASA retained the services of Miya Puerto Rico LLC (Miya) a local subsidiary of Miya Luxemburg Holdings S.a.r.l., a world-renowned NRW consultant. The objective of this strategic NRW management and reduction plan is to provide PRASA with the necessary information to embark on a comprehensive and cost-effective long-term NRW management program. The scope of work for this effort includes:

- Rapid NRW assessment including preparation of a water balance and calculation of water loss PIs
- Development of a comprehensive NRW management strategy
- Preparation of initial cost estimates
- Preparation of rough NRW level forecasts
- Revision of PRASA’s organizational structure and recommendation of changes necessary for successful NRW management
- Determination of required staffing of the future NRW team
- Preparation of an initial cost/benefit analysis

Miya is also expected to provide benchmark comparisons with other jurisdictions (world-wide) as well as the necessary guidance for the implementation of the plan, considering their experiences with what has worked, and what has not, in other jurisdictions comparable to Puerto Rico. The implementation of this program is still in its very initial stages and MPPR/Malcolm Pirnie intends to follow up on the progress of this initiative and provide an update of such progress in future Consulting Engineer’s reports.

Additionally, PRASA is currently in the procurement process for the implementation of two operational initiatives that had been originally included under the PPP Project. These are:

1. Development of a Customer Geodatabase (Cadaster)
2. Development and Installation of Automated Meter Reading Technology for Large Meter Customers in the Metro Region

PRASA is projecting additional revenues from these two initiatives in the order of \$1M and \$2M for FY2015 and FY2016, respectively. A brief description of these two select initiatives is presented below.

### **3.7.1 Development of a Customer Geodatabase**

This project consists in the development of an island-wide customer geodatabase to identify and map (geospatially) PRASA's existing and potential customers including, but not limited to, developed and pre-developed parcels not included in PRASA's SAP customer database. This Geodatabase shall then be linked with PRASA's SAP customer database.

PRASA seeks to develop a tool for the proactive management of its customer database, that will help in the detection of theft and, ultimately, in the reduction of apparent (commercial) losses. As such, the Project objectives focus on:

- the Reduction of NRW losses
- the identification of PRASA's customers and non-registered users geospatially
- the improvement of water system planning (uses and needs) and water conservation

Procured services include the following:

- Integration of PRASA's current customer database with the existing databases of other Puerto Rico agencies to identify common customers and use as the starting point for the Geodatabase to be created as part of this Project.
- Field investigations to collect and validate customer data for those customers not identified through the integration of the databases.
- Development of the Geodatabase using Geographic Information System ("GIS") software.
- Maintaining and updating the Geodatabase throughout the Contract Term.
- Preparation of protocols for creating and updating the Geodatabase; and for updating PRASA's SAP System ("SAP") customer database.
- Linking the Geodatabase with PRASA's SAP customer database.
- Standardizing customers' physical and postal addresses in both the Geodatabase and PRASA's SAP customer database.
- Preparation of Operation and Maintenance ("O&M") documents for the Geodatabase.
- Training PRASA employees in the O&M, updating, and troubleshooting of the Geodatabase.

PRASA has completed the procurement process for this project and is currently in the contract development phase. Project development and implementation is projected to commence in FY2013. The implementation time is estimated at 12 months.

### **3.7.2 Development and installation of an AMR/AMI System for Large Meter Customer in the Metro Region**

This project consists in the installation and operation of an Automatic Meter Reading and/or Advanced Metering Infrastructure (AMR/AMI) system for approximately 3,400 large meter customers in the Metro Region. The project objectives include:

- Increasing efficiency and accuracy of the meter reading and billing process: PRASA seeks to reduce the time it takes to read meters and thus, increase the frequency of meter reads while reducing the number of estimated bills. PRASA also seeks to reduce the errors in customer bills associated with manual meter reads.
- Improving customer service: PRASA seeks to improve customer service by reducing estimated and erroneous bills, and allowing customers to access their consumption data over the Internet.

Services to be procured include, but are not limited to:

- Supply and installation of an AMR/AMI system.
- Integration of the AMR/AMI system with PRASA's customer information system (SAP)
- Provision of an interactive web application for customers to access their consumption data over the Internet.
- Operation and maintenance of the system, including reading and maintaining the meters and associated equipment.

Procurement for this initiative should be completed in FY2012, and implementation is projected to commence in FY2013. The implementation time for this initiative is estimated at 18 months.

## **3.8 Conclusions**

PRASA's O&M practices are adequate. One recurring finding in the facility inspections is the need for facility-specific O&M plans or manuals for treatment plants. Also, there is an identified need of standardized process for prioritizing, scheduling, and executing preventive, corrective and routine maintenance activities.

Currently, PRASA's operational and cost metrics are generally unfavorable compared to the median values for utilities in the U.S., which is not a surprising result considering the size and complexity of the System; PRASA's high staffing levels, which translate into high payroll and benefits costs; and high electricity costs.

PRASA's staff has been significantly reduced in recent years and this has affected PRASA's meter reading performance metrics and effectiveness in addressing leaks and overflows. PRASA could benefit from a utility-wide organizational assessment to better identify areas with staffing needs and surpluses, respectively.



Finally, benchmark comparisons show that PRASA has areas that could be improved and that represent large opportunities with regards to the reduction of its NRW and increasing its billings and collections. PRASA continues to develop and implement operational initiatives with the goal of improving and optimizing its operations. The operational initiatives currently being implemented are generally aligned with PRASA's needs and represent potential additional cost savings or revenue enhancements that could positively impact PRASA's financial situation.

## 4 Capital Improvement Program and Regulatory Compliance Status

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### 4.1 Introduction

PRASA continues to implement an aggressive CIP to improve its water and wastewater infrastructure. The purpose of the CIP is to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, permit continued economic development and help bring PRASA's infrastructure into compliance with all regulatory requirements.

The CIP is a dynamic program that is constantly evolving and undergoing revision as needs and funding are identified, and as projects transition from planning through design, construction and startup. PRASA's five-year CIP has a comprehensive listing of projects and budgets through June 30, 2016. A total of 647 projects are scheduled for implementation during this period. As required by PRASA's Board, PRASA's Infrastructure Department must annually submit for its approval an updated five-year CIP plan. Given the magnitude of the CIP, it is understandable that it will continue to evolve over time and the number and budgets of projects is expected to be updated regularly. As of November 30, 2011, PRASA's CIP for fiscal years 2012 through 2016 includes \$1,558.7M in capital expenditures over fiscal years 2012 through 2016. In FY2011, PRASA's capital expenditures amounted to \$338.5M.

The CIP projects are divided into categories, groups and types. In addition, PRASA has implemented a prioritization system in order to better manage the CIP, given its size and complexity. The individual project cost estimates within the CIP, including the R&R program, have not been independently verified. This section of the report provides:

- an overview of PRASA's CIP (approved by PRASA's Board on September 2011), including summary of the program by project category,
- an assessment of the adequacy of the CIP to address identified system deficiencies and current requirements stipulated in open consent decrees with regulatory agencies, and
- an overview of the potential effects of future regulations on PRASA's System and CIP.

### 4.2 CIP Development and Management

PRASA continues to engage world renowned engineering and consulting companies (Program Management Consultants, or PMCs) in the development, implementation, and evolution of the CIP. PMCs provide support to PRASA in the project development process and actively participate in the planning, design and construction phases. They also manage key tasks that drive CIP project budgets, such as defining project scopes, negotiating consultant contracts for studies and design services, and preparation of project construction cost estimates. As a result of

PRASA's CIP implementation plan and the economic situation currently affecting Puerto Rico, the number of CIP projects being implemented has been reduced over recent years. Therefore, effective July 1, 2009, PRASA reduced the number of Program Management Consultants (PMCs) from five to two, as shown in Figure 4-1 below.

**Figure 4-1: Current Program Management Consultants and their Respective Regions**



As a result, the associated program overhead costs yielded cost savings to PRASA of approximately \$7M. PRASA continues to work with the other three firms not selected to continue as PMCs (CSA Group, CPM-MPPR, and Black & Veatch of Puerto Rico) in areas such as planning, design, land acquisition and other special assignments.

### 4.3 CIP: Project Distribution and Costs

There are 647 projects currently included in the FY2012–FY2026 CIP. Projects included in the CIP cover major capital improvements identified throughout all five Regions, as well as island-wide initiatives such as technological advancements, telemetry implementations, R&R component of the IPMP, meter replacement, and R&R to the System.

The CIP is developed by PRASA taking into consideration a) current and future infrastructure and operational needs identified from system planning studies, and b) regulatory commitments as stipulated in consent decrees, administrative orders, and other agreements with regulatory agencies. Once the need for a capital improvement project is identified, a project creation form is prepared. The form summarizes the project scope, preliminary schedule, and cost estimates, amongst other information. The project is then assigned a CIP project number and added to the CIP inventory, where it is categorized according to PRASA's classification and prioritization system. Periodically, the changes to the CIP are presented to PRASA's Board for their revision and approval.

Total CIP investments per project are calculated taking into consideration the following estimated costs:

- Planning, Studies, and Land Acquisition Costs
- Design Costs
- Construction Costs
- Project Management and Inspection Costs
- Contingencies
- Miscellaneous Cost (includes financing costs, insurance, O&M documents and administrative costs)

The project management and inspection costs are estimated to be 7.5% of the construction cost. Contingencies are estimated to be 10% of the construction cost. Project costs are inflated, on a compound basis, by 3.8% until the construction notice to proceed is executed. These percentages are considered reasonable, since they are based on historic data of completed projects. Also, throughout the development of the planning and design phases of the project, the contingencies are modified as the construction cost estimates are updated. Once the project goes out to bid and the bid is awarded, the amount calculated for contingencies is no longer updated and it remains as part of the assigned funds of the project until it is completed and closed-out. During the construction phase of the projects, contingencies are used to cover change order costs and other costs that may occur, such as additional land acquisition, permitting, or design activities.

Since 2006, PRASA's metrics regarding completion of construction projects in a timely fashion and within budget have improved. Through FY2011, PRASA reports that its rate of change order costs to total construction costs is approximately 5%; this represents a decrease of 6% when compared to the results prior to 2006 (first year of PRASA's CIP with PMCs). Similarly, in terms of construction delays (increases in time to complete project), the percentage through FY2011 is now 33%, which represents a decrease of 91% when compared to the results prior to 2006.

#### 4.3.1 Project Classification and Prioritization

CIP projects are classified into mandatory or non-mandatory categories. Mandatory projects are those that are required by law, as stipulated in consent decrees, administrative orders, and agreements with regulatory agencies including the USEPA and PRDOH. There are five CIP categories, listed below in order of importance:

- Mandatory (USEPA, PRDOH, Civil Action, Administrative Orders)
- Non-Mandatory Compliance (Health and Safety)
- Non-Mandatory Quality, Efficiency, Reliability and Redundancy
- Non-Mandatory Growth
- Non-Mandatory Other

Projects are further classified as either water or wastewater system projects. Water System projects include projects for improvements or construction of new facilities regarding: water supply, water distribution, WTPs, water pump stations, amongst others. Wastewater System projects include projects for improvements or construction of new facilities regarding: wastewater collection, WWTP, wastewater pump stations, amongst others.

Other types of projects that are included in the CIP are:

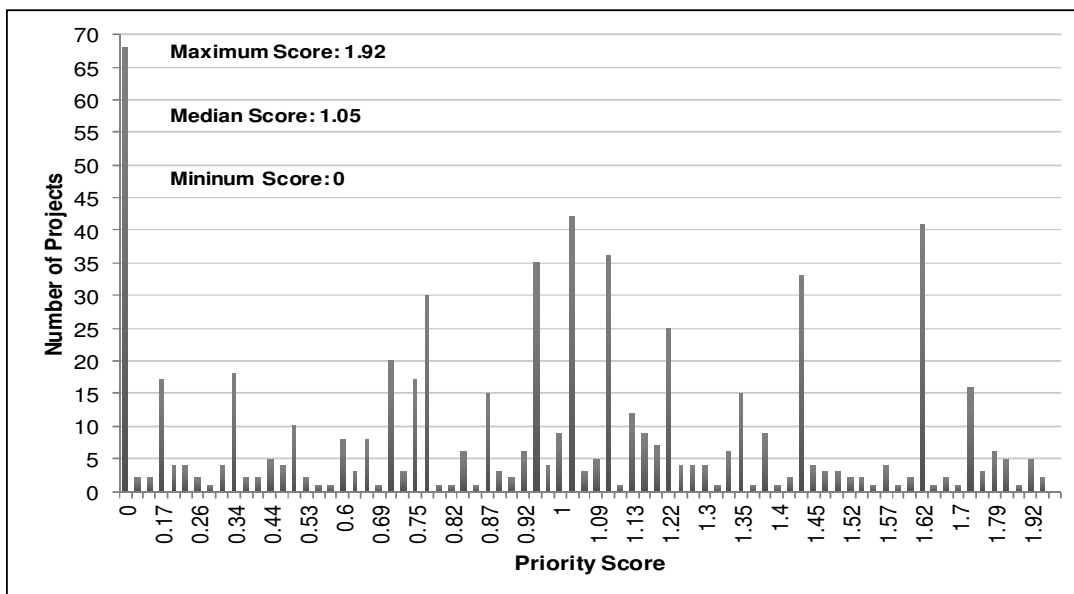
- R&R component of the IPMP (includes water and wastewater project types)
- Renewal and Replacement (includes water and wastewater project types)
- Technology (includes information technology project types)
- Meters
- Buildings
- Fleet

In addition to project classification, CIP projects are ranked according to a prioritization score. This score is the result of the weighted sum of the evaluation criteria adopted in PRASA's Master Plan. Categorizing and prioritizing projects gives PRASA the ability to maintain an organized and dynamic CIP. The criteria and associated weight of importance by which each project is evaluated are:

- Environmental Compliance (35% weight) – Satisfying local and federal environmental regulations, discharge limits, watershed protection, and sludge treatment and handling.
- Quality of Service (22% weight) – Service quality improvements, improvements to existing service areas, service continuity, WTP capacity expansion to meet demand, and treated water storage.
- Operational Efficiency (17% weight) – Reduction of operational costs and physical losses, plant improvements, and instrumentation.
- Reliability and Redundancy (13% weight) – Distribution redundancy to handle peak demand, emergencies and other transient events, raw water storage, transmission redundancy, electrical power redundancy, and intake improvements.
- System Growth (9% weight) – Wastewater service extension, WWTP expansions in to accommodate service extension, and inclusion of Non-PRASA water systems.
- PRASA Management Privilege (4% weight) – Used by PRASA's management to increase priority of a project and break ties, when necessary.

The maximum score a project can receive is two (High Priority), and the minimum is zero (Low Priority). As shown on Figure 4-2, most projects fall between the medium to high priority ranges.

**Figure 4-2: Project Distribution by Prioritization Score<sup>1</sup>**



<sup>1</sup> A total of 68 projects have received the minimum score of zero. Projects with a prioritization score of "0" have not yet been classified by PRASA; the CIP table automatically assigns a "0" wherever no score has been assigned. None of the projects that have a "0" score are of highest priority to PRASA.

### 4.3.2 CIP Programming: FY2012-2016

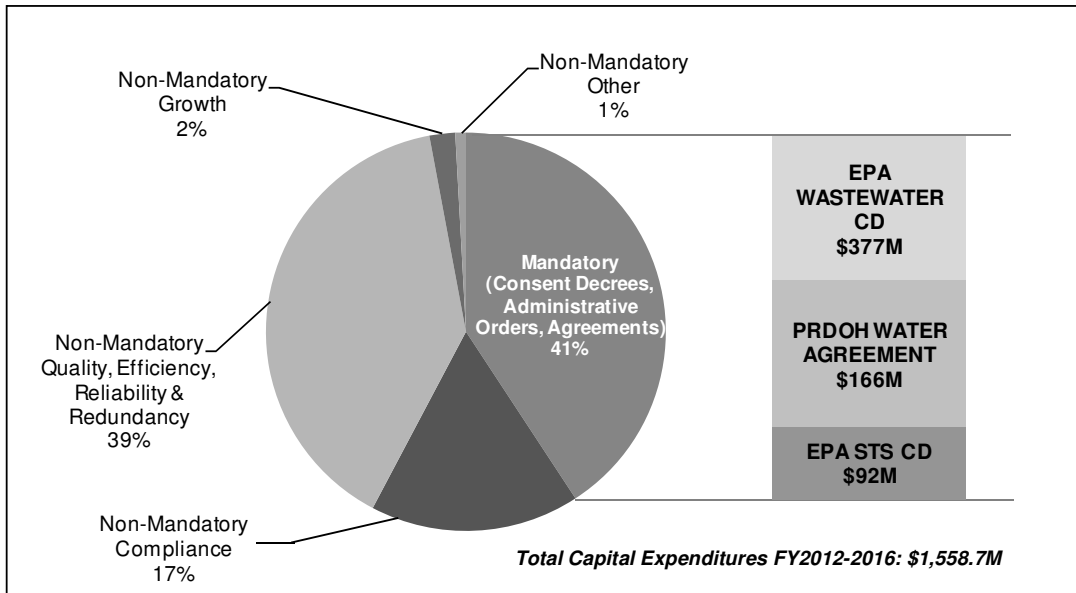
The CIP budget for FY2012 through FY2016 is \$1,558.7M and includes \$634.7M for mandatory projects, as shown in Table 4-1. Figure 4-3 shows the total capital expenditures by category for FY2012 through FY2016.

**Table 4-1:  
Capital Improvement Program FY2012-2026 by Category (\$, Millions)**

| Project Category  | Fiscal Year Ending June 30, |                |                |                |                | Total <sup>1</sup> |
|---|-----------------------------|----------------|----------------|----------------|----------------|--------------------|
|   | 2012                        | 2013           | 2014           | 2015           | 2016           | 2012-2016          |
| Mandatory (Consent Decrees, Agreements etc.)                | \$140.0                     | \$158.8        | \$137.4        | \$93.6         | \$104.9        | \$634.7            |
| Non-Mandatory Compliance                                    | 73.6                        | 73.0           | 47.1           | 31.2           | 40.6           | 265.5              |
| Non-Mandatory Quality, Efficiency, Reliability & Redundancy | 169.2                       | 153.4          | 111.7          | 85.2           | 93.0           | 612.5              |
| Non-Mandatory Growth  | 14.8                        | 6.6            | 3.6            | 4.2            | 3.3            | 32.5               |
| Non-Mandatory Other   | 9.1                         | 4.1            | 0.3            | -              | -              | 13.5               |
| <b>TOTAL</b>  | <b>\$406.7</b>              | <b>\$395.9</b> | <b>\$300.1</b> | <b>\$214.2</b> | <b>\$241.8</b> | <b>\$1,558.7</b>   |

<sup>1</sup> Numbers may not add due to rounding.

Figure 4-3: FY2012-FY2016 Capital Expenditures by Project Category



### Water System Projects

The water system projects include projects to improve compliance (mandated and not mandated), new WTPs, new reservoirs and upgrades to water distribution systems. Total capital expenditures in water system projects for FY2012–FY2016 are estimated at approximately \$544M, of which approximately \$319M is allocated for projects classified as mandatory. Figure 4-4 shows the FY2012–FY2016 CIP expenditures for water system projects.

### Wastewater System Projects

The wastewater system projects include projects to improve compliance, new WWTPs, and upgrades to wastewater collection systems. Total capital expenditures in wastewater system projects for FY2012–FY2016 are estimated at \$473M, of which approximately \$292M is allocated for projects classified as mandatory.

### Other Projects: Operational, Planning, R&R and Technology

Total capital expenditures for all other capital projects are estimated at approximately \$541M for FY2012–FY2016. These projects address R&R, preventive maintenance, meter replacements, office and building improvements, fleet upgrades, additional studies and system renovation, and technology improvements. R&R component of the IPMP and certain R&R projects are categorized as mandatory-driven, with an estimated FY2012–FY2016 capital expenditure of \$24M.

Table 4-2 shows the project distribution and capital expenditure by group and type classification for FY2012 through FY2016.

**Table 4-2:  
Capital Improvement Program 2011-2016 by Project Type (\$, Millions)<sup>1</sup>**

| Category Type                          | Sub-Category             | Fiscal Year Ending on June 30, |                |                |                |                | Total <sup>1</sup> |
|--|--------------------------|--------------------------------|----------------|----------------|----------------|----------------|--------------------|
|  |                          | 2012                           | 2013           | 2014           | 2015           | 2016           | 2012-2016          |
| Water System                           | Water Supply             | \$16.5                         | \$23.9         | \$28.9         | \$17.6         | \$14.6         | \$101.5            |
|  | Water Pump Stations      | 5.8                            | 3.1            | 0.2            | -              | -              | 9.1                |
|  | WTP Capacity Increase    | 0.8                            | 2.9            | 5.7            | 6.7            | 1.0            | 17.1               |
|  | WTP Improvements         | 57.6                           | 68.9           | 38.2           | 12.0           | 10.8           | 187.5              |
|  | WTP New                  | 21.6                           | 19.4           | 24.8           | 13.5           | 7.9            | 87.2               |
|  | Water Distribution       | 77.8                           | 39.9           | 18.3           | 4.5            | 1.4            | 141.9              |
|  | <b>SUBTOTAL</b>          | <b>\$180.1</b>                 | <b>\$158.1</b> | <b>\$116.1</b> | <b>\$54.3</b>  | <b>\$35.7</b>  | <b>\$544.3</b>     |
| Wastewater System                      | Wastewater Pump Stations | \$8.9                          | \$9.7          | \$1.6          | \$0.1          | \$ -           | \$20.3             |
|  | WWTP Capacity Increase   | 8.6                            | 14.9           | 27.2           | 46.0           | 65.2           | 161.9              |
|  | WWTP Improvements        | 15.5                           | 12.3           | 9.5            | 5.0            | 8.0            | 50.3               |
|  | WWTP New                 | 7.3                            | 2.8            | -              | -              | 3.3            | 13.4               |
|  | Wastewater Collection    | 64.2                           | 68.0           | 47.0           | 21.8           | 26.5           | 227.5              |
|  | <b>SUBTOTAL</b>          | <b>\$104.5</b>                 | <b>\$107.7</b> | <b>\$85.3</b>  | <b>\$72.9</b>  | <b>\$103.0</b> | <b>\$473.4</b>     |
| Meters                                 | Water Meters             | \$36.0                         | \$24.2         | \$16.8         | \$18.3         | \$22.9         | \$118.2            |
| Buildings                              | Buildings                | 5.3                            | 3.3            | 0.8            | -              | -              | 9.4                |
| Fleet                                  | Fleet                    | 2.5                            | 2.7            | 2.9            | 3.0            | 5.5            | 16.6               |
| IPMP (R&R component only) <sup>2</sup> | Water & Wastewater       | 16.2                           | 7.1            | -              | -              | -              | 23.3               |
| R&R Structure                          | Water & Wastewater       | 22.0                           | 38.4           | 51.4           | 53.8           | 57.6           | 223.2              |
| Technology                             | Water & Wastewater       | 40.1                           | 54.3           | 23.5           | 2.3            | 4.7            | 124.9              |
| Other (Studies, renovation, etc.)      | Water & Wastewater       | -                              | -              | 3.4            | 9.6            | 12.4           | 25.4               |
|  | <b>SUBTOTAL</b>          | <b>\$122.1</b>                 | <b>\$130.0</b> | <b>\$98.8</b>  | <b>\$87.0</b>  | <b>\$103.1</b> | <b>\$541.0</b>     |
| <b>TOTAL<sup>1</sup></b>               |                          | <b>\$406.7</b>                 | <b>\$395.8</b> | <b>\$300.2</b> | <b>\$214.2</b> | <b>\$241.8</b> | <b>\$1,558.7</b>   |

<sup>1</sup> Numbers may not add due to rounding.

<sup>2</sup> Does not include actual maintenance costs related to the IPMP; these are included in PRASA's O&M budget.

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## 4.4 Current Regulatory Compliance and the CIP

PRASA is currently bound by the terms of several comprehensive consent decrees and settlement agreements to eliminate treatment plant non-compliance and unpermitted discharges of untreated sewage, and to improve the quality of potable water and sludge treatment systems. These agreements include the following:

1. PRASA IV: 2003 Consent Decree, United States v. PRASA, Commonwealth of Puerto Rico, and Compañía de Aguas de Puerto Rico, Inc., Civil Action No. 01-1709 (JAF) – Addresses violations to the Section 301 and 402 of the Clean Water Act (CWA) and regulations and PRASA’s NPDES permits with regard to certain of PRASA’s wastewater pump stations
2. 2006 Wastewater Consent Decree, United States v. PRASA and Commonwealth of Puerto Rico, Civil Action No. 06-1624 (SEC) – Addresses violations to the Section 301 and 402 of the CWA and regulations promulgated there under, and PRASA’s NPDES permits with regard to PRASA’s WWTPs.
3. Puerto Rico Department of Health 2006 Drinking Water Settlement Agreement Civil Action KPE 2006-0858<sup>12</sup>– Addresses non-compliance and alleged violations with the Puerto Rico Potable Water Purity Protection Law, as amended (“Ley para Proteger la Pureza de las Aguas Potables de Puerto Rico, Ley Num 5 de 21 de Julio de 1977, según enmendada”), the SDWA and applicable regulations, and the General Environmental Health Regulation (“Reglamento General de Salud Ambiental, Reglamento Núm. 6090 de 4 de febrero de 2000”).
4. 2010 USEPA STS Consent Decree, United States v. PRASA and Commonwealth of Puerto Rico – Addresses alleged violations to the Safe Drinking Water Act (SDWA) and the CWA specifically to the National Primary Drinking Water Regulations (NPDWRs).

These consent decrees with USEPA and the agreement with PRDOH require PRASA to implement remedial plans, and develop and implement CIP projects to bring the System into compliance with regulatory requirements. PRASA currently estimates that the total cost (incurred and projected) of compliance with the various decrees will be approximately \$2.7 billion through fiscal year 2025.

PRASA’s five-year CIP, previously described was compared with existing (active) consent decrees and agreements that PRASA has entered into with regulating agencies in order to determine the adequacy of the identified projects in the CIP with regulatory requirements. MPPR/Malcolm Pirnie has found that the CIP is structured to modernize and help bring the systems into compliance with applicable environmental laws, and adequately addresses the

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<sup>12</sup> In 2008 CER and PRASA’s Official Statement, it was referred to as 2006 Drinking Water Settlement Agreement. Year has been updated to reflect date Settlement Agreement was signed: March 15, 2007. Subsequently, the Settlement Agreement was amended on June 16, 2008.

requirements of these consent decrees and agreements. Nonetheless, it shall be noted that the actual cost of compliance with the consent decrees and agreements and PRASA's total capital expenditures may vary substantially depending on, among other things:

- inflationary environment with respect to the costs of labor and supplies needed to implement the compliance program
- weather conditions that could adversely affect construction schedules and consumption patterns
- population trends and political and economic developments in Puerto Rico that could adversely impact the collection of operating revenues
- willingness of the U.S. Justice Department, USEPA, PRDOH and others, to cooperate with respect to the timing of implementation and any additional requirements that may arise as PRASA implements its mandated studies and remedial plans
- possibility of new environmental legislation or regulations affecting the Systems
- unanticipated costs or potential modifications to projects resulting from requirements and limitations imposed by environmental laws and regulations
- inherent uncertainty involved in CIP projects of the magnitude undertaken by PRASA

#### 4.5 Future Regulations and Other Regulatory Requirements

The CIP was reviewed for adequacy to comply with future regulations and regulatory other regulatory requirements that could impact compliance limits for PRASA's water and wastewater facilities.

Regarding the wastewater system, although plant-specific changes to effluent permit limits may change from time to time, due to site-specific issues, there are no identified future regulations anticipated to require additional capital improvements to the WWTPs beyond those future effluent limits identified in the consent decrees. However, PRASA may be required to implement a repair plan of its wastewater collection system (including any existing combined sewer systems) to eliminate sewer overflows. At this time, the economic impact of developing and implementing repair plans in these systems is uncertain. As such, PRASA is presently unable to determine the total cost of the CIP projects to be required to bring the wastewater collection systems into regulatory compliance and, as such, has not included these in its CIP.

Regarding the water system, anticipated future regulations for potable water systems (PWSs) at the time of this report writing include:

- Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2 ESWTR).

- Groundwater Rule (GWR).
- Future contaminants of concern based on current scientific knowledge.

Likely concerns for PRASA pertaining to each regulation are discussed in the following subsections.

PRASA has included some capital investments in its FY2012-2016 CIP in preparation of the following future regulations. However, additional capital improvements may be required. At this time it is not possible for PRASA to determine the magnitude of such expenditures, but it is possible that these may be significant. Also, PRASA and the Regulatory Agencies are currently in discussions to potentially modify certain requirements of the existing consent decrees and agreements. These modifications could result in the delay or advancement of the implementation of certain projects currently included in the CIP, and/or the modification of their scope of work. At this time it is not possible for PRASA to determine the results of these discussions and the effects these may have on its CIP; nonetheless PRASA expects that these discussions will be beneficial for PRASA from a financial standpoint.

#### **4.5.1 Likely Effects of Stage 2 DBPR on PRASA**

Compliance data from records provided by PRASA for 2006 show that 34.1% of PWSs have disinfection byproducts (DBPs) greater than the 64 parts per billion (ppb) for total trihalomethane (TTHMs) or 48 ppb for HAAs. While the maximum contaminant levels (MCLs) for TTHMs and HAAs are 80 ppb and 60 ppb respectively, 64 ppb and 48 ppb were used because they represent 80% of the MCL. As a general rule of thumb, if a PWS is within 80% of the MCL for DBPs, it is in danger of violating Stage 1 DBPR and should be considered as a likely violator of Stage 2 DBPR. This data suggests that 34% of the PWSs are likely to be affected by Stage 2 DBPR. The following are the likely effects of the Stage 2 DBPR on some PRASA drinking water systems:

- Changes in the management of the distribution system to minimize residence times hence reduce the formation of DBPs.
- Movement of the point(s) of chlorine addition without compromising overall disinfection efficacy (additional disinfectants may be needed)
- Optimizing organics removal through the treatment process – through additional treatment or enhanced coagulation/softening measures
- Use of alternative disinfectants

It is important to note that these measures have varying degrees of costs. Some measures are not capital intensive, and the costs are mainly associated with administrative and operational changes, while others, such as new solids removal systems for sedimentation basins or expanded solids treatment systems for greater quantities of coagulants (to reduce organics), will require capital expenditures.

#### 4.5.2 Likely Effects of LT2 ESWTR on PRASA

Based on the FY2010 CER facility inspections results, 15% of WTPs (a total of 19 out of 127) have experienced turbidity violations from January to December 2009. In comparison to the 2009 CER, a decrease in this percent from 24% to 15% was observed. Plants struggling to meet turbidity compliance will certainly continue to struggle under the more stringent LT2 requirements for *Cryptosporidium*. If any of the struggling plants have significant occurrences of *Cryptosporidium* (which must be determined by required monitoring), they will most likely require additional removal of pathogens and more stringent treatment. In all likelihood, plants struggling with turbidity removal will require capital projects to continue to meet more stringent regulations. Some PRASA projects that are currently under development or are being implemented include provisions to comply with this future regulation, including projects at Hatillo-Camuy, Sanamuerto and Enrique Ortega WTPs. Moreover, PRASA has established policy for new WTPs to be designed for an effluent turbidity level of 0.1 NTU although the current regulatory limit is 0.3 NTU.

Once the results of source water monitoring have been tabulated for each WTP, and Bin Classifications (level of additional treatment required) made, this can be used to determine the appropriate compliance strategy for each WTP. Plants will complete this source monitoring between by 2012.

#### 4.5.3 Likely Effects of the GWR on PRASA

The GWR has two primary requirements: completing sanitary surveys and triggered source water monitoring. Because systems will not be completing their own surveys, PRASA will need to work closely with PRDOH and provide it with all the necessary information to complete the sanitary surveys. The rule also requires source water monitoring. It is important to note that the rule gives PRDOH many enforcement options. Hence, PRASA and PRDOH can work together to determine how to implement the rule.

#### 4.5.4 Likely Effects of the Future Contaminants on PRASA

Based on available information, no determinations could be made to determine the likely impact on PRASA due to potential regulations from candidate future contaminants which include, but are not limited to: endocrine disrupting compounds, pharmaceuticals and personal care products, N-nitrosodimethylamine (NDMA), chromium (VI), perchlorate, and algal toxins. Treatment for emerging contaminants varies greatly depending upon the nature of the contaminant. However, several of the above contaminants require advanced treatment technologies to be used as effective measures for mitigation. Some of the possible technologies available are:

- Carbon – Granular Activated Carbon has been shown to be an effective barrier for naturally occurring organic matter in some cases as well as has adsorptive capacity to remove certain pharmaceuticals and endocrine disruptors.

- NF/RO – In order to remove the most persistent contaminants, high pressure filtration methods are necessary to mitigate contamination. This comes at a high cost to the public utility.
- UV – Ultraviolet (UV) radiation is being used throughout the industry to address concerns with DBP formation and cryptosporidium inactivation. Evidence suggests that UV radiation may play a role in helping to address some emerging contaminants as well.
- AOP – Advanced Oxidation Processes can be used with or without UV radiation to aggressively treat total organic carbon (TOC) and initial evidence suggests AOP may be used to treat some contaminants of concern.

## 4.6 Master Plan Updating

The 2010–2030 PRASA Master Plan Update was completed in April of 2011. The 2010–2030 Master Plan provides PRASA with a clear roadmap for the implementation of its future investments in water and wastewater infrastructure over the next 20 years. PRASA is currently evaluating, comparing, and merging its existing CIP inventory with the one provided by the updated 2010-2030 Master Plan. Subsequently, PRASA plans to continuously revise its Master Plan in order to maintain its CIP updated with the System necessities. Additional modifications to PRASA’s Master Plan may be warranted as conversations with Regulatory Agencies continue and additional regulatory requirements arise.

## 4.7 Conclusions

PRASA’s CIP generally addresses the needs of the System and complies with PRASA’s existing commitments with regulatory agencies. The CIP includes projects that cover a broad array of current and future needs, as identified by PRASA and as required by consent decrees. The CIP also includes funding for PRASA’s R&R program. However, given PRASA’s high rate of leaks and overflows, and continuing aging infrastructure, additional funds and an acceleration of the R&R program may be required in order to reduce/minimize these incidences. Finally, PRASA’s CIP includes funding for preventive maintenance improvements, as well as for other necessary infrastructure projects (i.e., fleet and building renovation, and technological improvements) essential to maintaining and preserving the utility assets.

PRASA’s classification and prioritization process allows for an organized and systematic management of the CIP. Projects are not only classified by category, group and type, but are also ranked according to a prioritization score which allows PRASA to easily identify priority projects as the CIP evolves. By categorizing and prioritizing the projects in the CIP, PRASA is able to keep track of mandatory-driven projects versus the non-mandatory, and make adjustments as projects move from planning through start-up. Presently, regulatory agencies and PRASA’s PMCs actively participate in the project planning and design phases, providing support to PRASA in the project development process, overseeing compliance with consent decrees, and searching for innovative solutions to comply with current, and when applicable, future regulations.

PRASA will need to perform additional assessments and implement operational changes or additional capital improvements to bring non-compliant facilities into compliance. However, PRASA's record of compliance with the milestones of the 2006 Consent Decree and PRDOH Agreement supports PRASA's ongoing commitment to bring its System into compliance.

The full impact of future regulations and other regulatory requirements on PRASA's System are not known at this time. In some cases, future regulations and additional regulatory requirements are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes and intensive repair programs. In general, the existing CIP does not include projects intended solely to address future regulations or additional regulatory requirements that may be imposed on PRASA. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs.

## 5 Financial Analysis

### 5.1 Introduction

In the preparation of this Supplemental Report, MPPR/Malcolm Pirnie reviewed the PRASA-prepared financial forecast (the Forecast) shown in Exhibit 1 (enclosed at the end of this section). This section summarizes the findings of MPPR/Malcolm Pirnie's review and provides an assessment of the reasonableness of PRASA's assumptions in the preparation of the Forecast. The purpose of this review was to assess the sufficiency of the proposed financial plan to provide the revenues necessary to support the projected costs shown in Exhibit 1, including O&M expenses, debt service payments, required reserve deposits and other payments. Additionally, the Forecast illustrates the anticipated debt service coverage (DSC) for the five fiscal years from July 1, 2011 through June 30, 2016 (the forecast period).

The Forecast represents PRASA's estimate of the most probable results of operations and debt service requirements for the forecast period. Thus, it reflects PRASA's judgment, based upon present circumstances, as to the most likely set of conditions and course of action. MPPR/Malcolm Pirnie worked closely with PRASA to obtain the information necessary to support its conclusions regarding the Forecast. The following information, provided by PRASA, was used in this review:

- PRASA's FY2012 annual budget
- PRASA's revenue and expense projections and calculated net operating income and the preliminary debt service requirements
- Audited financial statements for FY2009, FY2010, and FY2011
- Actual detailed expenses for FY2009, FY2010, and FY2011, and budgeted expenses for FY2012
- Debt service schedules for all currently outstanding debt service and preliminary projected debt obligations (provided by underwriters)
- 2008 Master Agreement of Trust (2008 MAT)
- Amended and restated Master Agreement of Trust (2012 MAT)
- 2009 Fiscal Oversight Agreement (2009 FOA)
- Amended and restated Fiscal Oversight and Support Agreement (2012 FOA)

The following presents a summary of the financial review and MPPR/Malcolm Pirnie's assessment of the reasonableness of the Forecast and its key underlying assumptions regarding

water consumption (demand) and sales, customer growth, revenues, O&M expenses, capital expenditures and debt service.

## 5.2 PRASA's Rate Structure

PRASA implemented a two-phase rate increase effective October 10, 2005 and July 1, 2006. This was the last time PRASA increased its rates. Resolution No. 2167 (the Resolution) was approved on October 6, 2005 by PRASA's Board of Directors after recommendation by PRASA's Executive President and the Board's Revenue Committee. The Resolution included provisions for future increases as outlined below:

- a) Rates for water and sewer service are not allowed to be increased prior to July 1, 2009 (FY2010);
- b) Increases after July 1, 2009 will be calculated according to a specified formula (Coefficient of Annual Adjustment [CAA] described below);
- c) Beginning July 1, 2009, there is a cap or limit on future annual increases of 4.5% and a limit on the cumulative increases of 25%;
- d) If PRASA requires an increase in excess of 4.5% in any single year, or once the 25% cumulative limit is reached, PRASA must follow the formal approval process for requesting a rate increase.

Increases implemented after July 1, 2009 are limited by the calculation of the CAA described in the Resolution. There are three steps to determining the CAA as follows:

STEP 1 – Calculate the Coefficient of Deficiency (CD) for the applicable year:

$$CD = \frac{\text{Operating Expenses and Debt Service}}{\text{Operating Revenues}}$$

STEP 2 – Calculate the Annual Base Coefficient (CAB) for the Base Year:

$$CAB = \frac{\text{Operating Expenses and Debt Service (FY2007)}}{\text{Operating Revenues (FY2007)}}$$

STEP 3 – Calculate the CAA:

$$CAA = CD/CAB$$

If the CD for any year is greater than the CAB from FY2007, i.e., CD for FY2010 greater than CAB, then the rates can be increased by the lesser of the CAA less one (CAA-1) or 4.5% until the 25% cumulative maximum is reached.



The rates that are currently in place are based on the public utility ratemaking principles taken from Principles of Public Utility Rates<sup>13</sup> and promote water conservation. The rate structure for water and wastewater services consists of a fixed monthly base charge per account and a volumetric consumption rate for residential, commercial, industrial and government customer classes. The fixed base charge varies with the size of the water service line and includes 10 cubic meters of monthly consumption regardless of total water use, while the volumetric rate is assessed based on the metered water consumption that exceeds the first 10 cubic meters per month.

All customers pay for service; however, PRASA does provide a 35% subsidy to the base charge for residents over the age of 65 who are eligible under the Programa de Asistencia Nutricional (“PAN” Program) or residents under the Programa de Asistencia Temporal para Familias Necesitadas (“TANF” Program); both government assistance programs. Also, since FY2010, in compliance with ACT 69 approved by the Puerto Rico Legislative Assembly in August of 2009, PRASA provides a subsidy to all public housing customers in order to limit the monthly payments of these customers to only the water and wastewater base fee charge (\$19.71 per month). In total, PRASA offers annual subsidies of approximately \$16M to qualifying customers. Table 5-1 summarizes the number of residential customers that are provided a subsidy for water and wastewater bills as of July 31, 2011.

**Table 5-1:  
Water and Wastewater Subsidized Customer Accounts**

| Subsidy                       | Number of Customers | Percent of Total Residential Customers |
|-------------------------------|---------------------|--|
| PAN Subsidy                   | 35,490              | 2.75%                                  |
| TANF Subsidy                  | 12,146              | 0.94%                                  |
| Fixed Tariff (Public Housing) | 51,476              | 3.99%                                  |
| <b>Total</b>                  | <b>99,112</b>       | <b>7.68%</b>                           |

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<sup>13</sup> James C. Bonbright, Albert L. Danielsen, and David R. Kamerschen with assistance from John B. Legler

PRASA's current rate structure for residential customers, effective since July 1, 2006, is shown in Tables 5-2 and 5-3 below.

**Table 5-2:  
Residential Monthly Base Charge per Account  
(includes first 10 cubic meters of monthly consumption)**

| Water Service Line | Water      | Wastewater | Water & Wastewater |
|--------------------|------------|------------|--------------------|
| 1/2" & 5/8"        | \$10.60    | \$9.11     | \$19.71            |
| 3/4"               | 16.18      | 13.94      | 30.12              |
| 1"                 | 26.58      | 17.90      | 44.48              |
| 1 1/2"             | 50.22      | 27.54      | 77.76              |
| 2"                 | 85.49      | 47.09      | 132.58             |
| 3"                 | 131.13     | 78.45      | 209.58             |
| 4"                 | 294.97     | 137.76     | 432.73             |
| 6"                 | 786.63     | 642.86     | 1,429.49           |
| 8"                 | 1,258.61   | 734.69     | 1,993.30           |
| 10"                | 2,013.79   | 1,175.50   | 3,189.29           |
| 12"                | \$3,222.06 | \$1,880.81 | \$5,102.87         |

**Table 5-3:  
Residential Volumetric Rate per Cubic Meter**

| Block | Monthly Usage (cubic meters) | Water  | Wastewater | Water & Wastewater |
|-------|------------------------------|--------|------------|--------------------|
| 1     | >10 - 15                     | \$1.10 | \$0.90     | \$2.00             |
| 2     | >15 - 35                     | 1.60   | 1.33       | 2.93               |
| 3     | > 35                         | 2.16   | 1.77       | 3.93               |

Based on FY2009 - FY2011 water usage, PRASA's average residential customer consumed 17 cubic meters of water. Table 5-4 shows a typical residential bill under existing water and wastewater rates for 17 cubic meters of use.

**Table 5-4:  
Residential Typical Bill  
(Based on three-year average use of 17 cubic meters per month)**

| Monthly Usage (cubic meters) | Water   | Wastewater | Water & Wastewater |
|------------------------------|---------|------------|--------------------|
| 17                           | \$19.30 | \$16.27    | \$35.57            |

PRASA's current rate structure for non-residential customers (includes commercial, industrial and government customer classes), effective since July 1, 2006, is shown in Tables 5-5 through 5-7 below.

**Table 5-5:  
Non-Residential Monthly Base Charge per Account<sup>1</sup>  
(includes first 10 cubic meters of monthly consumption)**

| Water Service Line | Water    | Wastewater | Water & Wastewater |
|--------------------|----------|------------|--------------------|
| 1/2" & 5/8"        | \$21.43  | \$17.67    | \$39.10            |
| 3/4"               | 31.73    | 28.00      | 59.73              |
| 1"                 | 53.72    | 39.43      | 93.15              |
| 1 1/2"             | 107.64   | 66.14      | 173.78             |
| 2"                 | 171.11   | 103.15     | 274.26             |
| 3"                 | 384.09   | 214.40     | 598.49             |
| 4"                 | 638.07   | 404.26     | 1,042.33           |
| 6"                 | 1,607.67 | 1,296.75   | 2,904.42           |
| 8"                 | 2,584.65 | 2,011.63   | 4,596.28           |
| 10"                | 4,135.45 | 3,218.61   | 7,354.06           |
| 12"                | 6,616.72 | 5,149.77   | 11,766.49          |

<sup>1</sup>Commercial, industrial and government customer classes.

**Table 5-6:  
Commercial and Government Volumetric Rate per Cubic Meter**

| Block | Monthly Usage (cubic meters) | Water  | Wastewater | Water & Wastewater |
|-------|------------------------------|--------|------------|--------------------|
| 1     | >10 – 100                    | \$1.53 | \$1.27     | \$2.80             |
| 2     | >100 – 200                   | 1.60   | 1.33       | 2.93               |
| 3     | > 200                        | 1.90   | 1.60       | 3.50               |

**Table 5-7:  
Industrial Volumetric Rate per Cubic Meters**

| Block | Monthly Usage (cubic meters) | Water  | Wastewater | Water & Wastewater |
|-------|------------------------------|--------|------------|--------------------|
| 1     | > 10                         | \$1.67 | \$1.40     | \$3.07             |

### 5.3 Master Agreement of Trust with Bondholders

In connection with the 2012 bond issue, on January 24, 2012 PRASA's Board of Directors authorized the execution of an amended and restated Master Agreement of Trust (2012 MAT) by and between PRASA and Banco Popular de Puerto Rico as Trustee. The 2012 MAT contains specific DSC requirements that must be met by PRASA. The requirements differ from those included in the 2008 MAT. The following sections provide a summary of the 2008 MAT requirements and the amendments included in the 2012 MAT.

#### 5.3.1 2008 Master Agreement of Trust

Currently, all revenues are deposited by PRASA into PRASA's Revenue Fund and used to pay current expenses. On the second to last business day of each month, PRASA transfers the moneys on deposit in its Revenue Fund to the Deposit Fund. On the last business day of each month, the Trustee transfers the moneys on deposit in the Deposit Fund to the following funds in the following order or priority:

- Senior Bond Fund – to fund principal and interest payments on Senior Indebtedness;
- Senior Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Senior Bonds or withdrawals or valuation losses;
- Senior Subordinate Bond Fund – to fund principal and interest payments on Senior Subordinate Indebtedness;
- Senior Subordinate Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Senior Subordinate Bonds or withdrawals or valuation losses;
- Subordinate Bond Fund – to fund principal and interest payments on Subordinate Indebtedness;
- Subordinate Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Subordinate Bonds or withdrawals or valuation losses;
- Operating Reserve Fund – to fund Operating Reserve Requirement and to pay reimbursement obligations on Operating Reserve Facilities;
- Capital Improvement Fund – to fund the Capital Improvement Fund Requirement;
- Commonwealth Payments Fund – to fund principal and interest on Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations; and
- Surplus Fund – to fund the Rate Stabilization Fund and, thereafter, for any lawful purpose.

### **5.3.1.1 Debt Service Coverage and Additional Bonds Tests Requirements**

PRASA's 2008 MAT with bondholders contained specific DSC requirements that had to be met. The 2008 MAT Rate Covenant requirements included the following:

- Net Revenues shall be sufficient in each fiscal year to be at least equal to 120% of the annual debt service with respect to the senior indebtedness for such fiscal year.
- Net Revenues shall be sufficient in each fiscal year to be at least equal to 110% of the annual debt service with respect to the senior indebtedness and the senior subordinate indebtedness for such fiscal year.
- Net Revenues shall be sufficient in each fiscal year to pay:
  - annual debt service on Indebtedness;
  - the amounts, if any, necessary to be deposited in any Senior Debt Service Reserve Account, Senior Subordinate Debt Service Reserve Account or Subordinate Debt Service Reserve Account to restore the respective amounts on deposit therein to the amount of the applicable Debt Service Reserve requirement;
  - the amount, if any, necessary to be deposited in the Operating Reserve Fund to maintain the balance therein at the Operating Reserve Fund requirement; and
  - the amount, if any, necessary to be deposited in the Capital Improvement Fund and the Rate Stabilization Account of the Surplus Fund in accordance with the annual budget for such fiscal year.

As defined and summarized from the 2008 MAT, Net Revenues is the difference between Revenues and Current Expenses. Current Expenses are the reasonable and necessary expenses, calculated on an accrual basis, to maintain, repair and operate the System, excluding non-cash reserves or expenses, e.g., depreciation expense. Indebtedness is defined as Bonds, Other System Indebtedness, Commonwealth Guaranteed Indebtedness (CGI) and Commonwealth Supported Obligations (CSO), collectively.

The DSC requirements of the 2008 MAT Rate Covenant vary by the seniority of the debt and are summarized in Table 5-8. The 2008 MAT also contained Additional Bonds Test (ABT) requirements that PRASA would have been required to meet had it decided to issue additional debt under the 2008 MAT. The ABT is a measure of whether or not the required DSC levels will still be met after the issuance of additional debt. Where two DSC values are shown for the ABT on Table 5-8, the first value is the minimum for net revenues divided by existing and proposed debt service (at the specific lien level). The second value is the minimum for net revenues divided by existing and proposed debt service (regardless of lien level) plus specified reserve fund deposits.

**Table 5-8:  
2008 MAT DSC Requirements**

| Lien Level         | Debt Secured                         | DSC for Additional Bonds Test <sup>1</sup> | DSC for Covenant Test | In Default if DSC not Achieved? |
|--------------------|--------------------------------------|--|-----------------------|---------------------------------|
| Senior             | 2008 Senior Bonds                    | 1.20 / 1.00                                | 1.20                  | Yes                             |
| Senior Subordinate | Bank Term Loan                       | 1.10 / 1.00                                | 1.10                  | Yes                             |
| Subordinate        | Not applicable currently             | 1.00                                       | 1.00                  | Yes                             |
| Below Subordinate  | Commonwealth Guaranteed Indebtedness | N/A  | 1.00                  | No                              |
| Below Subordinate  | Commonwealth Supported Obligations   | N/A  | 1.00                  | No                              |

<sup>1</sup> Under the 2008 MAT, two tests applied to future debt. The first test was net revenues divided by existing and proposed debt service (at the existing lien level); the second test was net revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

### 5.3.2 2012 Amended Master Agreement of Trust

The following key amendments have been made to the 2008 MAT. The main objective of these amendments is to establish, in favor of bondholders, a gross revenue pledge to replace the net revenue pledge and to stabilize funding of Current Expenses.

#### 5.3.2.1 Operating versus Authority Revenues

Under the 2012 MAT, two terms regarding revenues have been defined. These are: Authority Revenues and Operating Revenues.

**Authority Revenues** “shall mean Operating Revenues plus (i) any governmental grants or appropriations available to pay Current Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (ii) any amounts received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited in the Commonwealth Payments Fund) and (iii) any amounts transferred from the Budgetary Reserve Fund to the Trustee.”

**Operating Revenues** “shall mean all moneys received by or on behalf of the Authority, including (i) the moneys derived by or on behalf of the Authority from the sale of water produced, treated or distributed by, or the collection, transmission, treatment or disposal of sewage by the Systems, (ii) any proceeds of use and occupancy insurance on the Systems or any part thereof, (iii) except as provided in the following sentence, any income from the investments made under this Agreement, (iv) any special assessments, including assessments in the nature of impact fees, (v) amounts, if any, paid from the Rate Stabilization Account into the Operating Revenue Fund in any Fiscal Year minus the amounts, if any, paid from the Operating Revenue Fund into the Rate

*Stabilization Account during the same Fiscal Year; and (vi) regularly scheduled payments received under any Qualified Swap or Hedge Agreement during such period. In no event shall Operating Revenues include (i) income from the investment of moneys on deposit to the credit of the Construction Fund, proceeds of insurance (except use and occupancy insurance) or condemnation awards (which are required to be deposited directly to the credit of the Capital Improvement Fund), (ii) proceeds of sales of property constituting a part of the Systems (which are required to be deposited directly to the credit of the Capital Improvement Fund), (iii) the proceeds of Bonds or other Indebtedness, (iv) any amounts transferred from the Budgetary Reserve Fund to the Trustee and (v) any termination or similar payment under any interest rate swap or similar hedge agreement received by the Authority (which are required to be deposited directly to the credit of the Capital Improvement Fund).”*

### 5.3.2.2 Flow of Funds

Regarding the flow funds, the 2012 MAT includes the following changes:

- Senior, Senior Subordinate and Subordinate debt (and any debt that is secured on a parity therewith) takes priority over current operating expenses
- Commonwealth Guaranteed and Commonwealth Supported debt would continue to be funded/paid only after funding of current operating expenses
- All revenues shall be deposited by PRASA in the first instance to the Operating Revenue Fund to make the required deposits set forth below. The Trustee transfers the moneys on deposit in the Operating Revenue Fund to the following funds in the following order or priority:
  - Senior Bond Fund – to fund principal and interest payments on Senior Indebtedness;
  - Senior Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Senior Bonds or withdrawals or valuation losses;
  - Senior Subordinate Bond Fund – to fund principal and interest payments on Senior Subordinate Indebtedness;
  - Senior Subordinate Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Senior Subordinate Bonds or withdrawals or valuation losses;
  - Subordinate Bond Fund – to fund principal and interest payments on Subordinate Indebtedness;
  - Subordinate Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Subordinate Bonds or withdrawals or valuation losses;
  - Current Expense Fund (a new fund under the 2012 MAT) – to fund current operating expenses of PRASA;

- Operating Reserve Fund – to fund Operating Reserve Requirement and to pay reimbursement obligations on Operating Reserve Facilities;
- Capital Improvement Fund – to fund the Capital Improvement Fund Requirement;
- Commonwealth Payments Fund – to fund principal and interest payments on CGI and CSO; and
- Surplus Fund – to fund the Rate Stabilization Fund and, thereafter, for any lawful purpose.

### **5.3.2.3 Budgetary Reserve Fund**

Additionally, under the 2012 FOA, a new Budgetary Reserve Fund has been created. PRASA would initially fund the Budgetary Reserve Fund from bond proceeds – tax-exempt if permitted by applicable tax law. According to the 2012 FOA, GDB will hold the Budgetary Reserve Fund and will review and approve PRASA’s five-year fiscal improvement plan with its corresponding Budgetary Reserve Requirement for such fiscal years. If the balance in the Budgetary Reserve Fund falls below a certain level (i.e., transfers exceed the amount budgeted for the fiscal year or insufficient funds are available to cover the additional revenue requirement for the ensuing fiscal year) the Commonwealth agrees that, starting in FY2013 and for each fiscal year thereafter, it shall either (i) request an appropriation or provide another funding source for the projected Budgetary Reserve Requirement applicable to the next succeeding fiscal year (for example, in FY2012, as part of the FY2013 budget, the Commonwealth will request an appropriation or funding source sufficient to cover estimated Budgetary Reserve Requirement for FY2014) or (ii) advise PRASA that it does not intend to request an appropriation to cover all or a portion of the projected Budgetary Reserve Requirement for such next succeeding fiscal year. If the DSC requirement under the Rate Covenant is not met, and neither the Commonwealth nor the GDB advance funds to PRASA to cover shortfalls, PRASA would then be required to implement revenue enhancement and/or expense reducing measures, implement a rate structure change (i.e., implement a rate increase, or a combination of these measures, in order to satisfy the requirements of the 2012 MAT.

### **5.3.2.4 Rate Covenant**

The 2012 MAT includes modifications to the 2008 MAT Rate Covenant which PRASA must meet. These modifications are described below and summarized in Table 5-9.

As stated in the 2012 MAT, PRASA has covenanted to establish and collect rates, fees and charges so that it meets the following four independent requirements (which will be calculated annually no later than six months after the end of each fiscal year based on Operating Revenues and Authority Revenues set forth in PRASA’s most recent audited financial statements):

- Operating Revenues shall be at least equal to 250% of annual debt service with respect to Senior Indebtedness for the current fiscal year;



- Operating Revenues shall be at least equal to 200% of annual debt service with respect to Senior Indebtedness and Senior Subordinate Indebtedness for the current fiscal year;
- Operating Revenues shall be at least equal to 150% of annual debt service with respect to all Bonds and Other System Indebtedness for the current fiscal year; and
- Authority Revenues, shall be sufficient in each fiscal year to be at least equal to:
  - Annual debt service on Indebtedness;
  - Current expenses;
  - the amounts, if any, necessary to be deposited in any Senior Debt Service Reserve Account, Senior Subordinate Debt Service Reserve Account or Subordinate Debt Service Reserve Account to restore the amount on deposit therein to the amount of the applicable Debt Service Reserve Requirement (provided that each such Accounts will be deemed to be funded at the applicable Debt Service Reserve Requirement for so long as the deposits required by the [2012 MAT] are being made);
  - the amount, if any, necessary to be deposited in the Operating Reserve Fund to maintain the balance therein at the Operating Reserve Fund Requirement; and
  - the amount, if any, necessary to be deposited in the Capital Improvement Fund and the Rate Stabilization Account of the Surplus Fund in accordance with the Annual Budget for the current fiscal year.

Should PRASA decide to issue additional debt while any of the debt issued under the 2012 MAT is outstanding, the ABT requirements of the 2012 MAT would also have to be met. The ABT is a measure of whether or not DSC will still be met after the proposed, additional bonds are issued. The modified ABT requirements which PRASA must meet (under the 2012 MAT) include the following:

- Senior Bonds ABT
  - Operating Revenues are at least equal to 2.5x Senior Bonds maximum annual debt service; and
  - Operating Revenues are at least equal to 1.5x maximum annual debt service on all System Indebtedness.
- Senior Subordinated Bonds ABT
  - Operating Revenues are at least equal to 2.0x combined Senior Bonds and Senior Subordinate Bonds maximum annual debt service; and
  - Operating Revenues are at least equal to 1.5x maximum annual debt service on all System Indebtedness.

■ Subordinated Bonds ABT

- Operating Revenues are at least equal to 1.5x maximum annual debt service on all System Indebtedness

**Table 5-9:  
Summary of 2012 MAT DSC Requirements**

| Lien Level         | Debt Secured                         | DSC for Additional Bonds Test <sup>1</sup> | DSC for Covenant Test | In Default if DSC not Achieved? |
|--------------------|--------------------------------------|--|-----------------------|---------------------------------|
| Senior             | 2008 / 2012 Senior Bonds             | 2.5/1.5                                    | 2.5                   | Yes                             |
| Senior Subordinate | Bond Anticipation Note               | 2.0/1.5                                    | 2.0                   | Yes                             |
| Subordinate        | Not applicable currently             | 1.5  | 1.5                   | Yes                             |
| Below Subordinate  | Commonwealth Guaranteed Indebtedness | N/A  | 1.0                   | No                              |
| Below Subordinate  | Commonwealth Supported Obligations   | N/A  | 1.0                   | No                              |

<sup>1</sup>Two tests apply to future debt. The first test is Operating Revenues divided by existing and proposed debt service (at the existing lien level); the second test is Operating Revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

### 5.3.2.5 Annual Budget and Disbursement Schedule

As stated in the 2012 MAT, PRASA shall adopt a budget (the Annual Budget) for the operation of the Systems for the ensuing fiscal year. In addition to the Annual Budget, the 2012 MAT requires PRASA to also prepare an annual Disbursement Schedule for the payment of Current Expenses (as defined in the 2012 MAT). Each annual Disbursement Schedule shall be prepared in such manner as to show in reasonable detail, the Current Expenses expected to be incurred during the fiscal year (calculated on a cash basis), including (i) all cash disbursements contained in the Annual Budget for the fiscal year, (ii) expenses that may have accrued in prior years and are expected to be paid in the current fiscal year, (iii) amounts that are necessary to pay for or result from an emergency condition, (iv) amounts that are necessary to pay judgments or otherwise result from the settlement of litigation, (v) project expenditures that the PRASA has determined to capitalize, (vi) amounts that are necessary to be advanced for costs of improvements and (vii) other similar disbursements. The Disbursement Schedule shall be updated by PRASA and submitted to the Trustee and the GDB on a monthly basis.

## 5.4 Fiscal Oversight and Support Agreement

In connection with the 2012 bond issue, on January 24, 2012 PRASA's Board of Directors authorized the execution of an amended and restated Fiscal Oversight and Support Agreement (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the GDB. A summary of the major requirements of the 2009 FOA, as well as the amendments included in the 2012 FOA are described below.

#### **5.4.1 2009 Fiscal Oversight Agreement**

On July 9, 2009 PRASA and the GDB entered into a FOA that assigned responsibilities to the GDB as fiscal agent of PRASA. At the time, PRASA faced liquidity constraints which negatively affected its financial position, primarily due to:

- reduced levels of income caused in part by increased levels of uncollectible or past-due accounts;
- significant increases in energy costs; and
- uncertainty in the financial and credit markets, which combined with high levels of debt, limited PRASA's access to interim financing for its CIP projects.

PRASA requested GDB and GDB agreed to provide financial assistance to PRASA in the form of an emergency liquidity support facility under the terms of that certain credit agreement entered into between GDB and PRASA. GDB required PRASA to implement a comprehensive expense reduction program, including certain fiscal oversight controls (subject to existing laws, agreements, and commitments) designed to minimize future rate increases and to protect and improve the overall financial health and credit rating of PRASA. In turn, this would allow PRASA to obtain adequate financing to fund its CIP and operate the system in an efficient and reliable manner, in compliance with applicable laws and regulations and other regulatory requirements.

Under the 2009 FOA, GDB agreed to provide emergency financial assistance to PRASA, expressly conditioned upon PRASA's ability to achieve the financial performance metrics as delineated in the 2008 MAT, including the Rate Covenant as set forth therein. Also, through the 2009 FOA, GDB retained the right to monitor and enforce PRASA's compliance with such covenants, the 2008 MAT and the 2009 FOA. Also the 2009 FOA gave the GDB the authority to serve as fiscal agent for PRASA with respect to all bonds, notes or any other evidence of indebtedness issued, purchased, sold or exchanged by PRASA. Additionally, PRASA agreed to maintain continuous disclosure with GDB and, as such, meet certain reporting requirements.

#### **5.4.2 2012 Amended Fiscal Oversight and Support Agreement**

Some key amendments that have been included in the 2012 FOA are the following:

- PRASA will develop and implement a multi-year financial and operating plan (the Financial Improvement Plan) that establishes milestones for PRASA to achieve self-sufficiency through rate and cost adjustments.
- GDB will review and provide recommendations to PRASA regarding its preliminary Annual Budget, Disbursement Schedule and CIP, amongst others, prior to approval of PRASA's Board of Directors.

- As established under the 2012 FOA, GDB agrees to hold a Budgetary Reserve Fund in trust for PRASA intended to cover the Budgetary Reserve Requirement for each fiscal year; this Budgetary Reserve Requirement shall be equivalent to the amount projected by PRASA to be required in such fiscal year as financial support from the Commonwealth.
- To the extent that PRASA fails to seek or receive an appropriation from the Commonwealth in an amount equal to at least the Budgetary Reserve Requirement for a fiscal year, PRASA shall be obligated to implement revenue enhancement and/or expense reduction measures, revise its rate structure (i.e., rates, fees and charges), or a combination of these measures, to ensure that it will be in compliance with the Rate Covenant set forth in Section 7.01 of the 2012 MAT.
- PRASA shall comply with certain reporting requirements (to be submitted to GDB) including, but not limited, to the monthly Disbursement Schedule included and defined in the 2012 MAT.

GDB will continue to act as fiscal agent for PRASA and PRASA shall continue to comply with the continuous disclosure and reporting requirements of the 2012 FOA.

## **5.5 FY2012 – FY2016 Forecast**

Considering the requirements of the 2012 MAT and the 2012 FOA including, but not limited to, the amended Rate Covenant, PRASA has prepared a five-year financial projection for fiscal years 2012 through 2016. MPPR/Malcolm Pirnie reviewed the PRASA prepared FY2012 budget and the Forecast for FY2013 through FY2016 shown in Exhibit 1.

The Forecast presents PRASA's estimate of the expected results of operations and DSC for the forecast period. Thus, the Forecast reflects PRASA's judgment, based upon present circumstances, as to the most likely set of conditions and course of action. However, there will usually be differences between forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. MPPR/Malcolm Pirnie has no responsibility for updating this Supplemental Report for changes that occur beyond the date of its issuance. PRASA's revenue projections, on a cash basis; expenses, on an accrual basis; and their respective assumptions are discussed below.

### **5.5.1 Operating Revenues**

As defined in the 2012 MAT, Operating Revenues include:

- the moneys derived by or on behalf of PRASA from the sale of water produced, treated or distributed by, or the collection, transmission, treatment or disposal of sewage by the Systems;
- any proceeds of use and occupancy insurance on the Systems or any part thereof;

- certain income from investments made under the 2012 MAT;
- any special assessments, including impact fees;
- net amounts, if any, paid from the Rate Stabilization Account into the Operating Revenue Fund in any fiscal year; and
- regularly scheduled payments received under any Qualified Swap or Hedge Agreement.

Operating Revenues exclude any governmental grants or appropriations available to pay Current Expenses of PRASA, including grants or appropriations received by PRASA and specifically made for the payments of principal of and interest on obligations of PRASA.

PRASA's Operating Revenues projections, on a cash basis, and associated assumptions are discussed below:

1. Base Fee and Service Charges (Exhibit 1, line 2) – PRASA's single largest source of revenue is from the monthly base charge and volume rate for service. PRASA's FY2012 Annual Budget projection includes revenues from Base Fee and Service Charges (Service Revenues) of \$740 M, approximately \$27M more than FY2011 results. This represents an expected increase of 4% in FY2012. PRASA's Forecast projections for FY2013 through FY2016 include service revenues of \$730M, approximately \$17M more (or 2%) than the FY2011 \$713M results. This amount is based on the average of the results for FY2011 (\$713M), FY2010 (\$741M), and FY2009 (\$759M). PRASA is forecasting that Base Fee and Service charges will remain steady over the forecast period.

FY2011 results indicate PRASA did not achieve its Service Revenues budget of \$754M and the results were in fact 5% lower than budgeted amounts, and approximately 4% lower (\$27M) than FY2010 actual results. However, the decline in Base Fee and Service Charges during FY2011 are mostly due to one-time prior years' service charge adjustments that were recorded in FY2011, which had no impact on cash collections for the year. These adjustments are the result of negotiations completed by PRASA with customers to collect old debts or outstanding bills for service; negotiations included adjustments of debts that were unverifiable or deemed unreasonable by PRASA.

PRASA has experienced a modest growth in its number of accounts of approximately 0.74% per year from FY2004 to FY2011, shown in Table 5-10 below. However, PRASA is assuming a conservative forecast of customer growth going forward by projecting a zero percent (0%) customer growth rate in future fiscal years.

**Table 5-10:  
Customer Accounts FY2004 – FY2011**

| Fiscal Year                           | Customer Class |               |               |               | Total        |
|---------------------------------------|----------------|---------------|---------------|---------------|--------------|
|                                       | Residential    | Commercial    | Industrial    | Government    |              |
| 2004                                  | 1,145,963      | 67,375        | 1,528         | 11,033        | 1,225,899    |
| 2005                                  | 1,161,350      | 68,093        | 1,533         | 11,584        | 1,242,560    |
| 2006                                  | 1,173,040      | 68,396        | 1,526         | 11,688        | 1,254,650    |
| 2007                                  | 1,178,677      | 67,560        | 1,472         | 11,706        | 1,259,415    |
| 2008                                  | 1,181,366      | 63,004        | 1,447         | 11,519        | 1,257,336    |
| 2009                                  | 1,184,661      | 61,657        | 1,280         | 11,290        | 1,258,888    |
| 2010                                  | 1,204,636      | 62,938        | 1,237         | 10,946        | 1,279,757    |
| 2011                                  | 1,215,896      | 62,753        | 1,219         | 10,932        | 1,290,800    |
| <b>CAGR<sup>1</sup> FY2004-FY2011</b> | <b>0.85%</b>   | <b>-1.01%</b> | <b>-3.18%</b> | <b>-0.13%</b> | <b>0.74%</b> |

<sup>1</sup>CAGR = Compound Annual Growth Rate

Another factor that contributed to the decline in FY2011 Service Revenues was a reduction in demand for utility services. Total consumption in FY2011 decreased over 1% compared to FY2010, as shown in Table 5-11.

**Table 5-11:  
Average Monthly Billed Consumption by Class FY2010 – FY2011  
(1,000 Cubic Meters)**

| Fiscal Year         | Customer Class |              |               |              | Total         |
|---------------------|----------------|--------------|---------------|--------------|---------------|
|                     | Residential    | Commercial   | Industrial    | Government   |               |
| FY 2010             | 20,554         | 3,152        | 869           | 2,738        | 27,313        |
| FY 2011             | 19,721         | 3,350        | 1,153         | 2,788        | 27,013        |
| <b>% Difference</b> | <b>-4.05%</b>  | <b>6.28%</b> | <b>32.68%</b> | <b>1.83%</b> | <b>-1.10%</b> |

This reduction in consumption along with an increase in the total number of customers represents a decrease in the average billed consumption per account of approximately 1.9%, presented in Table 5-12.

**Table 5-12:  
Average Monthly Consumption per Account FY2010 – FY2011  
(Cubic Meters)**

| Fiscal Year         | Customer Class |              |               |              | Total         |
|---------------------|----------------|--------------|---------------|--------------|---------------|
|                     | Residential    | Commercial   | Industrial    | Government   |               |
| FY 2010             | 17.06          | 50.08        | 702.51        | 250.14       | 21.34         |
| FY 2011             | 16.21          | 53.38        | 945.86        | 255.03       | 20.93         |
| <b>% Difference</b> | <b>-4.98%</b>  | <b>6.59%</b> | <b>34.64%</b> | <b>1.95%</b> | <b>-1.92%</b> |

FY2012 year-to-date (YTD) results through November 30, 2011 show that the average monthly billed consumption is slightly below (2%) the FY2011 results. Also, Base Fee and Service Revenues are below the FY2012 budget target by approximately 7.5%.

Given the FY2011 results and FY2012 YTD results, MPPR/Malcolm Pirnie believes the \$730M projected for the rest of the forecast period is reasonable. However, it should be noted that continued strain on the economy could cause further decline in the consumption patterns of PRASA customers, resulting in still further reductions in projected revenues. Hence, FY2012 YTD results should be closely monitored and projections for subsequent fiscal years shall be adjusted accordingly.

2. Operational Initiatives (Exhibit 1, lines 3 & 4) – PRASA has projected revenues of \$60M from Operational Initiatives for FY2012 through FY2014, and of \$44M and \$45M for FY2015 and FY2016, respectively. As mentioned in Section 3 of this report, PRASA’s Operational Initiatives are a set of programs implemented to optimize revenue collection. The Revenue Optimization Program is the most significant (in terms of additional revenue potential) of these initiatives and has shown encouraging results in each of the past three fiscal years. Additionally, PRASA has included additional revenue benefits resulting from the Customer Geodatabase and the AMR/AMI System for Large Meter projects. A summary of the estimated annual benefits of these Operational Initiatives, as provided by PRASA and its consultant, is shown in Table 5-13 below.

**Table 5-13:  
Operational Initiatives Projections for FY2012 – FY2016  
(\$, Thousands)**

| Initiative   | FY 2012<br>Projection | FY2013<br>Projection | FY2014<br>Projection | FY2015<br>Projection | FY2016<br>Projection |
|--|-----------------------|----------------------|----------------------|----------------------|----------------------|
| Small Meters   | \$27,285              | \$31,318             | \$33,574             | \$34,431             | \$35,216             |
| Degradation  | (7,000)               | (7,000)              | (7,000)              | (7,000)              | (7,000)              |
| Large Meters   | 7,467                 | 7,801                | 7,011                | 6,433                | 5,813                |
| Theft and Tx <sup>1</sup> Accounts   | 7,902                 | 8,715                | 7,729                | 3,661                | 3,661                |
| Sprinklers   | 1,406                 | 1,549                | 882                  | 882                  | 882                  |
| Collection Management  | 1,250                 | 625                  | 625                  | -                    | -                    |
| Disconnections   | 15,950                | 13,750               | 11,550               | -                    | -                    |
| Inactive Accounts  | 320                   | 320                  | -                    | -                    | -                    |
| Class Correction   | 2,372                 | 2,488                | 2,488                | 2,488                | 2,488                |
| Condominiums   | 2,037                 | 2,037                | 2,037                | 2,037                | 2,037                |
| Miscellaneous  | 1,353                 | 1,353                | -                    | -                    | -                    |
| Geodatabase Cadaster & AMR/AMI <sup>2</sup> Large Meter Clients (Metro Region) | -                     | -                    | -                    | 1,068                | 1,903                |
| <b>Total Estimated Annual Benefits</b>   | <b>\$60,341</b>       | <b>\$62,956</b>      | <b>\$58,896</b>      | <b>\$44,000</b>      | <b>\$45,000</b>      |
| <b>PRASA Projection</b>  | <b>\$60,000</b>       | <b>\$60,000</b>      | <b>\$60,000</b>      | <b>\$44,000</b>      | <b>\$45,000</b>      |

<sup>1</sup> Inactive customer accounts with consumption.

<sup>2</sup> AMR/AMI (Automatic Meter Reading / Advanced Metering Infrastructure)

MPPR/Malcolm Pirnie believes PRASA has a strong commitment to the Operational Initiatives program (as evidenced by the associated results) and to achieving goals outlined for each initiative. FY2012 YTD results show that PRASA has collected approximately \$24M of additional revenues from its operational initiatives. Based on current and historical results of the program, and the Operational Initiatives program analysis executed by PRASA and its consultants, it is reasonable to expect that the projected incremental revenues resulting from the Operational Initiatives for the forecast period, in general, may be attainable. Nonetheless, PRASA's assumption for the incremental revenues from Operational Initiatives relies on the effective and timely implementation of these initiatives.

3. Collections Lag and Uncollectibles Reserve (Exhibit 1, line 5) – Prior to the two-stage 128% rate increase, implemented October 10, 2005 and July 1, 2006, PRASA's historical percentage of uncollectible accounts was approximately 4% of Service Revenues. In the years following the two-stage rate increase, PRASA's uncollectible accounts value has increased to approximately 12% of Service Revenues. Current local economic conditions, an increase in unemployment, and a reduction in the average household income have likely negatively impacted affordability and the ability of PRASA's customers to pay their utility bills. Yet, from FY2009 to FY2010, PRASA's rate of uncollectible accounts actually decreased from approximately 18% to 12%; while in FY2011 PRASA collected more than the net billed amount as a result of its reserve for uncollectible accounts to approximately 3% of Base Fee and Service Charges, partly as a result of PRASA's initiative to adjust and collect outstanding debt (mostly from government accounts) from prior years.

PRASA's FY2012 Annual Budget project includes a reduction in revenues of \$54M as a reserve for uncollectible accounts, representing a \$38M increase in the reserve when compared to FY2011 results (mainly due to the FY2012 budgeted increase in Base Fee and Service Charges). This results in a reserve for uncollectible accounts percentage of approximately 7%. FY2012 YTD results through November 30, 2011 demonstrate that PRASA is currently at an 8% uncollectible rate, which represents a negative deviation from the budgeted target of 7%. For FY2013 through FY2016, PRASA is assuming an uncollectible rate of approximately 10% of projected Service Revenues in each fiscal year. MPPR/Malcolm Pirnie finds PRASA's assumption for the uncollectible budget rate to be in line with FY2010, FY2011 and FY2012 YTD results; however, considering the current economic environment and the high unemployment rate in Puerto Rico<sup>14</sup>, MPPR/Malcolm Pirnie cautions that the rate for uncollectible accounts could increase. As such, PRASA should closely monitor its rate of uncollectible accounts throughout FY2012 and adjust its projections as needed.

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<sup>14</sup> Based on the United States Bureau of Labor Statistics, as of June 2011 the unemployment rate in Puerto Rico was 16.1% which is one percent lower than reported in June 2010; Source: [www.stats.bls.gov](http://www.stats.bls.gov)



4. Subsidy (Exhibit 1, lines 6 and 7) – PRASA’s Forecast includes a reduction in revenues to reflect the subsidy offered to customers who qualify for the Programa de Asistencia Nutricional (PAN Program) or residents under the Programa de Asistencia Temporal para Familias Necesitadas (TANF Program). The subsidy, approved in October of 2005 by PRASA’s Board of Directors, provides a 35% base charge discount to PAN or TANF-eligible customers, i.e., qualifying seniors over 65 years of age, disabled persons, and families in need of temporary assistance.

PRASA has calculated the full impact of this subsidy to be approximately \$17M annually if all eligible customers apply for and meet the qualification criteria (estimated at 210,000 customers). However, PRASA does not expect all 210,000 eligible customers to apply for the subsidy and therefore does not forecast the subsidy to reach the \$17M level. For the last three fiscal years this subsidy has totaled approximately \$3.2M per year. The Forecast assumes the level of the subsidy at \$4M in FY2012 and in each year of the forecast period.

Also, in August of 2009 Puerto Rico’s Legislative Assembly approved Act 69 which includes a partial subsidy for water and wastewater consumption costs for residents of public housing projects. PRASA originally projected that this new subsidy program could cost approximately \$16.2M in additional subsidy assistance offered to PRASA customers who qualify (estimated based on a full-year participation of the eligible customers). In FY2010 and FY2011 this subsidy totaled \$7M (the implementation of the program did not occur for the entire 12-month period) and \$12M, respectively. PRASA is projecting that in FY2012 and in each year of the forecast period it will grant approximately \$12M in assistance to qualified customers based on a full program year.

While it is difficult to predict the impact that any new subsidy will have on PRASA’s revenues, recent history has shown that subsidy participation is usually low. Hence, MPPR/Malcolm Pirnie believes that PRASA’s subsidy estimate over the Forecast is reasonable but should be re-assessed on an annual basis in case participation is higher than expected.

5. Miscellaneous Income (Exhibit 1, line 8) – PRASA projects \$4M from miscellaneous income in FY2012 and in each year of the forecast period. This miscellaneous income includes mainly fines, reconnection charges, bulk water sales, other miscellaneous revenues, and interest income. Results show that PRASA collected \$3.3M in miscellaneous income in FY2011. FY2012 YTD results through November 30, 2011 show that PRASA is currently below or short of the budget amount for FY2012. However, this is a typical trend that usually corrects itself during the third and fourth quarters of the fiscal year. Hence, MPPR/Malcolm Pirnie finds these projections reasonable based on results from previous years. Fines should be closely monitored due to the economic situation, as the uncollectible rate for these fines may be higher than previous years.

6. Special Assessments (Exhibit 1, line 9) – PRASA collects revenues from new service installations. This fee is collected from developers and applies to new water and sewer connections to the System. The current fees are \$500 each for water and sewer connections (\$1,000 total per unit). Special Assessments depend on the fees paid by developers of new projects and it is expected that the current economic situation will continue to impact the local new housing market during the next few years.

PRASA generated \$6.8M in FY2011 from Special Assessments, half the amount generated in FY2008. This four-year downward trend is consistent with the current economic situation and its impact on the local housing market. PRASA projects \$5M from Special Assessments during FY2012. The \$5M projection for Special Assessments, although lower than the most recent three-year average of \$10.8M, is in line with the FY2011 preliminary results. However, this revenue source is exclusively dependent upon economic conditions, and could be lower than the FY2011 level if the recession continues. Due to the current status of the Puerto Rico housing market, FY2012 YTD results through November 30, 2011 show that PRASA is currently off or below target with its budget. If this trend continues throughout the fiscal year, PRASA will not be able to meet its Special Assessments' budget. Considering the FY2012 YTD results, PRASA has included \$3M in its Forecast for FY2013 through FY2016 Special Assessments. MPPR/Malcolm Pirnie finds this projection reasonable. Results should be closely monitored in case economic conditions further deteriorate new developments.

7. Rate Stabilization Account (Exhibit 1, line 10) – In accordance with the MAT, a Rate Stabilization Account, the balance of which is determined in the annual budget, must be established. This account is established within the Surplus Fund which contains any remaining moneys after all the required deposits are made. Equal monthly deposits over the fiscal year must be deposited to the account to make the balance in the fund equal to the balance set forth in the annual budget. Given PRASA's current financial situation, PRASA has not projected that any funding will be available for establishing a Rate Stabilization Account over the forecast period.

### 5.5.2 Other Sources of Revenues

In FY2011, PRASA received a contribution of \$105M from the Central Government General Fund to fund an otherwise anticipated operational deficit. In FY2012, a similar contribution was approved by the Puerto Rico Legislature in the Central Government's annual budget. As of December 31, 2011, PRASA received \$70.3M of the \$183.9M approved from this assignment in FY2012. Based on FY2011 and FY2012 YTD results, PRASA may be able secure government appropriations in future years if necessary. However, because Central Government contributions require legislative approval and are subject to the availability of funds in the Central Government's annual budget, PRASA's ability to secure these funds in future years is uncertain.

In order to supplement its future revenue requirements and to comply with the requirements of Section 7.01 of the 2012 MAT, PRASA is projecting that other funding sources will be available from either transfers from the Budgetary Reserve Fund<sup>15</sup> or the implementation of rate increases. After FY2013, PRASA is projecting draws from the Budgetary Reserve Fund in amounts of \$95M and \$145M in fiscal years 2012 and 2013, respectively. The Forecast shows that PRASA projects funding deficits in the amount of \$330M, \$385M, and \$420M for FY2014, FY2015, and FY2016, respectively. PRASA is projecting that these deficits will be covered with additional transfers from the Budgetary Reserve Fund, from the implementation of rate increases, from other measures to increase revenues and/or reduce costs, or from a combination of these measures. MPPR/Malcolm Pirnie agrees that these projected deficits are mostly accurate. While PRASA's financial forecast does not specify how the Budgetary Reserve Fund will be funded once its initial funding has been depleted, the 2012 FOA clearly states that PRASA shall be obligated to implement revenue enhancing and/or cost reducing measures, revise its rates and fees, or implement a combination of these measures, in the case the Commonwealth fails to seek or receive an appropriation or provide another source of funding to satisfy the Budgetary Reserve Requirement. While PRASA has raised rates in recent years due to the local economic situation in Puerto Rico, the Commonwealth has provided the necessary funding to cover deficits in FY2010, FY2011 and FY2012. As such, it is MPPR/Malcolm Pirnie's opinion that it is reasonable to assume that support from the Commonwealth will continue if PRASA is unable to raise rates during the forecast period.

### 5.5.3 Operating (Current) Expenses

As defined in the 2012 MAT, **Current Expenses** “shall mean the reasonable and necessary current expenses, incurred by the Authority in the ordinary course of business, calculated on an accrual basis, of maintaining, repairing and operating the properties constituting the Systems or causing said maintenance, repair and operation, which expenses shall exclude depreciation, reserves for allowances for doubtful accounts and other non-cash reserves or expenses. For purposes of [the Rate Covenant] and the Annual Budget required by Section 7.02 [of the 2012 MAT], Current Expenses will be calculated on an accrual basis. For all other purposes of [the 2012 MAT], Current Expenses will be calculated on a cash basis. Notwithstanding any accounting treatment to the contrary, the amount of any termination or similar payment under any interest rate swap or similar hedge agreement shall, if payable by the Authority, not be taken into account in computing Current Expenses to the extent the same is paid by or on behalf of the Authority from the proceeds of any Indebtedness.”

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<sup>15</sup> Note: transfers from the Budgetary Reserve Fund (which is a new fund that will be created pursuant to the 2012 FOA) are considered Authority Revenues but not Operating Revenues as defined in the 2012 MAT.

PRASA’s expenses projections, on an accrual basis, and associated assumptions are discussed below.

1. Payroll and Benefits (Exhibit 1, line 18) – Payroll and Benefits is PRASA’s largest expense category. Over the past three fiscal years, PRASA has averaged approximately \$307M annually for this expense category; with a high of \$333M in FY2008 and a low of \$278M in FY2011. PRASA has projected payroll and benefits expenses of \$284M for FY2012. The projection for FY2012 represents a 1% increase from the FY2011 results of \$278.1M, established prior to the capitalization of project overhead costs. FY2012 YTD results through November 30, 2011 show that PRASA is currently above its Payroll and Benefits budget by approximately \$4.8M. This negative deviation is due mostly to additional overtime expenses incurred in the preparation for three hurricanes that threatened Puerto Rico in August and September of 2011. PRASA is projecting annual increases of approximately 2% each year in this expense category for fiscal years 2013 through 2016. This annual increase considers the impact of the negotiated labor Collective Bargaining Agreement (CBA) with the UIA-AAA.

PRASA and its largest union, the UIA-AAA have recently finalized negotiations of a new CBA, effective from January of 2012 through December of 2015, that contains certain retroactive and future economic agreements that have an impact on PRASA’s payroll and benefits expense projections. The new CBA was signed by the parties on January 20, 2012. PRASA is projecting that the negotiated terms will have an effect on its Forecast, as early as FY2012.

PRASA’s Forecast already includes the additional payroll and benefits expenses negotiated with UIA-AAA, the effects of which are summarized in the table below. These additional costs include: an increase in medical insurance benefits for current transitory employees (\$250 for 350 transitory employees), a new summer bonus (\$240 annual bonus per employee starting in FY2014), a meal allowance for plant operators, and an additional salary increase for employees (\$100 per month/per employee, starting in FY2014).

**Table 5-14:  
Projected Additional Expenses Related to UIA-AAA CBA (\$, Thousands)**

|  | FY2012  | FY2013  | FY2014  | FY2015   | FY2016   |
|--|---------|---------|---------|----------|----------|
| Projected Additional Payroll and Benefits Expenses UIA-AAA | \$1,013 | \$2,430 | \$9,951 | \$16,431 | \$22,911 |

PRASA has assumed an average cost per (full time employee) FTE for its regular employee classifications<sup>16</sup> of \$56,000. This amount is reasonable considering the FY2011 average

<sup>16</sup> Regular employee classifications include: Appointed, Career, UIA-AAA, and HIEPAAA employees.

salary per FTE was close to \$55,000. This cost takes into account the previously negotiated terms between PRASA and the UIA-AAA, which provided for a salary increase of approximately \$0.60 per hour, for UIA-AAA employees (excludes transitory employees whose benefits are as mandated by law).

Regarding PRASA's labor relations with its other labor union, the HIEPAAA, no material changes are reported.

As previously mentioned, PRASA intended to continue its personnel reduction initiative in future years, as programmed. However, given the current economic situation and high unemployment rate of Puerto Rico, PRASA's administration determined that it was in the best interest of Puerto Rico's citizens and overall economy to delay its staff reduction plan to future years. PRASA is projecting to reduce 50 FTEs, each year, in FY2013 and FY2014 (100 FTEs total during the forecast period). Additionally, PRASA included in its FY2012 budget 225 additional transitory employees that may be hired throughout the fiscal year to perform monthly customer meter readings and/or other customer service related activities. As such, PRASA projects staff levels for the remainder of the forecast period to approximate a total of 5,045.

MPPR/Malcolm Pirnie believes PRASA's payroll and related benefits are reasonable for the forecast period given that PRASA's cost per FTE and future attrition assumptions are conservative and includes the most recent conditions negotiated between PRASA and the UIA-AAA. PRASA should closely monitor its FY2012 results and make the necessary adjustments moving forward in order to offset the YTD negative deviation which will be further exacerbated by the additional expenses related to the UIA-AAA CBA. As such, PRASA may need to adjust its assumptions, especially regarding attrition levels and annual cost per FTE, as these could represent a material impact on the Forecast.

2. Electricity (Exhibit 1, line 19) – Electric Power is PRASA's second largest expense category. PRASA has projected an electric power expense of \$175M for FY2012. This amount represents a 12% increase from FY2011 results. The FY2012 projection is based on an expectation that oil market prices experienced between July 2010 and June 2011 (an average of \$93 per barrel of oil) will continue throughout FY2012. FY2012 YTD results through November 30, 2011 show that PRASA's Electric Power costs are slightly over its targeted budget (by approximately 5.6%). Also, PRASA is projecting an increase of 3% (over the FY2012 base) in electricity costs in each year from FY2013 through FY2016.

PRASA's electricity expense projections do not consider the potential savings from the energy conservation measures and diversification of power sources to be developed and implemented under the Comprehensive Energy Management Program (approximately \$25M annually). Also, the projections do not incorporate any additional potential savings to be

achieved by PRASA from the acquisition of the hydroelectric facilities (approximately \$30M). Refer to Section 3 for the detailed discussion of these initiatives.

Even though FY2012 YTD results show a negative deviation with respect to PRASA's budget, MPPR/Malcolm Pirnie finds the electricity costs assumptions and forecast reasonable given PRASA's on-going efforts to diversify its energy sources and reduce costs. However, even if energy consumption at PRASA's facilities is reduced as planned, if oil price increases continue at high rates throughout FY2012, PRASA's projections for energy costs could be materially understated. Hence, PRASA should closely monitor YTD results and adjust projections as necessary.

3. Maintenance and Repairs (Exhibit 1, line 20) – In previous fiscal years, this category had been included under the Other Expenses category. PRASA has projected \$42.7M for maintenance and repair expenses in FY2012. This is approximately 5% less than the projected results for FY2011. PRASA is currently implementing cost control measures to reduce its maintenance and repair costs and has required all Operational Regions to reduce its maintenance and repair budget for FY2012 by at least 5%. In future years, PRASA is assuming Maintenance and Repair cost will increase at a rate of 3% per year due mostly to inflation. FY2012 YTD results through November 30, 2011 show that PRASA is currently below its Maintenance and Repair budget which, in turn, helps to offset some of the budget overruns experienced in other categories such as payroll and electricity. MPPR/Malcolm Pirnie believes PRASA's Forecast assumptions for maintenance and repair are reasonable, considering PRASA's commitment to implementing and achieving cost controls in this and other expense categories.
  
4. Chemicals (Exhibit 1, line 21) – PRASA's FY2012 budget projection for chemical expenses amounts to \$30M. This projection is based on the FY2011 results, which were approximately \$29.5M (8% higher than budgeted for the fiscal year). Considering that chemical costs are usually affected by inflation and worldwide demand as they are mostly commodities, in future years PRASA is assuming chemical costs will increase at an annual rate of 3% over the FY2012 budget projection.

FY2012 YTD results through November 30, 2011 show that PRASA is off target with its Chemicals budget by approximately \$4.2M. PRASA reports that this negative deviation is due mostly to higher than expected chemicals demand for treatment during August and September of 2011. Assuming that PRASA is able to implement the necessary consumption and cost controls during the remainder of FY2012, and considering historical results and the projected annual increases, PRASA's forecast projections are reasonable. Nonetheless, PRASA should closely monitor YTD results and adjust projections as necessary should this deviation not be corrected by end of FY2012.

5. Superaqueduct Service Contract (Exhibit 1, line 22) – Over the past 10 years, and up until FY2011, the Superaqueduct had been managed and operated by Thames-Dick Superaqueduct Partners, PSC (Thames-Dick) under a contract agreement with PRASA (the Master Agreement). Thames-Dick’s compensation included two main components: a fixed fee for operation and management activities, which included Thames-Dick’s gross margin (approximately \$2M); and the pass-through of operation and maintenance expenses. These pass-through expenses included: power and fuel, chemical, insurance, contingencies and lagoon cleaning costs. The Master Agreement between Thames-Dick and PRASA was resolved by the parties pursuant to a Resolution Agreement dated May 18, 2011. The operations, maintenance and administration of the Superaqueduct were transferred back to PRASA as of June 19, 2011. The decision was made based on business and policy reasons, mutually agreed by the parties, and not based on their respective performance or existing claims.

FY2011 expense results for the Superaqueduct totaled \$28M. Current FY2012 projections for this expense category, which includes the pass through costs listed above, amount to \$26.9M. For future years, PRASA is assuming this expense category will increase at a rate of 1% per year over the FY2012 base. This projection reflects PRASA’s expected savings from the contract take over, and includes a small contingency to cover the additional costs associated with the cleaning of the sludge lagoons in future years.

FY2012 YTD results through November 30, 2011 show that PRASA is on target with the Superaqueduct budgeted expenses. Based on historical and YTD results, PRASA’s projections seem reasonable. However, important to note that this forecast could be negatively impacted by further increases in electricity and chemical costs.

6. Insurance (Exhibit 1, line 23) – Results for insurance expenses over the past four fiscal years have been more or less consistent, averaging approximately \$10M per year. PRASA has projected \$12.4M for insurance expenses in FY2012 and has assumed that this cost will increase at an annual rate of approximately 3% per year. FY2012 YTD results through November 30, 2011 show that PRASA is on target with this budget. Hence, MPPR/Malcolm Pirnie believes the Forecast projections to be conservative and reasonable considering historical results.
7. Other Expenses (Exhibit 1, lines 24) – Other Expenses is PRASA’s third largest expense category. Other Expenses includes, for example: materials and supplies, security, treatment of residuals and rentals, and water transport. Over the past four fiscal years, PRASA has averaged approximately \$156M in Other Expenses each year. PRASA has projected Other Expenses of \$126M for FY2012 and is assuming an annual increase of 3% per year over the forecast period. Overall, the Other Expenses budget for FY2012 is in line with FY2011 results. FY2012 YTD results through November 30, 2011 show that PRASA is on target

with this budget and that, to date, it has been able to achieve cost savings related to professional services and other sub-contracted services which, in turn, help to offset some of the budget overruns experienced in other categories such as payroll and electricity. MPPR/Malcolm Pirnie finds these projections reasonable when compared to actual results in previous years and YTD results.

8. Special Projects Reserve (Exhibit 1, line 25) – PRASA has included a one-time operational reserve of \$10.5M for Special Projects in FY2012. This reserve will be used for special projects throughout the fiscal year at the discretion and upon approval of PRASA’s Executive President. These Special Projects may include, but are not limited to: additional operational initiatives to increase revenues and/or reduce costs, additional operational and maintenance projects, etc. No additional amounts are projected over the forecast period for this expense category. FY2012 YTD results show that PRASA has used \$3.5M of this budget. MPPR/Malcolm Pirnie believes this new expense cost to be conservative and reasonable, as it provides PRASA a contingency fund for the implementation of optimization and improvement projects, amongst others.
  
9. Capitalized Expenses (Exhibit 1, line 26) – PRASA projects 5.7% of Operational Expenses will be capitalized every year of the forecast period. This capitalization rate is 0.3% lower than the rate used in FY2011, and 0.8% lower than in previous years. For prior years, a 6.5% capitalization rate was used based on the recommendations provided by an independent consultant retained by PRASA. The revised capitalization rate of 5.7% considers the projected CIP reduction, and is based on the latest revised report issued by its external consultant (issued in 2010 as an update to its 2007 Asset Capitalization Report). MPPR/Malcolm Pirnie has not reviewed this estimation in detail and, as such, is not providing an opinion. MPPR/Malcolm Pirnie assumes this estimation is reasonable given it has been accepted by PRASA’s outside, independent auditors in the preparation of its financial statements.

## 5.6 Funding of PRASA CIP

The CIP developed by PRASA estimates an expenditure of \$1,558.7M over the forecast period. Section 4 of this report contains a review of PRASA’s CIP. Specifically, it provides an assessment of the following:

- PRASA’s CIP, including a summary of the program by project category.
- The adequacy of the CIP to address identified system deficiencies and current requirements stipulated in open Consent Decrees held with regulatory agencies.
- The potential effects of future regulations to the PRASA system and the CIP.



Table 5-15 provides a summary of the CIP along with the anticipated sources of funding (as currently approved by PRASA’s Board of Directors). In addition to these sources and uses, PRASA is in the process of including in its CIP \$50M in additional uses of funds over the forecast period to finance facility improvements related to the EPC initiative described in Section 3. These additional uses will be financed with bonds proceeds.

**Table 5-15:  
CIP Projected Uses and Sources of Funds (\$, Thousands)**

|  | FY2012           | FY2013           | FY2014           | FY2015           | FY2016           | TOTAL              |
|--|------------------|------------------|------------------|------------------|------------------|--------------------|
| <b>USES OF FUNDS</b>                           |                  |                  |                  |                  |                  |                    |
| Repair & Replacement of Fixed Assets           | \$21,980         | \$38,385         | \$51,367         | \$53,824         | \$57,628         | <b>\$223,184</b>   |
| CIP Infrastructure Projects                    | 384,772          | 357,548          | 248,717          | 160,376          | 184,126          | <b>1,335,539</b>   |
| <b>Total Projected Capital Expenses (Uses)</b> | <b>\$406,751</b> | <b>\$395,933</b> | <b>\$300,084</b> | <b>\$214,200</b> | <b>\$241,754</b> | <b>\$1,558,722</b> |
| <b>SOURCES OF FUNDS</b>                        |                  |                  |                  |                  |                  |                    |
| Federal Funds – Rural Development Funds        | \$20,000         | \$15,000         | \$15,000         | \$15,000         | \$15,000         | \$80,000           |
| Federal Funds – State Revolving Funds          | 57,155           | 50,933           | 45,084           | 49,200           | 46,754           | 249,126            |
| Federal Economic Stimulus – Grants             | 18,475           | -                | -                | -                | -                | 18,475             |
| Federal Economic Stimulus – Loans              | 9,179            | -                | -                | -                | -                | 9,179              |
| Local Stimulus                                 | 1,942            | -                | -                | -                | -                | 1,942              |
| Bonds Proceeds / Interim Financing             | 300,000          | 330,000          | 240,000          | 150,000          | 180,000          | 1,200,000          |
| <b>Total Sources of Funds</b>                  | <b>\$406,751</b> | <b>\$395,933</b> | <b>\$300,084</b> | <b>\$219,329</b> | <b>\$241,754</b> | <b>\$1,563,851</b> |

Of the sources of funds identified over the five-year forecast period (including the additional bonds proceeds to be used for the financing of the EPC initiative-related improvements), 78% are projected to come from bond proceeds and/or interim financing; 20% are projected to come from Federal Funds (State Revolving Fund, Rural Development bonds, American Recovery and Reinvestment Act, and other matching sources); and 2% is projected to come from federal and local economic stimulus funds (both loans and grants). Given current market conditions and PRASA’s fiscal situation, it is possible that the projected future bond issuances will not occur as projected. In such case, PRASA would have to continue to work with the GDB in order to secure the necessary interim funding to continue its CIP implementation.

## 5.7 Debt Service

### 5.7.1 Existing Debt Service

The 2008 Series A and B Senior Lien Revenue Bonds (the “Senior Lien Bonds”) and Revenue Refunding Bonds 2008 Series A and B (collectively, the “2008 Guaranteed Bonds”) were issued

as part of a comprehensive financial plan to fund PRASA's CIP and restructure PRASA's outstanding indebtedness to accommodate its current and future CIP needs. The proceeds of PRASA's \$1,338,649,456 Senior Lien Bonds were used by PRASA to (i) fund a portion of the cost of its CIP, (ii) refinance certain lines of credits and bond anticipation notes, (iii) establish a debt service reserve fund, (iv) establish a deposit for capitalized interest, (v) fund payments for termination of a forward interest rate swap agreement, and (vi) pay for expenses related to the issuance of the Senior Lien Revenue Bonds. The proceeds of PRASA's \$284,755,000 Revenue Refunding Bonds (Commonwealth Guaranteed) 2008 Series A and B were used by PRASA to (i) refund the outstanding PRASA Series 1995 Bonds (Commonwealth Guaranteed), and (ii) pay for expenses related to the issuance of the Revenue Refunding Bonds. For more information, refer to the Plan of Finance in the respective Official Statements.

### **5.7.2 Proposed Debt Service**

The 2012 Series A and B Senior Lien Revenue Bonds (the Senior Lien Bonds) will be issued as part of a comprehensive financial plan to continue to fund PRASA's CIP. The proceeds of PRASA's \$1,800,450,000 tax exempt Senior Lien Bonds will be used to (i) refinance certain LOCs and BANs, (ii) fund a portion of the cost of its CIP, (iii) provide initial funding for the Budgetary Reserve Fund, (iv) establish a deposit for capitalized interests, and (v) pay for expenses related to the issuance of the Senior Lien Revenue Bonds. Additionally, the proceeds of PRASA's \$295,245,000 taxable Senior Lien Bonds will be used to refinance an existing \$241M BAN and provide additional financial liquidity to PRASA.

Exhibit 1 summarizes the existing and proposed debt service for the forecast period. Estimated debt service amounts include projected payments on the 2008 and 2012 Bonds, future bond offerings, LOC payments, and payments for maintaining required debt service reserves. The Senior bonds include existing Senior obligations, Senior obligations from the proposed issuance, and future bond offerings. The Senior Subordinated bonds include future bond offerings. There are no projected Subordinated bonds included in the Forecast. Commonwealth Guaranteed Indebtedness (CGI) includes existing obligations of PRASA that are guaranteed by the Commonwealth of Puerto Rico including the 2008 Commonwealth Guaranteed Bonds, USDA Rural Development Bonds, and SRF Loans. Commonwealth Supported Obligations (CSO) include the obligations of PRASA related to the Superaqueduct financing costs<sup>17</sup>. PRASA's Forecast includes its payment of the CGI and CSO.

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<sup>17</sup> In January of 2012 the Commonwealth refinanced certain outstanding debt, including the CSO. A portion of the refinanced debt will be paid directly by the Commonwealth (approximately \$131M), and the remainder (approximately \$162M) will be paid by PRASA; thus resulting in lower CSO annual debt service payment requirements for the forecast period than previously reported in the Consulting Engineer's Reports.

### 5.7.3 Debt Service Coverage

Exhibit 1 presents the PRASA-prepared Forecast and shows the calculation of the DSC, under the 2012 MAT, for the forecast period. The major assumptions used to develop the revenues and expenses used in the calculation of DSC were discussed in the preceding subsections and are reflected in Exhibit 1. Debt service requirements in PRASA’s Forecast include current debt and projected future bond issuances that are expected to be necessary to finance the CIP. Using these assumptions, PRASA projects that it will meet the DSC targets as required by the 2012 MAT. If the DSC requirement is not met, the 2012 MAT outlines specific actions, remedies, and timetables for PRASA to comply with the 2012 MAT.

Table 5-16 summarizes PRASA’s projected DSC over the forecast period (as shown in Exhibit 1). The projected DSC results for the forecast period have been calculated using the modified Rate Covenant requirements as included in the 2012 MAT. These include the new definition for Operating Revenues and Authority Revenues.

Based on the anticipated debt service obligations over the forecast period, PRASA would meet its DSC requirements. This is contingent upon PRASA being able to secure the necessary additional cash inflows from changes in the rate structure or from additional operational initiatives, continuing with the successful implementation of its operational initiatives, maintaining its billings and collections performance, and controlling its operational expenses as projected.

**Table 5-16:  
FY2012 – FY2016 Projected Debt Service Coverage**

| Debt Service Level                                 | DSC Requirements | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 |
|--|------------------|--------|--------|--------|--------|--------|
| Senior Debt  | 2.50             | 8.15   | 7.79   | 2.81   | 2.56   | 2.55   |
| Senior Subordinate Debt                            | 2.00             | 7.59   | 7.79   | 2.81   | 2.56   | 2.46   |
| Subordinate Debt                                   | 1.50             | 7.59   | 7.79   | 2.81   | 2.56   | 2.46   |
| Authority Revenues / All Expenses and Debt Service | 1.00             | 1.00   | 1.00   | 1.01   | 1.01   | 1.01   |

### 5.7.4 Debt Service Coverage – Additional Bonds Tests (ABT)

For ABT purposes, Operating Revenues are divided by the maximum annual debt service for any fiscal year. Table 5-17 summarizes PRASA’s projected ABT compliance over the forecast period (as shown in Exhibit 1). The projected ABT results for the forecast period have been calculated using the modified requirements as included in the 2012 MAT.

**Table 5-17:  
FY2012 – FY2016 Projected ABT Calculation**

| Debt Service Level      | Requirement <sup>1</sup> | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 |
|-------------------------|--------------------------|--------|--------|--------|--------|--------|
| Senior Debt             | 2.5/1.5                  | 3.20   | 2.77   | 2.60   | 2.54   | 2.55   |
| Senior Subordinate Debt | 2.0/1.5                  | 3.20   | 2.77   | 2.60   | 2.45   | 2.36   |
| Subordinate Debt        | 1.5                      | 3.20   | 2.77   | 2.60   | 2.45   | 2.36   |

<sup>1</sup>Two tests apply to future debt. The first test is Operating Revenues divided by existing and proposed debt service (at the existing lien level); the second test is Operating Revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

## 5.8 Operating Reserve Fund

In accordance with the 2012 MAT, an Operating Reserve Fund must be established in the amount of \$150M until March 1, 2013, and thereafter:

- (i) if there is a line of credit on deposit in the reserve fund, the reserve shall mean for the term of line of credit an amount equal to at least ninety (90) days of current expenses determined on the first day of the fiscal year in which such line of credit is delivered or renewed as set forth in the annual budget for such fiscal year; or
- (ii) if the reserve fund is funded from revenues, the reserve shall mean an amount equal to not less than ninety (90) days of current expenses determined annually based on the current expenses relating to the fiscal year of such calculation as set forth in the annual budget for such fiscal year.

PRASA has established a line of credit on deposit to maintain the Operating Reserve Fund to be in compliance with the 2012 MAT requirements.

## 5.9 Capital Improvement Fund

In accordance with the 2012 MAT, a Capital Improvement Fund must be established and funded for each fiscal year, in an amount equal to the greater of:

- (i) the amount set forth in the annual budget for such fiscal year, and
- (ii) the amount recommended by the Consulting Engineer.

Equal monthly deposits over the fiscal year must be deposited to the Fund to make the balance of the Fund equal to the requirement. In addition, the following must also be credited to the Fund:

- (i) the proceeds of any condemnation awards,
- (ii) proceeds of insurance (other than use and occupancy insurance),
- (iii) the proceeds of sales of property constituting a part of the Systems, and
- (iv) the proceeds of any termination or similar payment received by PRASA under any interest rate swap or similar hedge agreement.

PRASA is planning to deposit \$300M in the Capital Improvement Fund from bond issuance proceeds. PRASA estimates that this amount and the resulting capitalized interests (approximately \$146M) will be sufficient to partially fund PRASA's remaining FY2012's CIP, as well as the planned FY2013 CIP in its entirety. Based on the projected CIP capital expenditures, this deposit amount seems reasonable.

## **5.10 Conclusions and Recommendations**

Overall, MPPR/Malcolm Pirnie believes that the revenues and expenses included in PRASA's Forecast for fiscal years 2012 through 2016 (included in Exhibit 1) are reasonable based on recent historical performance. Based on such Forecast, PRASA should be able to comply with the Rate Covenant and the ABT requirements stipulated in the 2012 MAT. However, the probability of achieving this Forecast is conditioned on the following three assumptions:

1. PRASA's ability to maintain its service revenues in a very challenging economic environment – Continued uncertainty and strain on the economy could cause further decline in the consumption patterns of PRASA customers and collections, resulting in reductions in projected revenues. Hence, the YTD results for FY2012 should be closely monitored and projections for subsequent fiscal years shall be adjusted accordingly.
2. PRASA's ability to continue to successfully implement all of its operational initiatives – PRASA's Forecast includes results from operational initiatives that have been described throughout this report. The Forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/Malcolm Pirnie's conclusions regarding the Forecast assume the framework and execution of the operational initiatives will not materially change; any changes could significantly alter the findings contained and presented in this report. Although PRASA has made a dedicated commitment to implement the initiatives described in this report, there is a possibility that the projected results and, more specifically, the timing of those results will not be achieved.
3. PRASA's ability to secure other sources of revenue beyond FY2013 (after the initial funding of the Budgetary Reserve Fund has been depleted) – Starting in FY2014, compliance with the Rate Covenant and DSC requirements included in the 2012 MAT is contingent upon PRASA obtaining additional sources of revenues from the Budgetary Reserve Fund, as a result of future replenishments from the Central Government Fund or other sources of funding, or from the implementation of changes in its rate structure. The additional revenue requirements projected for FY2013, FY2014 and FY2015 amount to approximately \$330M, \$385M, and \$420M, respectively. In the event the Budgetary Reserve Fund is depleted and not replenished with additional funding (i.e., with additional Central Government appropriations or other sources of funding), PRASA would be required to implement revenue enhancing and/or cost reduction measures, rate structure changes, or a combination of these actions, that would generate sufficient revenues to meet its DSC requirements. These additional measures

would have to provide an equivalent percent increase in revenues of approximately 45% in FY2014, with additional increases of, approximately, 5% in FY2015, and 3% in FY2016.

Considering the overall conclusions presented above, MPPR/Malcolm Pirnie recommends the following with regards to PRASA's Forecast:

1. PRASA should continuously monitor the results of operational initiatives so that adjustments, if needed, are made on a timely basis to both the program's operational elements and budget projections. If results are not achieved as projected over the course of the fiscal year, PRASA should consider:
  - Re-assessing the implementation and performance of operational initiatives.
  - Enforcing stronger cost reduction and cost control measures in O&M expense categories by administrative orders from PRASA's Executive President; these include payroll and benefits, overtime costs, maintenance and repair, and chemical costs.
2. PRASA should also focus on achieving the implementation of all of its planned revenue enhancing and cost reducing initiatives on a timely manner. PRASA's projections greatly depend on the successful implementation of such initiatives.
3. PRASA should resume the implementation of its payroll and related costs controls and resume its personnel reduction program, as soon as possible. PRASA could benefit from a utility-wide organizational assessment in order to target areas where a surplus is identified, and address staff deficiencies where needed.
4. PRASA should consider deferring the implementation of some of its current capital investment commitments over a longer period of time so that its associated debt service requirements increase in a more gradual manner than as currently projected. For this, PRASA may consider discussing with Regulatory Agencies the possibility of deferring some projects and/or implementing temporary, less capital intensive projects to remediate certain situations.
5. Although PRASA has been able to adequately plan for, fund, and implement its CIP over the past fiscal years, it is recommended that PRASA develop capital financing policies that provide direction and guidance regarding the use of debt and cash funding the CIP in the future. PRASA should then begin funding the Capital Improvement Fund and the Rate Stabilization Account.
6. PRASA should consider increasing water and wastewater service rates to a level that will provide sufficient revenue to meet all of its obligations as defined in Article 7 of the 2012 MAT. This recommendation is supported by the fact that, in FY2011 and FY2012, PRASA received appropriations from government sources in the amounts of \$105M and \$70.2M (YTD), respectively, to balance its budget and to meet DSC requirements.

7. Any possible rate increase and changes in the rate structure should follow the basic Bonbright principles considered when the previous rate increases were authorized in October 2005. These principles include: revenue stability and predictability, simplicity and public acceptance, fairness to all customer groups, defensibility, and conservation.<sup>18</sup> Although PRASA's Board of Directors can approve up to a 4.5% automatic annual rate adjustment (up to 25% cumulative) as stipulated in the 2005 Rate Resolution, any increase above this amount must follow the due process established in Law #21 of May 1985, Law #170 of August 1988, and corresponding amendments.
  
8. At the time of preparation of this report, PRASA projects that approximately \$240M of the 2012 bond issue will be used to provide the initial funding of the Budgetary Reserve Fund. Transfers from this fund are intended to be used to meet PRASA's O&M expenses and certain Rate Covenant requirements. MPPR/Malcolm Pirnie is of the opinion that the use of long-term debt to fund recurring annual O&M expenses is not a sustainable financial practice. PRASA should begin setting the stage for rate increases as part of a multi-year, sustainable financial plan and not continue the use of long-term debt to pay for current expenses. To the extent Central Government appropriations or other sources of funding become available, this will moderate future rate increases. However, the long-term financial plan for PRASA should be a self sustaining plan with limited or no reliance on Central Government appropriations and no reliance on long-term debt to fund O&M expenses.

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<sup>18</sup> James C. Bonbright, Albert L. Danielson, and David R. Kammerschen, *Principles of Public Utility Rates* (Public Utilities Reports Inc.) 2<sup>nd</sup> ed. 1989.

**FINAL REPORT**  
Section 5  
Financial Analysis

**EXHIBIT 1**

| <b>PRASA FINANCIAL PROJECTIONS PRO FORMA</b><br>(\$, Thousands) |  | <b>FY2012</b>     | <b>FY2013</b>     | <b>FY2014</b>      | <b>FY2015</b>      | <b>FY2016</b>      |
|---|--|-------------------|-------------------|--------------------|--------------------|--------------------|
|   |  | <b>PROJECTION</b> | <b>PROJECTION</b> | <b>PROJECTION</b>  | <b>PROJECTION</b>  | <b>PROJECTION</b>  |
| <b>OPERATING REVENUES</b>                                       |  |                   |                   |                    |                    |                    |
| 1   | Service Collections  |                   |                   |                    |                    |                    |
| 2   | Base Fee and Service Charges   | \$740,000         | \$730,000         | \$730,000          | \$730,000          | \$730,000          |
| 3   | Operational Initiatives - Additional Billings  | 35,000            | 40,000            | 40,000             | 40,000             | 40,000             |
| 4   | Operational Initiatives - Collections from Prior Years                                     | 25,000            | 20,000            | 20,000             | 4,000              | 5,000              |
| 5   | Reserve for Uncollectible Accounts   | (54,309)          | (75,190)          | (75,190)           | (75,190)           | (75,190)           |
| 6   | PAN/TANF Subsidy   | (4,000)           | (4,000)           | (4,000)            | (4,000)            | (4,000)            |
| 7   | Subsidy to Public Housing  | (12,000)          | (12,000)          | (12,000)           | (12,000)           | (12,000)           |
| 8   | Miscellaneous Income   | 4,000             | 4,000             | 4,000              | 4,000              | 4,000              |
| 9   | Special Assessments  | 5,000             | 3,000             | 3,000              | 3,000              | 3,000              |
| 10  | Transfer from/(to) Rate Stabilization Account  | -                 | -                 | -                  | -                  | -                  |
| 11  | <b>Total Operating Revenues</b>  | <b>\$738,691</b>  | <b>\$705,810</b>  | <b>\$705,810</b>   | <b>\$689,810</b>   | <b>\$690,810</b>   |
| <b>Other Sources of Revenue</b>                                 |  |                   |                   |                    |                    |                    |
| 12  | Transfer from Budgetary Reserve Fund   | \$95,000          | \$145,000         | -                  | -                  | -                  |
| 13  | General Fund Contributions   | 70,264            | -                 | -                  | -                  | -                  |
| 14  | Additional External Support/Other Measures/Rate Increases                                  | -                 | -                 | 330,000            | 385,000            | 420,000            |
| 15  | <b>Total Other Sources of Revenue</b>  | <b>\$165,264</b>  | <b>\$145,000</b>  | <b>\$330,000</b>   | <b>\$385,000</b>   | <b>\$420,000</b>   |
| 16  | <b>Total Authority Revenues (Line 11 + Line 15)</b>  | <b>\$903,955</b>  | <b>\$850,810</b>  | <b>\$1,035,810</b> | <b>\$1,074,810</b> | <b>\$1,110,810</b> |
| <b>OPERATING EXPENSES</b>                                       |  |                   |                   |                    |                    |                    |
| 18  | Payroll and Related  | \$283,493         | \$292,123         | \$296,819          | \$301,474          | \$307,954          |
| 19  | Electric Power   | 175,000           | 180,250           | 185,658            | 191,227            | 196,964            |
| 20  | Maintenance and Repair   | 42,652            | 43,932            | 45,250             | 46,607             | 48,005             |
| 21  | Chemicals  | 30,000            | 30,900            | 31,827             | 32,782             | 33,765             |
| 22  | Superaqueduct Service Contract   | 26,900            | 27,169            | 27,441             | 27,715             | 27,992             |
| 23  | Insurance  | 12,410            | 12,782            | 13,166             | 13,561             | 13,968             |
| 24  | Other Expenses   | 125,522           | 129,288           | 133,166            | 137,161            | 141,276            |
| 25  | Special Projects Reserve   | 10,484            | -                 | -                  | -                  | -                  |
| 26  | Capitalized Operating Expenses   | (39,422)          | (40,837)          | (41,800)           | (42,780)           | (43,886)           |
| 27  | <b>Total Operating Expenses</b>  | <b>\$667,039</b>  | <b>\$675,607</b>  | <b>\$691,527</b>   | <b>\$707,747</b>   | <b>\$726,038</b>   |
| 28  | Total Senior Debt Service (S + SSUB + SUB)   | \$97,296          | \$90,600          | \$251,268          | \$269,606          | \$280,731          |
| 29  | Revenues Available for Operating Expenses and Other Debt Service After Senior Debt Service | \$806,659         | \$760,210         | \$784,542          | \$805,204          | \$830,079          |
| 30  | Total Commonwealth Debt Service (CGI & CSO)  | \$137,363         | \$80,934          | \$84,593           | \$88,890           | \$95,495           |
| 31  | <b>Net Authority Revenues After Operating Expenses and All Debt Service Obligations</b>    | <b>\$2,257</b>    | <b>\$3,669</b>    | <b>\$8,422</b>     | <b>\$8,567</b>     | <b>\$8,546</b>     |
| <b>DEBT SERVICE</b>   |  |                   |                   |                    |                    |                    |
|   | Senior (S)   | \$90,600          | \$90,600          | \$251,268          | \$269,606          | \$271,421          |
|   | Senior Subordinated (SSUB)   | 6,696             | -                 | -                  | -                  | 9,310              |
|   | Subordinated (SUB)   | -                 | -                 | -                  | -                  | -                  |
|   | Commonwealth Guaranteed Indebtednes (CGI)  | 109,649           | 80,934            | 84,593             | 87,296             | 86,496             |
|   | Commonwealth Supported Obligations (CSO)   | 27,714            | -                 | -                  | 1,594              | 8,999              |
|   | <b>Total Debt Service</b>  | <b>\$234,659</b>  | <b>\$171,534</b>  | <b>\$335,861</b>   | <b>\$358,496</b>   | <b>\$376,226</b>   |

\*Numbers may not add up due to rounding

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**EXHIBIT 1**

| <b>PRASA FINANCIAL PROJECTIONS PRO FORMA<br/>DEBT SERVICE COVERAGE AND ADDITIONAL BOND TESTS<br/>(\$, Thousands)</b> |   | <b>FY2012<br/>PROJECTION</b> | <b>FY2013<br/>PROJECTION</b> | <b>FY2014<br/>PROJECTION</b> | <b>FY2015<br/>PROJECTION</b> | <b>FY2016<br/>PROJECTION</b> |
|--|---|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 1  | Operating Revenues  | \$738,691                    | \$705,810                    | \$705,810                    | \$689,810                    | \$690,810                    |
| 2  | Other Sources of Revenue  | 165,264                      | 145,000                      | 330,000                      | 385,000                      | 420,000                      |
| 3  | Authority Revenues (Line 1 + Line 2)  | <u>\$903,955</u>             | <u>\$850,810</u>             | <u>\$1,035,810</u>           | <u>\$1,074,810</u>           | <u>\$1,110,810</u>           |
| 4  | Operating Expenses  | \$667,039                    | \$675,607                    | \$691,527                    | \$707,747                    | \$726,038                    |
| <b>Senior Debt</b>   |   |                              |                              |                              |                              |                              |
| 5  | <b>Senior</b>   |                              |                              |                              |                              |                              |
| 6  | Annual Debt Service   | \$90,600                     | \$90,600                     | \$251,268                    | \$269,606                    | \$271,421                    |
| 7  | DS Coverage Required = 2.50   | 8.15                         | 7.79                         | 2.81                         | 2.56                         | 2.55                         |
| 8  | Maximum Annual Debt Service   | \$230,792                    | \$254,711                    | \$271,422                    | \$271,422                    | \$271,422                    |
| 9  | ABT Coverage Required = 2.50  | 3.20                         | 2.77                         | 2.60                         | 2.54                         | 2.55                         |
| 10   | <b>Senior &amp; Senior Subordinated</b>   |                              |                              |                              |                              |                              |
| 11   | Annual Debt Service   | \$97,296                     | \$90,600                     | \$251,268                    | \$269,606                    | \$280,731                    |
| 12   | DS Coverage Required = 2.00   | 7.59                         | 7.79                         | 2.81                         | 2.56                         | 2.46                         |
| 13   | Maximum Annual Debt Service   | \$230,792                    | \$254,711                    | \$271,422                    | \$281,024                    | \$292,747                    |
| 14   | ABT Coverage Required = 2.0   | 3.20                         | 2.77                         | 2.60                         | 2.45                         | 2.36                         |
| 15   | <b>Senior, Subordinated Subordinated &amp; Subordinated</b>                                 |                              |                              |                              |                              |                              |
| 16   | Annual Debt Service   | \$97,296                     | \$90,600                     | \$251,268                    | \$269,606                    | \$280,731                    |
| 17   | DS Coverage Required = 1.50   | 7.59                         | 7.79                         | 2.81                         | 2.56                         | 2.46                         |
| 18   | Maximum Annual Debt Service   | \$230,792                    | \$254,711                    | \$271,422                    | \$281,024                    | \$292,747                    |
| 19   | ABT Coverage Required = 1.50  | 3.20                         | 2.77                         | 2.60                         | 2.45                         | 2.36                         |
| 20   | Net Authority Revenues  | \$806,659                    | \$760,210                    | \$784,542                    | \$805,204                    | \$830,079                    |
| 21   | Total Operating Expenses  | 667,039                      | 675,607                      | 691,527                      | 707,747                      | 726,038                      |
| 22   | Net Authority Revenues Available for Other Debt   | <u>\$139,620</u>             | <u>\$84,603</u>              | <u>\$93,015</u>              | <u>\$97,457</u>              | <u>\$104,041</u>             |
| <b>Other Debt</b>  |   |                              |                              |                              |                              |                              |
| 23   | <b>Commonwealth Guaranteed Indebtedness</b>   |                              |                              |                              |                              |                              |
| 24   | Annual Debt Service   | 109,649                      | 80,934                       | 84,593                       | 87,296                       | 86,496                       |
| 25   | DS Coverage Required = 1.00   | 1.27                         | 1.05                         | 1.10                         | 1.12                         | 1.20                         |
| 26   | <b>Commonwealth Supported Obligations</b>   |                              |                              |                              |                              |                              |
| 27   | Annual Debt Service   | 27,714                       | -                            | -                            | 1,594                        | 8,999                        |
| 28   | DS Coverage Required = 1.00   | 1.02                         | 1.05                         | 1.10                         | 1.10                         | 1.09                         |
| 29   | Total Annual Debt Service   | \$234,659                    | \$171,534                    | \$335,861                    | \$358,496                    | \$376,226                    |
| 30   | <b>Net Authority Revenues After Operating Expenses and<br/>All Debt Service Obligations</b> | <b>\$2,257</b>               | <b>\$3,669</b>               | <b>\$8,422</b>               | <b>\$8,567</b>               | <b>\$8,546</b>               |
| 31   | <b>Total Authority Revenues / All Obligations<br/>(Operating Expenses + Debt Service)</b>   | <b>1.00</b>                  | <b>1.00</b>                  | <b>1.01</b>                  | <b>1.01</b>                  | <b>1.01</b>                  |

\*Numbers may not add up due to rounding

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## 6 Conclusions and Recommendations

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### 6.1 Considerations and Assumptions

In preparation of this report and the conclusions contained herein, MPPR/Malcolm Pirnie has relied on certain assumptions and information provided by PRASA with respect to the conditions which may exist or events which may occur in the future. MPPR/Malcolm Pirnie believes the information and assumptions are reasonable, but has not independently verified information provided by PRASA and others. To the extent that actual future conditions differ from those assumed herein or provided to us by others, the actual results will vary from those forecast.

In the preparation of this report, MPPR/Malcolm Pirnie has made a number of principal considerations and assumptions (as provided throughout this report); some of the most notable are as follows:

1. MPPR/Malcolm Pirnie has made no determination as to the validity and enforceability of any contracts, agreement, existing law, rule, or regulation applicable to PRASA and its operations. However, for purposes of this report, MPPR/Malcolm Pirnie has assumed that all such contracts, agreements, laws, rules and regulations will be fully enforceable in accordance with their terms.
2. PRASA will generally continue the current policies of employing qualified and competent personnel; properly operating and maintaining the System in accordance with generally accepted industry practices; and of operating the System in a prudent and sound businesslike manner.
3. The proposed CIP reflects the general needs of the System, and the CIP will be largely implemented as planned and reflected in this report.

### 6.2 Conclusions and Recommendations

Set forth below are the principal opinions which MPPR/Malcolm Pirnie has reached regarding the review of PRASA's System, CIP and financial projections. For a complete understanding of the assumptions upon which these opinions are based, this report should be read in its entirety.

1. The condition of the facilities visited varied from new to those requiring capital upgrades. The condition of most facilities with implemented CIP projects improved from FY2009 to FY2010. However, a number of treatment facilities are operating out of compliance with discharge permit limits and drinking water standards. Despite these compliance problems, the facilities are generally producing and delivering potable water and conveying and treating wastewater to a level of competency. PRASA reports that no material changes regarding the System condition have occurred since FY2012.

2. PRASA's O&M practices are adequate. However, there is a need for standardization of O&M practices across regions and the need for facility-specific O&M plans or manuals for facilities. Also, there is an identified need of standardized processes for prioritizing and scheduling preventative, corrective and routine maintenance activities.
3. PRASA's operational initiatives are well developed and address critical aspects of PRASA's operation such as energy and non-revenue water. The Revenue Optimization Program and Staff Reduction Program have provided significant benefits to PRASA in the form of increased revenues and cost reductions, respectively. Once implemented as planned, PRASA's operational initiatives could provide substantial additional economic and operational benefits to PRASA in the future.
4. PRASA must continue to maintain its commitment for the implementation of the IPMP. In addition, PRASA must continue a focused corrective maintenance and R&R program in order to improve leaks and overflow metrics, to maintain and improve the condition of the System, and to provide a program for the long-term preservation of the System assets. PRASA has included provisions for the continuous implementation of the IPMP in its CIP and O&M financial projections.
5. With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are generally in alignment with the System needs. Some additional needs at select plant facilities have been identified by PRASA in recent months.
6. On average, PRASA has included in its CIP approximately \$44.6M in each year of the Forecast for R&R. Given PRASA's high rate of leaks and overflows, and continuing aging infrastructure, PRASA should consider increasing its annual R&R program funding and accelerating its R&R program. For this, an analysis of PRASA's R&R needs and budget is recommended in order to develop a sound R&R program that will allow PRASA to improve and extend the useful life of its System.
7. The CIP adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies. The full impact of future regulations and other regulatory requirements on PRASA's System are not known at this time. In some cases, future regulations and additional regulatory requirements are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes and intensive repair programs. In general, the existing CIP does not include projects intended solely to address future regulations or additional regulatory requirements that may be imposed on PRASA. Although, the existing CIP includes a contingency to address future regulations and any other regulatory requirements that PRASA may need to comply with, the impact of these may require significant operational and capital investments. PRASA continues to make allowances in its new designs to improve capabilities

to meet certain future regulations. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs.

8. Overall, PRASA's Forecast for fiscal years 2012 through 2016 (included in Exhibit 1) is reasonable based on recent historical performance. PRASA's compliance with the Rate Covenant and the ABT requirements stipulated in the proposed 2012 amended MAT are also reasonable. However, the probability of achieving this Forecast is conditioned on the following assumptions:

- PRASA's ability to maintain its service revenues in a very challenging economic environment – Continued uncertainty and strain on the economy could cause further decline in the consumption patterns of PRASA customers, resulting in still further reductions in projected revenues. Hence, the YTD results for FY2012 should be closely monitored and projections for subsequent fiscal years shall be adjusted accordingly.
- PRASA's ability to continue to successfully implement all of its operational initiatives – PRASA's Forecast includes results from operational initiatives that have been described throughout this report and assumptions regarding the future cost of payroll, electricity, chemicals, and other expense items. The Forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/Malcolm Pirnie's conclusions regarding the Forecast assume the framework and execution of the operational initiatives will not materially change; any changes could significantly alter the findings contained and presented in this report. Although PRASA has made a dedicated commitment to implement the initiatives described in this report, there is a possibility that the projected results and, more specifically, the timing of those results will not be achieved.
- PRASA's ability to secure other sources of revenue beyond FY2013 (after the initial funding of the Budgetary Reserve Fund has been depleted) – Starting in FY2014, compliance with the Rate Covenant and DSC requirements included in the 2012 MAT is contingent upon PRASA obtaining additional sources of revenues from the Budgetary Reserve Fund, as a result of future replenishments from the Central Government Fund or other sources of funding, or from the implementation of changes in its rate structure. The additional revenue requirements projected for FY2013, FY2014 and FY2015 amount to approximately \$330M, \$385M, and \$420M, respectively. In the event the Budgetary Reserve Fund is depleted and not replenished with additional funding (i.e., with additional Central Government appropriations or other sources of funding), PRASA would be required to implement revenue enhancing and/or cost reduction measures, rate structure changes, or a combination of these actions, that would generate sufficient revenues to meet its DSC requirements. These additional measures would have to provide an equivalent percent increase in revenues of approximately 45% in FY2014, with additional increases of, approximately, 5% in FY2015, and 3% in FY2016.

Respectfully Submitted,

MP ENGINEERS OF PUERTO RICO, P.S.C.

/s/ Guillermo Marxuach, P.E.  
President



**SUMMARY OF THE TRUST AGREEMENT AND SUMMARY OF THE PROPOSED  
AMENDMENT TO THE TRUST AGREEMENT**

*The following are brief summaries of certain provisions of the Trust Agreement and a proposed amendment to the Trust Agreement. Such statements do not purport to be complete or definitive and are qualified in their entirety by reference to the Trust Agreement, copies of which are available from the Government Development Bank or the Trustee. Capitalized terms not defined in this Official Statement shall have the meanings set forth in the Trust Agreement.*

**Definition of Certain Terms**

**“Accreted Value”** shall mean, as of any date of computation with respect to any Capital Appreciation Bond, an amount equal to the principal amount of such Bond plus the interest accrued on such Bond from the date of original issuance of such Bond to the periodic date specified in the Supplemental Agreement authorizing such Capital Appreciation Bond on which interest on such Bond is to be compounded (hereinafter, a “Periodic Compounding Date”) next preceding the date of computation or the date of computation if a Periodic Compounding Date, such interest to accrue at the interest rate per annum of the Capital Appreciation Bonds set forth in the Supplemental Agreement authorizing such Bonds, compounded periodically on each Periodic Compounding Date. Plus, if such date of computation shall not be a Periodic Compounding Date, a portion of the difference between the Accreted Value as of the immediately preceding Periodic Compounding Date (or the date of original issuance if the date of computation is prior to the first Periodic Compounding Date succeeding the date of original issuance) and the Accreted Value as of the immediately succeeding Periodic Compounding Date, calculated based upon an assumption that, unless otherwise provided in the Supplemental Agreement authorizing such Capital Appreciation Bonds, Accreted Value accrues in equal daily amounts on the basis of a year consisting of twelve 30-day months.

**“Annual Budget”** shall mean the budget by that name referred to in the section entitled “Annual Budget and Disbursement Schedule” below.

**“Annual Debt Service”** shall mean for any Indebtedness (without duplication) the total payments required to be made for principal of and interest on such Indebtedness, including mandatory sinking fund redemptions, and payments to reimburse Enhancement Facility Providers with respect to such Indebtedness scheduled to come or coming due within a specified Fiscal Year, but excluding any capitalized interest funded from proceeds of Indebtedness. For purposes of calculating such principal and interest, the following assumptions are to be used:

(a) In determining the principal due in a Fiscal Year, payment shall be assumed to be made in accordance with the amortization schedule then in effect for such Indebtedness (unless a different subsection of this definition applies for purposes of determining principal maturities or amortization), including any scheduled redemption of such specified Indebtedness at its then Accreted Value and, for such purpose, the redemption payment shall be deemed a principal payment;

(b) For Tender Indebtedness, the options or obligations of the holders of such Indebtedness to tender the same for purchase or payment prior to their stated maturity or maturities shall be treated as principal on the first date on which such holders may or are required to tender such Indebtedness, except that any such option or obligation shall not be treated as principal if (i) such Indebtedness is rated in at least one of the three highest long-term rating categories or in the two highest short-term rating categories (without regard to any gradations in such categories) by a Rating Agency;

(c) For purposes of computing the Rate Covenant only, if Variable Rate Indebtedness has been outstanding for any period prior to the date of calculation, interest on such Indebtedness shall be calculated using the higher of (i) the average rate or rates which were assumed by the Authority in its Annual Budget corresponding to the period for which such Rate Covenant computation is being made, and (ii) the actual weighted average rate or rates borne by such Indebtedness during such period; provided, however, that if a Hedge Agreement is in effect which provides that the Authority is to pay to the Qualified Counterparty an amount determined with

reference to a fixed rate of interest on a notional amount equal to the principal of such Indebtedness, for purposes of determining the Annual Debt Service on such Variable Rate Indebtedness, it will be deemed to bear interest at such fixed rate of interest or such stated rate in accordance with such Hedge Agreement;

(d) For purposes of determining whether Bonds may be issued in compliance with the respective tests set forth in the Trust Agreement and described under “SECURITY FOR THE BONDS- Additional Bonds” in the front section of this Official Statement, the rate of interest to be borne by Variable Rate Indebtedness will be deemed to be 120% of the rate quoted in an index generally accepted in the securities industry for securities having ratings and maturity or tender dates comparable to that of the applicable Variable Rate Indebtedness as of the date of issuance thereof; provided, however, that if a Hedge Agreement is in effect which provides that the Authority is to pay to the Qualified Counterparty an amount determined with reference to a fixed rate of interest on a notional amount equal to the principal of such Indebtedness for purposes of determining the Annual Debt Service on such Variable Rate Indebtedness, it will be deemed to bear interest at such fixed rate of interest in accordance with such Hedge Agreement; and provided, further, however, that interest on such Indebtedness that is the subject of a Qualified Swap shall be deemed to be 120% of the higher of (i) the average rate or rates which were assumed by the Authority in its Annual Budget corresponding to the period for which such Rate Covenant computation is being made, and (ii) the actual weighted average rate or rates borne by such Indebtedness during such period;

(e) For purposes of determining the Debt Service Reserve Requirement, if any, attributable to Variable Rate Indebtedness, the rate of interest to be borne by such Variable Rate Indebtedness will be deemed to be 120% of the rate quoted as of its date of issuance in an index generally accepted in the securities industry for securities having ratings and maturity or tender dates comparable to that of such Indebtedness and in no event will Qualified Swaps be considered;

(f) For purposes of determining the annual amount payable in respect of Bond Anticipation Notes and any other Indebtedness designated by the Authority as a Refundable Principal Installment, such Indebtedness that is or would be a Refundable Principal Installment shall be treated on the date of calculation as if (i) from the date of issuance thereof the principal amount of such Indebtedness had been payable as part of equal annual installments of principal and interest over a period extending from the due date thereof through the 30<sup>th</sup> anniversary of the issue date of such Indebtedness and (ii) interest accrued at a rate equal to the rate quoted in the 30-year revenue bond index, or if different, the revenue bond index most closely related to the term of the Indebtedness, as applicable, published in *The Bond Buyer* no more than two weeks prior to the date of calculation, or if that index is no longer published, another similar index selected by the Authority;

(g) The Accreted Value of Capital Appreciation Bonds or the Appreciated Value of Deferred Income Bonds shall be included in the calculation of Annual Debt Service at the times and in the manner provided in subsection (a) of the section entitled “Special Provisions Relating to Capital Appreciation Bonds and Deferred Income Bonds” below;

(h) Any interest paid or to be paid from a Crossover Escrow Account on Crossover Refunding Bonds and any principal of and premium to be paid from such Escrow Account on Crossover Refunded Bonds shall be excluded from the calculation of Annual Debt Service;

(i) For any Indebtedness for which a binding commitment, letter of credit or other credit arrangement providing for the extension of such Indebtedness beyond its original maturity date exists, the computation of the Annual Debt Service payable on such Indebtedness shall, at the option of the Authority, be made on the assumption that such Indebtedness will amortize in accordance with such credit arrangement, as long as such credit arrangement is rated in one of the three highest long-term rating categories or in the highest short term rating category (without regard to any gradations within such categories) by a Rating Agency; and

(j) For purposes of computing the Rate Covenant (and whether Bonds may be issued in compliance with respective tests set forth in the Trust Agreement and described under “SECURITY FOR THE BONDS- Additional Bonds” in the front section of this Official Statement, any termination payment due under a Qualified Swap or Hedge Agreement shall be included in the calculation of Annual Debt Service (assuming such amount will amortize as required under the applicable Qualified Swap or Hedge Agreement) to the extent such payment is not paid from the proceeds of Bonds or Other System Indebtedness.



**“Appreciated Value”** shall mean, with respect to any Deferred Income Bond, (i) as of any date of computation prior to the Current Interest Commencement Date, an amount equal to the principal amount of such Bond plus the interest accrued on such Bond from its date of original issuance to the Periodic Compounding Date next preceding the date of computation or the date of computation if a Periodic Compounding Date, such interest to accrue at the interest rate per annum of the Deferred Income Bonds set forth in the Supplemental Agreement authorizing such Bonds, compounded periodically on each Periodic Compounding Date as in such Agreement provided, plus, if such date of computation shall not be a Periodic Compounding Date, a portion of the difference between the Appreciated Value as of the immediately preceding Periodic Compounding Date (or the date of original issuance if the date of computation is prior to the first Periodic Compounding Date succeeding the date of original issuance) and the Appreciated Value as of the immediately succeeding Periodic Compounding Date, calculated based upon an assumption that, unless otherwise provided in the Supplemental Agreement authorizing such Deferred Income Bonds, Appreciated Value accrues in equal daily amounts on the basis of a year consisting of twelve 30-day months and (ii) as of any date of computation on and after the Current Interest Commencement Date, the Appreciated Value on the Current Interest Commencement Date.

**“Authority Revenues”** shall mean Operating Revenues plus (i) any governmental grants or appropriations available to pay Current Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (ii) any amounts received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited in the Commonwealth Payments Fund) and (iii) any amounts transferred from the Budgetary Reserve Fund to the Trustee.

**“Bond Anticipation Notes”** shall mean any obligations issued in anticipation of the issuance of Bonds.

**“Bonds”** shall mean any bonds, notes or other obligations issued from time to time pursuant to the provisions of the Trust Agreement, including Senior Bonds, Senior Subordinate Bonds, Subordinate Bonds or Bond Anticipation Notes, but not including Other System Indebtedness, Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations.

**“Budgetary Reserve Fund”** shall mean the Budgetary Reserve Fund maintained by Government Development Bank in trust for the Authority, pursuant to the amended and restated Fiscal Oversight and Support Agreement, dated as of February 15, 2012, by and among the Authority, the Commonwealth of Puerto Rico and Government Development Bank.

**“Business Day”** shall mean a day on which banking business is transacted, but not including a Saturday, Sunday or legal holiday, or a day on which banking institutions are authorized by law to close in the city in which the Trustee has its principal corporate trust office or in the Commonwealth of Puerto Rico.

**“Calculation Date”** shall have the meaning set forth in subsection (a) of the section entitled “Special Provisions Relating to Capital Appreciation Bonds and Deferred Income Bonds” below.

**“Capital Appreciation Bonds”** shall mean any Bonds issued under the Trust Agreement as to which interest is (i) compounded on the periodic compounding dates that are specified in the Supplemental Agreement authorizing such Capital Appreciation Bonds and (ii) payable only at maturity, earlier redemption or other payment thereof pursuant to the Trust Agreement or such Supplemental Agreement.

**“Capital Improvement Fund Requirement”** shall mean for each Fiscal Year, an amount equal to the greater of (i) the amount set forth in the Annual Budget for such Fiscal Year and (ii) the amount recommended by the Consulting Engineer.

**“Commonwealth Guaranteed Indebtedness”** shall mean any obligations of the Authority that are designated as Commonwealth Guaranteed Indebtedness by the Authority and are guaranteed by the Commonwealth of Puerto Rico, including but not limited to the Authority’s Puerto Rico Aqueduct and Sewer Authority Bonds, Series 2008, the Authority’s Puerto Rico Aqueduct and Sewer Authority Revenue Bonds, USDA/Rural

Development Issue (Guaranteed by the Commonwealth of Puerto Rico), the Revenue Bonds of the Authority, FmHA issuances, series K to Z, and all obligations of the Authority to Puerto Rico Infrastructure Financing Authority evidencing revolving loans funded pursuant to the Puerto Rico Water Pollution Control and Drinking Water Treatment Revolving Funds that were created under Act No. 44 of the Legislature of Puerto Rico, approved June 21, 1988, as amended, and Act No. 32 of the Legislature of Puerto Rico, approved July 7, 1997, as amended, and all the loans granted by the Commonwealth Revolving Funds, under the provisions of the Federal Clean Water Act of 1972, as amended and the Federal Safe Drinking Water Act of 1996, as amended.

**“Commonwealth Supported Obligations”** shall mean the obligations of the Authority which are the subject of an agreement between the Authority and Government Development Bank for Puerto Rico or are payable solely from appropriations of the Commonwealth of Puerto Rico, including but not limited to the note of the Authority, dated August 2001, relating to North Coast Superaqueduct.

**“Consultant”** shall mean any qualified and experienced firm or corporation retained by or on behalf of the Authority to perform the acts and duties required of a Consultant under the provisions of the Trust Agreement, which may be, without limitation, a firm of independent certified public accountants, the Consulting Engineer or an independent insurance consultant, and which may include governmental or nongovernmental entities, acceptable to the Consulting Engineer or other Consultants depending on their skill and expertise for the specific acts and duties they are to perform under the provisions of the Trust Agreement.

**“Consulting Engineer”** shall mean any qualified and experienced engineering firm or corporation retained by the Authority to perform the acts and duties required of the Consulting Engineer under the provisions of the Trust Agreement.

**“Cost of Improvements”** shall mean the cost of construction of Improvements, including the cost of all labor, materials, machinery and equipment, the cost of all lands, structures, real or personal property, rights, rights-of-way, roads, easements, franchises and interest acquired or used for, or in connection with the Authority, any termination payments payable under any Qualified Swap or Hedge Agreements, the cost of engineering and legal services, the cost of preliminary surveys, plans and specifications, payments with respect to litigation, expenses of administration properly chargeable to such construction, legal, architectural and engineering expenses and fees, the cost of audits, the fees and expenses of Consultants, financing charges, taxes or other governmental charges lawfully assessed during construction, claims arising in connection with construction, premiums on insurance in connection with construction, interest on the Indebtedness or other obligations of the Authority issued to finance Costs of Improvements, during and for a reasonable period after completion of the acquisition, construction, reconstruction, repair, improvement or equipping of the Improvement; the annual fees for any Enhancement Facility and tender agent fees and fees payable for remarketing Indebtedness during such period as may be specified in the resolution of the Board or the Supplemental Agreement authorizing the issuance of such Bonds and all other items of expense not elsewhere in this definition specified, incident to the financing or construction of any Improvements and the placing of the same in operation.

**“Costs of Issuance”** means the items of cost or expense incurred in connection with the authorization, sale and issuance of Indebtedness, which items of expenses shall include, but not be limited to, document printing, reproduction and execution and delivery costs, filing and recording fees, costs of credit ratings, initial fees and charges of the Trustee or a Qualified Depository, legal fees and charges, professional consultants’ fees, fees and charges for execution, authentication, transportation and safekeeping of Bonds, premiums, fees and charges for insurance on Bonds, commitment fees or similar charges relating to an Enhancement Facility, a Qualified Swap or a Hedge Agreement, costs and expenses in connection with the refunding of Indebtedness or other obligations of the Authority, costs and expenses incurred pursuant to a remarketing agreement and other costs, charges and fees, including those of the Authority, in connection with the foregoing.

**“Crossover Amount”** shall mean the amount of money and Defeasance Obligations on deposit in a Crossover Escrow Account and which, together with investment income thereon, are held as provided in the definition of “Crossover Refunded Bond.”

**“Crossover Date”** shall mean the date on which the Crossover Amount on deposit in a Crossover Escrow Account shall be used to retire all Outstanding Crossover Refunded Bonds for which such Crossover Escrow Account was established.

**“Crossover Escrow Deposit Agreement”** shall mean an escrow deposit or similar agreement under which a Crossover Escrow Account is created and administered.

**“Crossover Refunded Bond”** shall mean any Indebtedness deemed to be refunded from the proceeds of Crossover Refunding Bonds. Any Indebtedness shall be deemed to have been refunded from the proceeds of Crossover Refunding Bonds and shall be deemed to be Crossover Refunded Bonds if the Trustee shall have received and shall hold in the applicable Crossover Escrow Account in trust therefor and irrevocably committed thereto.

(a) Moneys, together with any amounts described in paragraph (b) below, sufficient, or

(b) Defeasance Obligations, which shall not contain provisions permitting the redemption thereof at the option of the issuer, the principal of and interest on which when due, and without any reinvestment thereof, will provide moneys, together with any amounts described in paragraph (a) above, sufficient:

(i) for the payment of all principal of and premium, if any, on such Crossover Refunded Bonds as the same become due, whether at their maturity or redemption dates or otherwise, as the case may be, or if a default in payment shall have occurred on any maturity or redemption date, then for the payment of all principal of and premium on such Crossover Refunded Bonds to the date of the tender of payment; provided, that if any of those Crossover Refunded Bonds are to be redeemed prior to the maturity thereof, notice of that redemption shall have been duly given or irrevocable provision shall have been duly made for the giving of that notice, and

(ii) for the payment of interest (in whole or in part) on such Crossover Refunding Bonds.

Prior to the Crossover Date, the Crossover Amount may be pledged as security for the Crossover Refunding Bonds, such Crossover Refunded Bonds, or both. The moneys and proceeds of such Defeasance Obligations shall, to the extent needed, be used for the foregoing purposes or used to reimburse an Enhancement Facility Provider for amounts advanced by it for the foregoing purposes.

**“Crossover Refunding”** shall mean a transaction in which Crossover Refunding Bonds are issued to refund Crossover Refunded Bonds and in which a Crossover Amount is deposited in a Crossover Escrow Account.

**“Crossover Refunding Bonds”** shall mean Bonds, to the extent that any proceeds from the sale thereof shall, upon deposit in a Crossover Escrow Account, constitute a Crossover Amount.

**“Current Expenses”** shall mean the reasonable and necessary current expenses, incurred by the Authority in the ordinary course of business, of maintaining, repairing and operating the properties constituting the Systems or causing said maintenance, repair and operation, which expenses shall exclude depreciation, reserves for allowances for doubtful accounts and other non-cash reserves or expenses. For purposes of the provisions under the “Rate Covenant” section of the Trust Agreement and the Annual Budget required by the Trust Agreement, Current Expenses will be calculated on an accrual basis. For all other purposes of the Trust Agreement, Current Expenses will be calculated on a cash basis. Notwithstanding any accounting treatment to the contrary, the amount of any termination or similar payment under any interest rate swap or similar hedge agreement shall, if payable by the Authority, not be taken into account in computing Current Expenses to the extent the same is paid by or on behalf of the Authority from the proceeds of any Indebtedness.

**“Current Expense Fund”** shall mean the Current Expense Fund established under the Trust Agreement.

**“Current Interest Commencement Date”** shall mean, with respect to any particular Deferred Income Bonds, the date specified in the Supplemental Agreement authorizing such Deferred Income Bonds (which date

must be prior to the maturity date for such Deferred Income Bonds) after which interest accruing on such Deferred Income Bonds shall be payable periodically on dates specified in such Supplemental Agreement with the first such payment date being the first such periodic date immediately succeeding such Current Interest Commencement Date.

**“Debt Service Reserve Facility”** shall mean (i) any irrevocable, unconditional letter of credit issued by a bank or savings and loan association whose long-term uncollateralized debt obligations are rated in one of the two highest long-term rating categories (without regard to any gradations within such categories) by each Rating Agency, and (ii) any insurance policy providing substantially equivalent liquidity as an instrument described in clause (i) and which is issued by a municipal bond or other insurance company, the obligations insured by which are rated in one of the two highest long-term rating categories (without regard to any gradations within such categories) by each Rating Agency and which is used, to the extent permitted under the Trust Agreement, to fund all or a portion of the applicable Debt Service Reserve Requirement, provided that (x) the term of the Debt Service Reserve Facility is at least 36 months, (y) the only condition to a drawing under the Debt Service Reserve Facility is insufficient amounts in the applicable fund or account held by the Trustee to which such Facility relates when needed to pay debt service on the applicable Bonds or the expiration of such Facility and (z) the provider of the Debt Service Reserve Facility shall notify the Authority and the Trustee at least 24 months prior to the expiration of such Facility.

**“Debt Service Reserve Requirement”** shall mean with respect to each Account within the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund, as applicable, as of any particular date of computation an amount equal to (i) the amount set forth in the Supplemental Agreement authorizing the issuance of a particular Series of Bonds, or (ii) if not otherwise specified in a Supplemental Agreement authorizing the issuance of a particular Series of Bonds, the lesser of (x) maximum Annual Debt Service on the Outstanding Bonds secured by such Account, payable in any Fiscal Year for the related Bonds, (y) ten percent (10%) of the proceeds of the Outstanding Bonds secured by such Account calculated in accordance the Code and (z) 125% of the average Annual Debt Service for the payment of the principal of and interest on the Outstanding Bonds secured by such Account.

**“Deferred Income Bonds”** shall mean any Bonds as to which interest accruing prior to the Current Interest Commencement Date is (i) compounded periodically on the dates specified in the Supplemental Agreement authorizing such Deferred Income Bonds and (ii) payable only at redemption or other payment thereof pursuant to such Supplemental Agreement.

**“Defeasance Obligations”** shall mean any non-callable and non-prepayable obligations described in clauses (a), (b) or (c) of the definition of Investment Obligations.

**“Deposit Date”** shall mean the last Business Day of each month.

**“Disbursement Schedule”** shall mean the schedule by that name referred to in the section entitled “Annual Budget and Disbursement Schedule” below.

**“Enhancement Facility”** shall mean any letter of credit, standby purchase agreement, line of credit, policy of bond insurance, surety bond, guarantee or similar instrument, or any other agreement, securing, providing liquidity for, supporting or enhancing outstanding Indebtedness, including any Bond Insurance Policy, Debt Service Reserve Facility, Operating Reserve Facility or any combination of the foregoing, or any agreement relating to the reimbursement thereof whether or not such instrument or agreement has been drawn upon, obtained by the Authority.

**“Enhancement Facility Provider”** shall mean the provider or issuer of any Enhancement Facility.

**“Fiduciary”** shall mean (i) the Trustee, (ii) a Qualified Depository or any other bank or trust company designated as trustee, fiscal agent, administrative agent or other fiduciary for Outstanding Other System Indebtedness and (iii) with respect to the Term Loan, Banco Popular de Puerto Rico, as administrative agent.

**“Fiscal Year”** shall mean the period commencing on the first day of July of any year and ending on the last day of June of the following year or any other twelve month period designated by the Board.

**“Government Certificates”** shall mean certificates or other instruments representing proportionate ownership of Government Obligations, which Government Obligations are held by a bank or trust company organized under the laws of the United States of America or any of its states or territories in the capacity of custodian of such certificates or other instruments.

**“Government Obligations”** shall mean (i) direct obligations of, or obligations the payment of the principal of and interest on which are unconditionally guaranteed by, the United States of America; (ii) Government Certificates, under which the owner of the investment is the real party in interest and has the right to proceed directly and individually against the obligor on the underlying obligations described in said clause (i) and which underlying obligations are not available to satisfy any claim of the custodian or any person claiming through the custodian or to whom the custodian may be obligated; and (iii) evidences of ownership of proportionate interests in future interest or principal payments on obligations specified in clauses (i) and (ii) above held by a bank (including the Trustee) or trust company as custodian, under which the owner of the investment is the real party in interest and has the right to proceed directly and individually against the underlying obligations described in said clauses (i) and (ii) and which underlying obligations are not available to satisfy any claim of the custodian or any person claiming through the custodian or to whom the custodian may be obligated.

**“Guaranty Act”** shall mean Act No. 45 of the Legislature of Puerto Rico, approved July 28, 1994, as amended.

**“Hedge Agreement”** shall mean an interest rate swap or other hedging agreement, arrangement or security however denominated, with or guaranteed by a Qualified Counterparty and expressly identified pursuant to its terms as being entered into in connection with and in order to hedge interest rate fluctuations on all or a portion of any Bonds where (i) interest on such Indebtedness or such portion of such Indebtedness is payable at a variable rate of interest for any future period of time or is calculated at a varying rate per annum, and (ii) a fixed rate is specified as payable by the Authority in such agreement, or such Indebtedness, taken together with such agreement, results in a net fixed rate payable by the Authority for such period of time (the “Hedge Fixed Rate”), assuming the Authority and the Qualified Counterparty(ies) with whom the Authority has entered into the agreement make all payments required to be made by the terms of the agreement. If the required rating of a Qualified Counterparty is lowered below the minimum rating level specified in the Trust Agreement for such Qualified Counterparty and collateral has not been posted as required by such Hedge Agreement, such Hedge Agreement shall no longer constitute a “Hedge Agreement” under the Trust Agreement.

**“Improvements”** shall mean such betterments, renewals and replacements of the Systems or any part thereof, and such additions and extensions thereto, as may be necessary or desirable to keep the same in proper condition for the safe, efficient and economic operation thereof and for the interconnection thereof where feasible to integrate into the Systems any unit or part thereof, and shall include such water and sewer projects as may be authorized to be constructed or acquired under the provisions of the Act, and such betterments, renewals and replacements of such properties and such additions and extensions thereto as may be necessary or desirable for continuous and efficient service by or on behalf of the Authority to the public.

**“Indebtedness”** shall mean, collectively, Bonds, Other System Indebtedness, Commonwealth Supported Obligations and Commonwealth Guaranteed Indebtedness.

**“Insurance Consultant”** shall mean any qualified and experienced firm or corporation retained by the Authority to perform the act and duties of an Insurance Consultant required by the provisions of the Trust Agreement.

**“Interest Accrual”** shall mean for any period the amount of interest on Indebtedness that would accrue during such period if such interest accrued ratably on the basis of a year consisting of twelve (12) thirty-day months. Unless otherwise provided by resolution of the Authority or a Supplemental Agreement, the monthly accrual in respect of interest on Indebtedness shall commence on the later to occur of the date of issue of the applicable Indebtedness and the date that is six months prior to the due date of such interest and shall end on the first day of the

month following the relevant Deposit Date. In the case of Variable Rate Indebtedness, (i) other than the Term Loan, the Interest Accrual shall be calculated based on the sum of the interest accrued through the Business Day preceding the relevant Deposit Date and the interest (calculated at the rate on such Indebtedness on the Business Day preceding the Deposit Date plus one percent (1%)) that would accrue on such Indebtedness from the Deposit Date to the later to occur of the first day of the next calendar month and any interest payment date on such Indebtedness occurring prior to the next Deposit Date and (ii) with respect to the Term Loan, the amount accrued during such period as calculated thereunder.

**“Investment Obligations”** shall mean any of the following, to the extent that the same is legal for the investment of public funds under the laws of the Commonwealth of Puerto Rico:

- (a) Government Obligations;
- (b) Obligations issued or guaranteed by any of the following:
  - (i) Federal Home Loan Bank System,
  - (ii) Export-Import Bank of the United States,
  - (iii) Federal Financing Bank,
  - (iv) Government National Mortgage Association,
  - (v) Federal Home Loan Mortgage Company,
  - (vi) Federal Housing Administration,
  - (vii) Private Export Funding Corp.,
  - (viii) Federal National Mortgage Association,
  - (ix) Federal Farm Credit Bank,
  - (x) Resolution Funding Corporation, and
  - (xi) Rural Economic Community Development Administration (formerly, Farmers Home Administration).

or any indebtedness issued or guaranteed by any instrumentality or agency of the United States;

(c) Refunded municipal obligations rated in the highest long-term rating category by at least one Rating Agency (without regard to any gradations within such category) and meeting the following conditions:

(i) (A) such obligations are not to be redeemed prior to maturity or the trustee therefor has been given irrevocable instructions concerning their call for redemption, and (B) the issuer of such obligations has covenanted not to redeem such obligations other than as set forth in such instructions;

(ii) such obligations are secured by Government Obligations that may be applied only to interest, principal, and premium payments on such obligations;

(iii) the principal of or interest on such Government Obligations (plus any cash held in escrow with respect to such obligations) are sufficient to meet the liabilities of such obligations;

(iv) such Government Obligations are held by an escrow agent or trustee; and

(v) such Government Obligations are not available to satisfy any other claims, including those against said trustee or escrow agent;

(d) Direct and general, long-term obligations of any state of the United States of America, the District of Columbia or the Commonwealth of Puerto Rico (each a “State”), to the payment of which the full faith and credit of such State is pledged and that are rated in any of the three highest long-term rating categories or in the highest short-term rating category (without regard to any gradations within such categories) by at least two Rating Agencies;

(e) Direct and general, short-term obligations of any State, to the payment of which the full faith and credit of such State are pledged and that are rated in either of the two highest short-term rating categories (without regard to any gradations within such categories) by at least two Rating Agencies;

(f) Interest-bearing demand or time deposits with, or interests in money market portfolios issued by, State banks or trust companies, national banking associations or savings and loan associations that are members of the Federal Deposit Insurance Corporation (“FDIC”), including the Trustee or any of its affiliates. Such deposits or interests must be (i) continuously and fully insured by FDIC or (ii) fully secured by Government Obligations or obligations described in clause (b) of this definition (“Clause (b) Securities”) or (iii) secured by surety company bonds held by the Trustee which, when executed, shall be for an amount equal to the amount of such interest-bearing demand or time deposits that are not secured by (i) or (ii) above. Such Government Obligations or Clause (b) Securities must have a market value at all times at least equal to the principal amount of the deposits or interests. The Government Obligations or Clause (b) Securities must be held by a third party (who shall not be the provider of the collateral), or by any Federal Reserve Bank or depository, as custodian for the institution issuing the deposits or interests. Such third party shall have a perfected first lien in the Government Obligations or Clause (b) Securities serving as collateral, and such collateral is to be free from all other third party liens;

(g) Repurchase agreements entered into with a Qualified Counterparty. The repurchase agreement shall be in respect of Government Obligations or Clause (b) Securities. The repurchase agreement securities and, to the extent necessary, Government Obligations or Clause (b) Securities, plus accrued interest, shall be maintained in an amount equal to at least 100% of the amount invested in the repurchase agreements. In addition, the provisions of the repurchase agreement shall meet the following additional criteria;

(A) An Authority designated third party (who shall not be the provider of the collateral selected by the Authority) has possession of the repurchase agreement securities and the Government Obligations or Clause (b) Securities;

(B) Failure by the repurchase agreement provider to cure any deficiency in the requisite collateral levels within two (2) Business Days will require the person having possession of the securities to liquidate the securities immediately; and

(C) The repurchase agreement provider represents to grant the person having possession of the securities a perfected, first priority security interest in the securities;

(h) Money market accounts of any state or federal bank, including the Trustee or any of its affiliates, or bank whose holding parent company is rated in any of the three highest long-term rating categories or the highest short-term rating category (without regard to any gradations within such categories) by at least two Rating Agencies;

(i) Investment agreements the issuer or guarantor of which is a Qualified Counterparty;

(j) Any debt or fixed income security the issuer of which is rated in any of the three highest long-term rating categories or the highest short-term rating category (without regard to any gradations within such categories) by at least two Rating Agencies;

(k) Demand deposits, including interest-bearing money market accounts trust deposits, time deposits or bankers acceptances (in each case having maturities of not more than 360 days) of a domestic bank (including the Trustee or any of its affiliates), including a branch office of a foreign bank, which branch office is located in the United States, provided that such bank at the time of purchase, has a short-term bank deposit rating of “prime-1” or better by Moody’s and a rating of “A-1” or better by Standard & Poor’s; and

(l) Money market mutual funds, including, without limitation any mutual fund for which the Trustee or any of its affiliates serves as investment manager, administrator, shareholder servicing agent, and/or custodian or sub custodian, notwithstanding that (i) the Trustee or such affiliate receives fees from such funds for

services rendered, (ii) the Trustee or such affiliate charges and collects fees for services rendered pursuant to the Trust Agreement which fees are separate from the fees received from such funds, and (iii) services performed for such funds and pursuant to the Trust Agreement may at times duplicate those provided to such funds by the Trustee or such affiliate.

Notwithstanding anything in the Trust Agreement to the contrary, any investment that would, at the time of such investment, be legal for the investment of the public funds under the laws of the Commonwealth of Puerto Rico shall also qualify as an Investment Obligation.

**“Operating Reserve Facility”** shall mean any irrevocable, unconditional letter of credit or revolving line of credit issued by (i) Government Development Bank for Puerto Rico or (ii) a bank or savings and loan association whose long-term uncollateralized debt obligations are rated in any of the three highest long-term rating categories or in the two highest short-term rating categories (without regard to any gradations within such categories) by each Rating Agency and which Facility is used, to the extent permitted under the Trust Agreement, to fund all or a portion of the Operating Reserve Requirement.

**“Operating Reserve Requirement”** shall mean \$150,000,000 until March 1, 2013, and thereafter, (i) if there is an Operating Reserve Facility on deposit in the Operating Reserve Fund, shall mean for the term of such Operating Reserve Facility (without regard to any renewal provisions contained therein) an amount equal to at least ninety (90) days of Current Expenses determined on the first day of the Fiscal Year in which such Operating Reserve Facility is delivered or renewed as set forth in the Annual Budget for such Fiscal Year or (iii) if funded from Authority Revenues, shall mean an amount equal to not less than ninety (90) days of Current Expenses determined annually based on the Current Expenses relating to the Fiscal Year of such calculation as set forth in the Annual Budget for such Fiscal Year.

**“Operating Revenues”** shall mean all moneys received by or on behalf of the Authority, including (i) the moneys derived by or on behalf of the Authority from the sale of water produced, treated or distributed by, or the collection, transmission, treatment or disposal of sewage by the Systems, (ii) any proceeds of use and occupancy insurance on the Systems or any part thereof, (iii) except as provided in the following sentence, any income from the investments made under the Trust Agreement, (iv) any special assessments, including assessments in the nature of impact fees, (v) amounts, if any, paid from the Rate Stabilization Account into the Operating Revenue Fund in any Fiscal Year minus the amounts, if any, paid from the Operating Revenue Fund into the Rate Stabilization Account during the same Fiscal Year; and (vi) regularly scheduled payments received under any Qualified Swap or Hedge Agreement during such period. In no event shall Operating Revenues include (i) income from the investment of moneys on deposit to the credit of the Construction Fund, proceeds of insurance (except use and occupancy insurance) or condemnation awards (which are required to be deposited directly to the credit of the Capital Improvement Fund), (ii) proceeds of sales of property constituting a part of the Systems (which are required to be deposited directly to the credit of the Capital Improvement Fund), (iii) the proceeds of Bonds or other Indebtedness, (iv) any governmental grants or appropriations available to pay Current Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (v) any amounts received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited in the Commonwealth Payments Fund), (vi) any amounts transferred from the Budgetary Reserve Fund to the Trustee and (vii) any termination or similar payment under any interest rate swap or similar hedge agreement received by the Authority (which are required to be deposited directly to the credit of the Capital Improvement Fund).

**“Other System Indebtedness”** shall mean the Term Loan and any other obligation of the Authority, including Qualified Swaps and Hedge Agreements and any termination payments thereunder but not including Bonds, that the Authority is required, or has elected, to treat as payable on a parity with Bonds with respect to the pledge of Authority Revenues.

**“Outstanding”** shall mean Indebtedness that has been duly issued and delivered under the Trust Agreement or under other documents and has not been (i) canceled or surrendered to the Trustee or a comparable fiduciary for cancellation or (ii) deemed to have been paid as provided in the section entitled “Discharge of



Agreement” below or under similar provisions of such different documents, has not had other obligations issued in exchange therefor or had its principal become due and moneys sufficient for its payment deposited with the Trustee as provided in the Trust Agreement, or otherwise so treated under comparable issuance documents.

In determining whether holders of a requisite aggregate principal amount of the Outstanding Indebtedness have concurred in any request, demand, authorization, direction, notice, consent or waiver under the Trust Agreement or other applicable documents, words referring to or connoting “principal of” or “principal amount of” Outstanding Indebtedness shall include the Accreted Value or similar value of Indebtedness as of the immediately preceding interest compounding or similar date for such Indebtedness. Indebtedness that is owned by or for the benefit of the Authority shall be disregarded and deemed not to be Outstanding for the purpose of any such determination.

**“Principal Accrual”** shall mean for any period the amount of principal or sinking fund installment on Indebtedness that would accrue during such period if such principal or sinking fund installment accrued ratably on the basis of a year consisting of twelve (12) thirty-day months. Unless otherwise provided by resolution of the Authority or a Supplemental Agreement, the monthly accrual in respect of the principal of Indebtedness or sinking fund installment for a Term Bond shall commence on the first day of the twelfth month preceding the due date of such principal or sinking fund installment and shall end on the first day of the month succeeding the relevant Deposit Date.

**“Qualified Counterparty”** shall mean (at the time of delivery of the applicable Investment Obligation or the execution of the applicable Hedge Agreement or Qualified Swap) (i) a bank, trust company, savings and loan association, national banking association, insurance company or other financial services company, including the Trustee or any of its affiliates, whose senior long term debt obligations, other senior unsecured long term obligations, financial program rating, counterparty rating or claims paying ability are rated in any of the three highest long-term rating categories (without regard to any gradations within such categories) by a Rating Agency or any institution listed as a primary government securities dealer in the Federal Reserve Bank of New York and (ii) in the case of Hedge Agreements and Qualified Swaps, a person whose obligations are guaranteed by a person whose senior long term debt obligations, other senior unsecured long term obligations, financial program rating, counterparty rating or claims paying ability, are rated in any of the three highest long-term rating categories (without regard to any gradations within such categories) by a Rating Agency, or whose obligation, if any, to make payment to the Authority upon the termination of the subject Hedge Agreement or Qualified Swap is fully collateralized by Investment Obligations described in clauses (a), (b) or (c) of the definition of Investment Obligations; provided, however, that such obligation shall be deemed to be fully collateralized if the Investment Obligations shall have a market value, determined periodically in accordance with such Hedge Agreement or Qualified Swap, that is not less than 100% of the amount of any termination payment. If the required rating of a Qualified Counterparty is lowered below the minimum rating level specified in the Trust Agreement for such Qualified Counterparty and collateral has not been posted as required by such Hedge Agreement, such Qualified Counterparty shall no longer constitute a “Qualified Counterparty” under the Trust Agreement.

**“Qualified Depository”** or **“Depositaries”** shall mean one or more banks or trust companies meeting the requirements described in the section entitled “Appointment of Successor Trustee by Bondholders; Temporary Trustee” below and designated or permitted to be designated by the Secretary of the Treasury of the Commonwealth as a depository for funds of agencies and instrumentalities of the Commonwealth of Puerto Rico, which have been designated as depositaries of the Authority by resolution of the Board remaining in full force and effect. A certified copy of each resolution of the Board designating a Qualified Depository or Depositaries shall be filed with the Trustee.

**“Qualified Swap”** shall mean a contract pursuant to which a Qualified Counterparty has agreed to make payments to the Authority during a particular period equal to the interest payable on specified Bonds or on a specified nominal amount at the actual rate or rates or, if on a nominal amount at a stated rate or rates, payable thereon and, in consideration therefor, the Authority agrees to make payments to the Qualified Counterparty equal to the interest required to be paid on the specified Bonds or stated to be due on the nominal amount during the period calculated as if the specified Indebtedness or nominal amount bore an assumed rate (fixed or variable) of interest specified in the contract.

**“Rate Covenant”** shall mean the obligation of the Authority to fix, charge, collect and revise rates, fees and other charges for the use of and the services furnished by the Systems sufficient to meet the requirements under the Trust Agreement and as described under “SECURITY FOR THE BONDS- Rate Covenant” in the front section of this Official Statement.

**“Rating Agency”** or **“Rating Agencies”** shall mean Fitch, Moody’s, Standard & Poor’s or any other nationally recognized securities rating agency which then maintains a rating on Bonds at the request of the Authority.

**“Refundable Principal Installment”** shall mean the Term Loan, Bond Anticipation Notes or any other Indebtedness, the principal of which the Authority intends to pay with moneys which are not Authority Revenues, provided that such intent shall have been expressed in the Supplemental Agreement or other document authorizing such Indebtedness and provided further that such Indebtedness shall be a Refundable Principal Installment only through the date which is thirty (30) days prior to the date on which such Indebtedness comes due or such earlier time as the Authority has determined to pay such Indebtedness with moneys which are not Authority Revenues.

**“Reserve Determination Date”** shall mean (a) each Interest Payment Date for Bonds, or (b) any other date established in writing by an Authorized Representative of the Authority for the valuation of obligations on deposit in any Senior Debt Service Reserve Account or Senior Subordinate Debt Service Reserve Account.

**“Senior Indebtedness”** shall mean, collectively, Senior Bonds and any Other System Indebtedness secured on a parity therewith.

**“Senior Subordinated Indebtedness”** shall mean, collectively, Senior Subordinated Bonds and any Other System Indebtedness secured on a parity therewith.

**“Subordinated Indebtedness”** shall mean, collectively, Subordinate Bonds and any Other System Indebtedness secured on a parity therewith.

**“Systems”** shall mean collectively, the existing water supply, treatment and distribution system and the existing sewage collection, transmission, treatment and disposal system owned or operated by or on behalf of the Authority, together with all Improvements, and shall include any rights of service, leasehold interests or other contractual rights of the Authority in said Systems and any Improvements.

**“Tender Indebtedness”** shall mean any Indebtedness a feature of which is an option or obligation on the part of the Holders of such Indebtedness to tender all or a portion of such Indebtedness to a fiduciary for purchase or redemption prior to the stated maturity date of such Indebtedness, which may include Variable Rate Indebtedness with such a feature.

**“Term Loan”** shall mean that loan made to the Authority pursuant to the Term Loan Agreement, dated as of September 8, 2006, by and among the Authority, Banco Popular de Puerto Rico, as administrative agent, and the other financial institutions which are parties thereto.

**“Variable Rate Indebtedness”** shall mean any Indebtedness the interest rate on which is not established at the time of incurrence at a fixed or constant rate, provided that (a) the maximum interest rate on such Indebtedness and the maximum rate payable to any Enhancement Facility Provider with respect to such Indebtedness shall be specified at the time of issuance of such Indebtedness; (b) the Enhancement Facility shall cause such Indebtedness to be rated by a Rating Agency in the two highest long-term or one of the two highest short-term rating categories (without regard to any gradations within such categories) of such Rating Agency; (c) any obligation of the Authority to reimburse such Enhancement Facility Provider shall (i) amortize in equal annual installments of principal and interest over a term of no less than the shorter of ten years and stated final maturity of such Variable Rate Indebtedness or (ii) be payable solely from amounts on deposit in the Subordinate Debt Service Fund, and (d) any two or more Series of Bonds that are issued on the same date, the interest on which when such Series are considered in the aggregate shall be a fixed or constant rate, shall not be considered Variable Rate Indebtedness.

### **Selection of Bonds to be Redeemed.**

Unless otherwise required by any Supplemental Agreement, in the event of redemption of less than all the Outstanding Bonds of the same Series and maturity, the particular Bonds or portions thereof to be redeemed shall be selected by the Trustee in such manner as the Trustee in its discretion may deem fair, except that to the extent practicable, the Trustee shall select Bonds for redemption such that no Bond remaining Outstanding shall be of a denomination of less than \$5,000. In the event of redemption of less than all the Outstanding Bonds of the same Series stated to mature on different dates, the principal amount of such Series of Bonds to be redeemed shall be applied in any order of maturity of the Outstanding Series of Bonds to be redeemed that the Authority may elect upon receipt of an opinion of Bond Counsel that such redemption would not result in the interest payable on such Bonds being included in gross income for federal income tax purposes to the Holders thereof under the Code. The portion of Bonds of any Series to be redeemed in part shall be in the principal amount of the minimum authorized denomination thereof or some integral multiple thereof and, in selecting Bonds of a particular Series for redemption, the Trustee shall treat each such Bond as representing that number of Bonds of such Series which is obtained by dividing the principal amount of such registered Bond by the minimum denomination (referred to below as a “unit”) then issuable rounded down to the integral multiple of such minimum denomination. If it is determined that one or more, but not all, of the units of principal amount represented by any such Bond is to be called for redemption, then, upon notice of intention to redeem such unit or units, the Holder of such Bond shall forthwith surrender such Bond to the Trustee for (a) payment to such Holder of the redemption price of the unit or units of principal amount called for redemption and (b) delivery to such Holder of a new Bond or Bonds of such Series in the aggregate unpaid principal amount of the unredeemed balance of the principal amount of such Bond. New Bonds of the same Series and maturity representing the unredeemed balance of the principal amount of such Bond shall be issued to the registered Holder thereof, without charge therefor. If the Holder of any such Bond of a denomination greater than a unit shall fail to present such Bond to the Trustee for payment and exchange as aforesaid, such Bond shall, nevertheless, become due and payable on the date fixed for redemption to the extent of the unit or units of principal amount called for redemption (and to that extent only). (Section 3.04 of the Trust Agreement).

### **Purchase of Bonds.**

The Authority may purchase or cause to be purchased any Bonds of any particular Series or maturity in lieu of redemption of such Bonds (in which event any Bonds so purchased shall be cancelled and shall cease to bear interest pursuant to the provisions of the Trust Agreement) or for any other purpose pursuant to written instructions given by the Authority to the Trustee. Such purchases shall be made in such manner as directed by the Authority. The Authority or the Trustee shall pay the purchase price of such Bonds together with accrued interest thereon from such funds as may be available therefor pursuant to the Trust Agreement, any Supplemental Agreement, or as otherwise may be made available by the Authority. (Section 3.05 of the Trust Agreement).

### **Parity of Senior Indebtedness; Pledges of Authority Revenues and Certain Funds and Accounts.**

(a) The Trust Agreement constitutes a continuing, irrevocable pledge of Authority Revenues to secure payment of all amounts due with respect to all Senior Indebtedness that may from time to time be issued or incurred and Outstanding, including but not limited to the principal of and premium, if any, and interest thereon and for the other purposes as provided in the Trust Agreement; provided, however, that any Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations are not subject to the lien of the Trust Agreement and shall only be used for the purposes set forth in the section entitled “Commonwealth Payments Fund” below.

(b) Senior Indebtedness shall be issued pursuant to a Supplemental Agreement or evidenced by other documents and shall be equally and ratably secured by the pledge of Authority Revenues under the Trust Agreement, without preference, priority or distinction over any other issue of Senior Indebtedness; provided, however, that the moneys in any Senior Debt Service Reserve Account shall only secure the Series of Senior Bonds to which such Account relates, and provided, further, that any Senior Bonds may have additional security pledged to its payment. In no event will moneys in any Senior Debt Service Reserve Account be available to pay Other System Indebtedness secured on a parity with Senior Bonds. The Senior Bond Fund, the Construction Fund (but only to the extent of moneys derived from the proceeds of Senior Indebtedness on deposit therein), the Current Expense Fund, the Operating Reserve Fund, the Capital Improvement Fund and the Surplus Fund shall be trust funds and are

pledged equally and ratably to the payment of the principal of and interest on all Senior Indebtedness and for the other purposes as provided in the Trust Agreement.

(c) In connection with the issuance or incurrence of Senior Indebtedness, the Authority, as provided in the applicable Supplemental Agreement or evidenced in other documentation, may create additional accounts and subaccounts within any fund or account established by the Trust Agreement. Moneys in any account of the Senior Bond Fund relating to particular Senior Indebtedness shall only secure such Senior Indebtedness.

(d) Nothing in the Trust Agreement shall be construed, however, as (a) requiring that any Senior Indebtedness bear interest at the same rate or in the same manner as any other Senior Bonds, have the same, or an earlier or later, maturity, or be subject to redemption prior to maturity on the same basis as any other Senior Indebtedness, (b) prohibiting the Authority from entering into financial arrangements designed to assure that moneys will be available for the payment of certain Senior Indebtedness when due, or (c) prohibiting the Authority from pledging moneys or assets of the Authority other than those pledged in the Trust Agreement for the benefit of certain Senior Indebtedness.

(e) The lien and trust created in the Trust Agreement are for the benefit of the Holders of Senior Indebtedness and any Beneficiaries relating thereto and for their additional security until all the Senior Indebtedness have been paid or defeased in accordance with the Trust Agreement or if such Indebtedness was not incurred under the Trust Agreement, in accordance with similar provisions of the controlling document. (Section 2.11 of the Trust Agreement).

#### **Parity of Senior Subordinate Indebtedness; Pledge of Authority Revenues and Certain Funds and Accounts.**

(a) The Trust Agreement constitutes a continuing, irrevocable pledge of Authority Revenues to secure payment of all amounts due with respect to all Senior Subordinate Indebtedness that may from time to time be issued or incurred and Outstanding, including but not limited to the principal of and premium, if any, and interest thereon, subject and subordinate to the right of the Authority to pledge Authority Revenues to secure payment of the principal and premium, if any, and interest on all Senior Indebtedness Outstanding; provided, however, that any Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations are not subject to the lien of the Trust Agreement and shall only be used for the purposes set forth in the section entitled "Commonwealth Payments Fund" below.

(b) Senior Subordinate Indebtedness shall be issued pursuant to a Supplemental Agreement or evidenced by other documents and shall be equally and ratably secured by the pledge of Authority Revenues under the Trust Agreement, without preference, priority or distinction over any other issue of Senior Subordinate Indebtedness; provided, however, that the moneys in any Senior Subordinate Debt Service Reserve Account shall only secure the Series of Senior Subordinate Bonds to which such Account relates, and provided, further, that any Series of Senior Subordinate Bonds may have additional security pledged to its payment. In no event will moneys in any Senior Subordinate Debt Service Reserve Account be available to pay Other System Indebtedness secured on a parity with Senior Subordinate Bonds. The Senior Subordinate Bond Fund (but only to the extent of moneys derived from the proceeds of Senior Subordinate Indebtedness on deposit therein), the Current Expense Fund, the Operating Reserve Fund, the Capital Improvement Fund and the Surplus Fund are pledged equally and ratably to the payment of the principal of and interest on all Senior Subordinate Indebtedness, subject only and subordinate to the pledge of Authority Revenues to secure payment of the principal of and premium, if any, and interest on all Senior Indebtedness Outstanding and for the other purposes as provided in the Trust Agreement.

(c) The lien and trust created under the Trust Agreement are for the benefit of the Holders of Senior Subordinate Indebtedness and any Beneficiaries relating thereto and for their additional security until all the Senior Subordinate Indebtedness have been paid or defeased in accordance with the Trust Agreement or if such Indebtedness was not incurred under the Trust Agreement, in accordance with similar provisions of the controlling document. (Section 2.12 of the Trust Agreement).

### **Parity of Subordinate Indebtedness; Pledge of Authority Revenues and Certain Funds and Accounts.**

(a) The Trust Agreement constitutes a continuing, irrevocable pledge of Authority Revenues to secure payment of all amounts due with respect to all Subordinate Indebtedness that may from time to time be issued or incurred and Outstanding, including but not limited to the principal of and premium, if any, and interest thereon subject and subordinate to the right of the Authority to pledge Authority Revenues to secure payment of the principal of and premium, if any, and interest on all Senior Indebtedness and Senior Subordinate Indebtedness Outstanding; provided, however, that any Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations are not subject to the lien of the Trust Agreement and shall only be used for the purposes set forth in the section entitled “Commonwealth Payments Fund” below.

(b) Subordinate Indebtedness shall be issued pursuant to a Supplemental Agreement or evidenced by other documents and shall be equally and ratably secured by the pledge of Authority Revenues under the Trust Agreement, without preference, priority or distinction over any other issue of Subordinate Indebtedness; provided, however, that the moneys in any Subordinate Debt Service Reserve Account shall only secure the Series of Subordinate Bonds to which such Account relates, and provided, further, that any Series of Subordinate Bonds may have additional security pledged to its payment. In no event will moneys in any Subordinate Debt Service Reserve Account be available to pay Other System Indebtedness secured on a parity with Subordinate Bonds. The Subordinate Bond Fund, the Construction Fund (but only to the extent of moneys derived from the proceeds of Subordinate Bonds on deposit therein), the Current Expense Fund, the Operating Reserve Fund, the Capital Improvement Fund and the Surplus Fund are pledged equally and ratably to the payment of the principal of and interest on all Subordinate Indebtedness, subject only and subordinate to the pledge of Authority Revenues to secure payment of the principal of and premium, if any, and interest on all Senior Indebtedness and Senior Subordinate Indebtedness Outstanding and for the other purposes as provided in the Trust Agreement.

(c) The lien and trust created under the Trust Agreement are for the benefit of the Holders of Subordinate Indebtedness and any Beneficiaries relating thereto and for their additional security until all the Subordinate Indebtedness shall have been paid or defeased in accordance with the Trust Agreement or if such Indebtedness was not incurred under the Trust Agreement, in accordance with similar provisions of the controlling document. (Section 2.13 of the Trust Agreement).

### **Special Provisions Relating to Capital Appreciation Bonds and Deferred Income Bonds.**

(a) The Accreted Value of Capital Appreciation Bonds or the Appreciated Value of Deferred Income Bonds becoming due at maturity or by virtue of a sinking fund installment shall be included in the calculations of accrued and unpaid and accruing interest or principal installments made under the definitions of Annual Debt Service only from and after the date (the “Calculation Date”) which is one year prior to the date on which such Accreted Value or Appreciated Value, as the case may be, becomes so due, and the principal and interest portions of such Accreted Value or Appreciated Value shall be deemed to accrue in equal daily installments from the Calculation Date to such due date.

(b) For the purposes of (i) receiving payment of the redemption price if a Capital Appreciation Bond is redeemed prior to maturity, or (ii) receiving payment of a Capital Appreciation Bond if the principal of Bonds is declared immediately due and payable following an Event of Default, as provided in the section entitled “Extended Interest Payments” below, or (iii) computing the principal amount of Bonds held by the Holder of a Capital Appreciation Bond in giving to the Authority any notice, consent, request, or demand pursuant to the Trust Agreement for any purpose whatsoever, the principal amount of such Capital Appreciation Bond shall be deemed to be its then current Accredited Value.

(c) For the purposes of (i) receiving payment of the redemption price if a Deferred Income Bond is redeemed prior to maturity, or (ii) receiving payment of a Deferred Income Bond if the principal of Bonds is declared immediately due and payable following an Event of Default, as provided in the section entitled “Extended Interest Payments” below, or (iii) computing the principal amount of Bonds held by the Holder of a Deferred Income Bond in giving to the Authority any notice, consent, request, or demand pursuant to the provisions of the

Trust Agreement for any purpose whatsoever, the principal amount of a such Deferred Income Bond shall be deemed to be its then current Appreciated Value. (Section 2.19 of the Trust Agreement).

#### **Establishment of Certain Funds and Accounts**

(a) There are established under the Trust Agreement the following funds and accounts to be held by the Trustee, each of which Fund shall include “Puerto Rico Aqueduct and Sewer Authority” in its designation:

- (i) Operating Revenue Fund;
- (ii) Construction Fund, in which there shall be established a Capitalized Interest Account and a Costs of Issuance Account;
- (iii) Senior Bond Fund, in which there shall be established a Senior Interest Account, a Senior Principal Account and a Senior Sinking Fund Account, and a separate subaccount in each such Account with respect to each issue of Senior Indebtedness;
- (iv) Senior Debt Service Reserve Fund, in which there shall be established a Senior Debt Service Reserve Account for each Series of Senior Bonds as required by the applicable Supplemental Agreement;
- (v) Senior Subordinate Bond Fund, in which there shall be established a Senior Subordinate Interest Account, a Senior Subordinate Principal Account and a Senior Subordinate Sinking Fund Account, and a separate subaccount in each such Account with respect to each issue of Senior Subordinate Indebtedness;
- (vi) Senior Subordinate Debt Service Reserve Fund, in which there shall be established a Senior Subordinate Debt Service Reserve Account for each Series of Senior Subordinate Bonds as required by the applicable Supplemental Agreement;
- (vii) Subordinate Bond Fund, in which there shall be established a Subordinate Interest Account, a Subordinate Principal Account and a Subordinate Sinking Fund Account, and a separate subaccount in each Account with respect to each issue Subordinate Indebtedness;
- (viii) Subordinate Debt Service Reserve Fund in which there shall be established a Subordinate Debt Service Reserve Account for each Series of Subordinate Bonds, as required by the applicable Supplemental Agreement;
- (ix) Operating Reserve Fund;
- (x) Capital Improvement Fund;
- (xi) Commonwealth Payments Fund in which there shall be established a Commonwealth Guaranteed Indebtedness Account and a Commonwealth Supported Obligations Account; and
- (xii) Surplus Fund in which there shall be established a Rate Stabilization Account.

(b) There is established under the Trust Agreement the Current Expense Fund to be held by the Authority or by a Qualified Depository on behalf of the Authority. (Section 5.01 of the Trust Agreement).

#### **Disposition of Operating Revenues and Authority Revenues**

(a) The Authority shall deposit, or cause to be deposited, all Operating Revenues in the Operating Revenue Fund. Upon the occurrence of an Event of Default specified in the subsections (a), (b), (c), (d)

or (e) of the section entitled “Events of Default” below, amounts on deposit in the Operating Revenue Fund shall be applied in accordance with the section entitled “Applications of Moneys” below. Authority Revenues consisting of governmental grants or appropriations available to pay Current Expenses of the Authority, shall be deposited in the Current Expense Fund. Authority Revenues consisting of grants or appropriations received by the Authority for the purpose of paying of principal of and interest on Bonds or Other System Indebtedness shall be deposited in the applicable debt service fund. Authority Revenues consisting of amounts transferred from the Budgetary Reserve Fund to the Trustee shall be deposited in the fund designated in the applicable Disbursement Schedule. Authority Revenues consisting of amounts received from the Commonwealth on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations shall be deposited directly in the Commonwealth Payments Fund, are not subject to the lien of the Trust Agreement and shall only be applied to the payment of principal and interest on Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations, as applicable.

(b) Beginning on the first Business Day of the month, the Trustee shall transfer the amount on deposit in the Operating Revenue Fund, in the following order of priority, but if the amounts so transferred shall be insufficient (after taking into account all prior deposits) to make any deposit as set forth below in this subsection, the Trustee shall only be required to deposit the amount then remaining after such prior deposits:

(i) To the Senior Bond Fund, the amount required to be deposited therein pursuant to the section entitled “Senior Bond Fund” below;

(ii) To the Senior Debt Service Reserve Fund, the amount required to be deposited therein pursuant to the section entitled “Senior Debt Service Reserve Fund” below;

(iii) To the Senior Subordinate Bond Fund, the amount required to be deposited therein pursuant to the section entitled “Senior Subordinate Bond Fund” below;

(iv) To the Senior Subordinate Debt Service Reserve Fund, the amount required to be deposited therein pursuant to the section entitled “Senior Subordinate Debt Service Reserve Fund” below;

(v) To the Subordinate Bond Fund, the amount required to be deposited therein pursuant to the section entitled “Subordinate Bond Fund” below;

(vi) To the Subordinate Debt Service Reserve Fund, the amount required to be deposited therein pursuant to the section entitled “Subordinated Reserve Fund” below;

(vii) To the Current Expense Fund, the amount required to be deposited therein pursuant to the section entitled “Current Expense Fund” below;

(viii) To the Operating Reserve Fund, the amount required to restore the balance on deposit therein to the Operating Reserve Requirement and to pay interest on and reimbursement obligations due with respect to an Operating Reserve Facility in accordance with the subsection (a) of the section entitled “Operating Reserve Fund” below;

(ix) To the Capital Improvement Fund, the amount required to be deposited therein pursuant to the section entitled “Capital Improvement Fund” below;

(x) To the Commonwealth Payments Fund, the amount required to be deposited therein pursuant to the section entitled “Commonwealth Payments Fund”; and

(xi) To the Surplus Fund, any remaining balance.

(c) The Trustee shall provide the Authority with a monthly certificate setting forth that, to the extent that amounts on deposit in the Operating Revenue Fund were sufficient therefor, the transfers required by clauses (i) through (x) of subsection (b) above have been made and the respective balances of such Funds and Accounts. If the amounts so deposited on or before any Deposit Date to the credit of the foregoing Funds, Accounts

and subaccounts shall be less than the respective required amounts for such month, said requirements therefor shall nevertheless be cumulative and the amount of any deficiency on any Deposit Date shall be added to the amount otherwise required to be deposited in each month thereafter until such time as such deficiency shall have been eliminated. In accordance with the provisions of the Trust Agreement, in the event that by any Deposit Date there are insufficient moneys to make in full the deposit to the Commonwealth Payments Fund for such month as required by subsection (a) and (b) of the "Commonwealth Payments Fund" below, the Trustee shall provide notice of such insufficiency to the Consulting Engineer, other Consultants, if any, and to Government Development Bank for Puerto Rico. In no event will failure to make the transfers required by subsection (b) of this Section be an Event of Default hereunder if such failure is due to insufficient moneys therefor. (Section 5.02 of the Trust Agreement).

### **Senior Bond Fund.**

(a) Deposits to the Senior Bond Fund. In accordance with the provisions of the Trust Agreement relating to Disposition of Authority Revenues (except that no distinction or preference shall exist in making the following deposits into the Senior Interest Account, the Senior Principal Account or the Senior Sinking Fund Account of the Senior Bond Fund, in each case, such accounts being on a parity with each other as to the deposits therein under the provisions of the Trust Agreement relating to Disposition of Authority Revenues), beginning on the first Business Day of a month, the Trustee shall make the following deposits:

(1) to the subaccounts established for each issue of Senior Indebtedness in the Senior Interest Account, (i) an amount of Authority Revenues equal to the Interest Accrual on all the outstanding Senior Indebtedness to and including the last day of the next calendar month; (ii) the amount of any payments or reimbursements due in the next ensuing month to each Enhancement Facility Provider to the extent such payment or reimbursement obligation constitutes Senior Indebtedness under the Trust Agreement; and (iii) the amount of any payments due in the next ensuing month under any Hedge Agreement or Qualified Swap secured on a parity with Senior Indebtedness; provided, further, that any such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose; and

(2) to the subaccounts established for each issue of Senior Indebtedness in the Senior Principal Account and Senior Sinking Fund Account, an amount of Authority Revenues equal to the Principal Accrual on the outstanding Senior Indebtedness to and including the last day of the next calendar month; provided, however, such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose.

(b) Use of Moneys in Senior Bond Fund. (1) On or before each Interest Payment Date, the Trustee shall pay to the Holders of Senior Indebtedness from funds on deposit in the Senior Interest Account, the amount required for the payment of the interest becoming due on Senior Indebtedness on such Interest Payment Date; provided, however, if the Trustee is not the Fiduciary for such Senior Indebtedness, the Trustee will withdraw from the Senior Interest Account and transfer to the Fiduciary therefor not later than one (1) Business Day prior to the applicable Interest Payment Date the amount required for the payment of interest becoming due on the Senior Indebtedness for which such Fiduciary so serves. On or before the date on which (x) regularly scheduled payments under a Hedge Agreement or Qualified Swap are due or (y) payments or reimbursements to an Enhancement Facility Provider are to be made, in each case relating to Senior Indebtedness, the Trustee shall pay to the persons entitled thereto from funds on deposit in the Senior Interest Account the corresponding amounts owing to such persons on such date.

(2) On or before each payment date, the Trustee shall pay to the Holders of Senior Indebtedness from funds on deposit in the Senior Principal Account, the amount required for the payment of principal becoming due on and any termination payment due in respect of Senior Indebtedness on such payment date and with respect to Senior Indebtedness as to which the Trustee is not the Fiduciary therefor, the Trustee shall pay to each such Fiduciary not later than one (1) Business Day prior to the applicable payment date from funds on deposit in the Senior Principal Account the corresponding amounts required for the payment of principal becoming due on and any termination payment due in respect of such Senior Indebtedness.



(3) On or before each mandatory redemption date, the Trustee shall pay to the Holders of Senior Indebtedness from funds on deposit in the Senior Sinking Fund Account, the amount required for the payment of mandatory sinking fund installments becoming due on Senior Indebtedness on such mandatory redemption payment date and with respect to Senior Indebtedness as to which the Trustee is not the Fiduciary therefor, the Trustee shall pay to each such Fiduciary not later than one (1) Business Day prior to the applicable mandatory redemption payment date from funds on deposit in the Senior Sinking Fund Account the corresponding amounts required for the payment of mandatory sinking fund installments becoming due on such Senior Indebtedness.

(4) Any amount in the Senior Sinking Fund Account not applied in accordance with subsection (c) below to the purchase of Senior Indebtedness by the forty-fifth (45th) day prior to the next date on which such Senior Indebtedness is so redeemable shall be applied to the redemption of such Senior Indebtedness on such redemption date. Any amounts deposited in the Senior Sinking Fund Account and not applied within twelve (12) months of their date of deposit to the purchase or redemption of Senior Indebtedness (except if held in accordance with the section entitled "Discharge of Agreement" below) shall be transferred to the Senior Interest Account. The Senior Indebtedness to be purchased or redeemed shall be selected by the Trustee in the manner provided in the section entitled "Selection of Bonds to be Redeemed" above. Amounts in the Senior Sinking Fund Account to be applied to the redemption of Senior Indebtedness shall be paid to the respective Trustee or Fiduciary on or before the redemption date and applied by them on such redemption date to the payment of the redemption price of the Senior Indebtedness being redeemed.

(c) Notwithstanding the provisions of clause (3) of paragraph (b) of this section, the Authority may, at any time but in no event less than forty-five (45) days prior to the date on which a mandatory sinking fund installment is scheduled to be due on Senior Indebtedness, direct the Trustee or Fiduciary to purchase, with money on deposit in the Senior Sinking Fund Account, at a price not in excess of par plus interest accrued and unpaid to the date of such purchase, term bonds to be redeemed on such date. At the direction of the Authority, any term bond so purchased may be cancelled upon receipt thereof by the Trustee or the Fiduciary and evidence of such cancellation shall be given to the Authority. The principal amount of each term bond so canceled shall be credited against the sinking fund installment due on such date as long as such term bond is canceled by the Trustee or Fiduciary prior to the date on which notice of redemption is given.

(d) In the event the amount on deposit in the Senior Interest Account on any Interest Payment Date exceeds the amount required to pay interest on the Senior Indebtedness on such Interest Payment Date, the Authority shall, if the amount on deposit in any Senior Debt Service Reserve Account is less than the applicable Debt Service Reserve Requirement, instruct the Trustee to transfer such excess to such Senior Debt Service Reserve Account to the extent of such deficiency, and otherwise retain any remaining excess in the Senior Interest Account or instruct the Trustee to transfer any such remaining excess to the Senior Principal Account or Senior Sinking Fund Account to be credited against subsequent required deposits thereto, as determined by the Authority.

(e) In the event the amount on deposit in the Senior Principal Account or Senior Sinking Fund Account on any principal or mandatory redemption payment date exceeds the amount required on such date to pay Senior Indebtedness at maturity or pursuant to mandatory sinking fund requirements, the Authority shall, if the amount on deposit in any Senior Debt Service Reserve Account is less than the applicable Debt Service Reserve Requirement, instruct the Trustee to transfer such excess to such Senior Debt Service Reserve Account to the extent of such deficiency, and otherwise retain such excess in the Senior Principal Account or Senior Sinking Fund Account, as the case may be, or instruct the Trustee to transfer such excess to the Senior Interest Account to be credited against subsequent required deposits thereto, as determined by the Authority.

(f) In the event the balance on deposit in the Senior Principal Account, the Senior Sinking Fund Account or the Senior Interest Account is insufficient for the purposes thereof, the Trustee shall deposit in such Accounts such amounts as may be necessary therefor first, from other legally available funds not subject to the lien of the Trust Agreement; second, from the Surplus Fund; third, from the Commonwealth Payments Fund; fourth, from the Capital Improvement Fund; fifth, from the Operating Reserve Fund; sixth, from the Current Expense Fund and last, from the applicable Senior Debt Service Reserve Account pursuant to the section entitled "Senior Debt Service Reserve Fund" below. (Section 5.03 of the Trust Agreement).

### **Senior Debt Service Reserve Fund.**

(a) In each month the Trustee shall deposit to each Account in the Senior Debt Service Reserve Fund (i) beginning on the first Business Day of such month, after making the deposits required by the Trust Agreement, an amount of Authority Revenues equal to (x) 1/60 of the amount (or such greater amount specified in the Supplemental Agreement authorizing any Senior Bonds), if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of an increase in the applicable Debt Service Reserve Requirement upon the issuance of additional Senior Bonds, and (y) except as provided in paragraph (c) below, 1/12 of the amount, if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of any other deficiency and (ii) the amount of proceeds of any Senior Bonds as required by the applicable Supplemental Agreement.

(b) Amounts in each Account in the Senior Debt Service Reserve Fund shall be used to pay debt service on the related Series of Senior Bonds on the dates such debt service is due when insufficient funds for that purpose are available in the Senior Bond Fund, after making any transfers pursuant to subsection (f) of the section entitled "Senior Bond Fund" above and all cash and investments in an Account in the Senior Debt Service Reserve Fund shall be used, together with other amounts available for such purpose under the Trust Agreement, to provide for payment in full of the related Series of Senior Bonds when the aggregate of such amounts is sufficient for such purpose. Amounts in each Account of the Senior Debt Service Reserve Fund shall be pledged to the Holders of the applicable Series of Senior Bonds to which such Account relates. In no event shall amounts on deposit in the Senior Debt Service Reserve Fund be used to pay principal of, interest on, or any other amounts due with respect, to Other System Indebtedness.

(c) In lieu of or in addition to cash or investments, at any time the Authority may cause to be deposited to the credit of any Senior Debt Service Reserve Account, a Debt Service Reserve Facility in the stated amount equal to all or a portion of the applicable Debt Service Reserve Requirement, irrevocably payable to the Trustee, as beneficiary for the Holders of the Senior Bonds to which such Account relates. If (x) the Authority receives an expiration notice and the applicable Enhancement Facility Provider does not extend the expiration date of a Debt Service Reserve Facility, (y) the Authority receives notice of the termination of a Debt Service Reserve Facility, or (z) the Authority receives notice that the applicable Enhancement Facility Provider of a Debt Service Reserve Facility no longer has the required credit rating, the Authority immediately shall (i) provide a substitute Debt Service Reserve Facility, (ii) deposit a sum equal to the Debt Service Reserve Requirement to the credit of the Senior Debt Service Reserve Account to which such Debt Service Reserve Facility relates (A) in equal monthly installments over the next succeeding 12 months in the case of receipt of an expiration notice, (B) prior to the termination date in the case of receipt of a termination notice, or (C) immediately in the case of such reduction in credit rating, or (iii) instruct the Trustee to draw on such Debt Service Reserve Facility (A) 12 months prior to expiration of the Debt Service Reserve Facility in the case of receipt of an expiration notice, (B) prior to the termination date in the case of receipt of a termination notice, or (C) immediately in the case of such reduction in credit rating and deposit the proceeds of such drawing to the credit of the Senior Debt Service Reserve Account to which such Debt Service Reserve Facility relates.

If a disbursement is made pursuant to a Debt Service Reserve Facility, the Authority shall either (i) reinstate such Facility in full or (ii) deposit to the credit of the Senior Debt Service Reserve Account a sum equal to the amount of the disbursement made under such Facility in accordance with its provisions.

(d) On or within five days after each Reserve Determination Date, the Trustee shall determine whether the balance on deposit in each Senior Debt Service Reserve Account was, as of the Reserve Determination Date, at least equal to the applicable Debt Service Reserve Requirement. In making such determination, any obligations in a Senior Debt Service Reserve Account shall be valued in accordance with the section entitled "Investment of Funds" below.

In the event the amount on deposit in a Senior Debt Service Reserve Account exceeds the applicable Debt Service Reserve Requirement, the Trustee shall transfer such excess as directed in writing by an Authorized Representative of the Authority, such direction to be accompanied by an Opinion of Bond Counsel that such transfer will not adversely affect the exclusion (if applicable) from gross income of interest on the respective Series of Senior Bonds to which such excess relates (i) to the subaccount of the Senior Principal Account

corresponding to such Series of Senior Bonds, or (ii) to fund the Operating Reserve Fund at the Operating Reserve Requirement, or (iii) to the Authority to be used to pay all or any portion of the Costs of Improvements designated by the Authority and approved by Bond Counsel. If an Authorized Representative of the Authority calls for a Reserve Determination Date in connection with the refunding and/or defeasance of a Series of Senior Bonds, then the Trustee is authorized to take such refunding and/or defeasance into account in valuing the Senior Debt Service Reserve Account securing such Series of Senior Bonds and is further authorized to apply the amount of any surplus arising from such valuation to reduce the amount of the refunding Bonds and/or to provide for the refunding or defeasance of the Series of Senior Bonds in such manner as such Authorized Representative may direct.

(e) In connection with any issuance of Senior Bonds, the Authority may, in the applicable Supplemental Agreement, provide that no deposit to the Senior Debt Service Reserve Fund shall be made for or with respect to such additional Senior Bonds, in which case: (i) the lien of and pledge on the Senior Debt Service Reserve Fund shall not extend to or be for the benefit of the Holders of such Senior Bonds, and (ii) the Annual Debt Service on such Senior Bonds shall not be taken into account in determining the applicable Debt Service Reserve Requirement.

In the event that a Supplemental Agreement so provides, then such Supplemental Agreement may also provide for the creation of a special reserve account solely for the Senior Bonds to which such Supplemental Agreement relates, separate from the Senior Debt Service Reserve Fund, and may provide for the deposit therein, at the time of issuance or from time to time thereafter, of an amount specified in the applicable Supplemental Agreement as the required reserve for such Senior Bonds, or may require the Authority to deposit to the credit of such special reserve account a Debt Service Reserve Facility to enhance the security for such Senior Bonds in lieu of a funded reserve account. (Section 5.04 of the Trust Agreement).

#### **Senior Subordinate Bond Fund.**

(a) Deposits to the Senior Subordinate Bond Fund. In accordance with the provisions of the Trust Agreement relating to Disposition of Authority Revenues (except that no distinction or preference shall exist in making the following deposits into the Senior Subordinate Interest Account, the Senior Subordinate Principal Account or the Senior Subordinate Sinking Fund Account of the Senior Subordinate Bond Fund, in each case, such accounts being on a parity with each other as to the deposits therein under the provisions of the Trust Agreement relating to Disposition of Authority Revenues), beginning on the first Business Day of the month, after making the deposits required by the Trust Agreement, the Trustee shall make the following deposits:

(1) to the subaccounts established for each issue of Senior Subordinate Indebtedness in the Senior Subordinate Interest Account, (i) an amount of Authority Revenues equal to the Interest Accrual on all the outstanding Senior Subordinate Indebtedness to and including the last day of the next calendar month; (ii) the amount of any payments or reimbursements due in the next ensuing month to each Enhancement Facility Provider to the extent such payment or reimbursement obligation constitutes Senior Subordinate Indebtedness under the Trust Agreement; (iii) the amount of any payments due in the next ensuing month under any Hedge Agreement or Qualified Swap secured on a parity with Senior Subordinate Indebtedness; provided, further, that any such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose; and

(2) to the subaccounts established for each issue of Senior Subordinate Indebtedness in the Senior Subordinate Principal Account and Senior Subordinate Sinking Fund Account, an amount of Authority Revenues equal to the Principal Accrual on the outstanding Senior Subordinate Indebtedness to and including the last day of the next calendar month; provided, however, such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose.

(b) Use of Moneys in Senior Subordinate Bond Fund. (1) On or before each Interest Payment Date, the Trustee shall pay to the Holders of Senior Subordinate Indebtedness from funds on deposit in the Senior Subordinate Interest Account, the amount required for the payment of the interest becoming due on Senior Subordinate Indebtedness on such Interest Payment Date; provided, however, if the Trustee is not the Fiduciary for such Senior Subordinate Indebtedness, the Trustee will withdraw from the Senior Subordinate Interest Account and

transfer to the Fiduciary therefor not later than one (1) Business Day prior to the applicable Interest Payment Date the amount required for the payment of interest becoming due on the Senior Subordinate Indebtedness to which the Fiduciary so serves. On or before the date on which (x) regularly scheduled payments under a Hedge Agreement or Qualified Swap are due or (y) payments or reimbursements to an Enhancement Facility Provider are to be made, in each case relating to Senior Subordinate Indebtedness, the Trustee shall pay to the persons entitled thereto from funds on deposit in the Senior Subordinate Interest Account the corresponding amounts owing to such persons on such date.

(2) On or before each payment date, the Trustee shall pay to the Holders of Senior Subordinate Indebtedness from funds on deposit in the Senior Subordinate Principal Account, the amount required for the payment of principal becoming due on and any termination payment due in respect of Senior Subordinate Indebtedness on such payment date and with respect to Senior Subordinate Indebtedness as to which the Trustee is not the Fiduciary therefor, the Trustee shall pay to each such Fiduciary not later than one (1) Business Day prior to the applicable payment date from funds on deposit in the Senior Subordinate Principal Account the corresponding amounts required for the payment of principal becoming due on and any termination payment due in respect of such Senior Subordinate Indebtedness.

(3) On or before each mandatory redemption date, the Trustee shall pay to the Holders of Senior Subordinate Indebtedness from funds on deposit in the Senior Subordinate Sinking Fund Account, the amount required for the payment of mandatory sinking fund installments becoming due on Senior Subordinate Indebtedness on such mandatory redemption payment date and with respect to Senior Subordinate Indebtedness as to which the Trustee is not the Fiduciary therefor, the Trustee shall pay to each such Fiduciary not later than one (1) Business Day prior to the applicable mandatory redemption payment date from funds on deposit in the Senior Subordinate Sinking Fund Account the corresponding amounts required for the payment of mandatory sinking fund installments becoming due on such Senior Subordinate Indebtedness.

(4) Any amount in the Senior Subordinate Sinking Fund Account not applied in accordance with subsection (c) below to the purchase of Senior Subordinate Indebtedness by the forty-fifth (45th) day prior to the next date on which such Senior Subordinate Indebtedness is so redeemable shall be applied to the redemption of such Senior Subordinate Indebtedness on such redemption date. Any amounts deposited in the Senior Subordinate Sinking Fund Account and not applied within twelve (12) months of their date of deposit to the purchase or redemption of Senior Subordinate Indebtedness (except if held in accordance with the section entitled "Discharge of Agreement" below) shall be transferred to the Senior Subordinate Interest Account. The Senior Subordinate Indebtedness to be purchased or redeemed shall be selected by the Trustee in the manner provided in the section entitled "Selection of Bonds to be Redeemed" above. Amounts in the Senior Subordinate Sinking Fund Account to be applied to the redemption of Senior Subordinate Indebtedness shall be paid to the respective Trustee or Fiduciary on or before the redemption date and applied by them on such redemption date to the payment of the redemption price of the Senior Subordinate Indebtedness being redeemed.

(c) Notwithstanding the provisions of this section, the Authority may, at any time but in no event less than forty-five (45) days prior to the date on which a mandatory sinking fund installment is scheduled to be due on Senior Subordinate Indebtedness, direct the Trustee or Fiduciary to purchase, with money on deposit in the Senior Subordinate Sinking Fund Account, at a price not in excess of par plus interest accrued and unpaid to the date of such purchase, term bonds to be redeemed on such date. At the direction of the Authority, any term bond so purchased may be cancelled upon receipt thereof by the Trustee or the Fiduciary and evidence of such cancellation shall be given to the Authority. The principal amount of each term bond so canceled shall be credited against the sinking fund installment due on such date as long as such term bond is canceled by the Trustee or Fiduciary prior to the date on which notice of redemption is given.

(d) In the event the amount on deposit in the Senior Subordinate Interest Account on any Interest Payment Date exceeds the amount required to pay interest on the Senior Subordinate Indebtedness on such Interest Payment Date, the Authority shall, if the amount on deposit in any Senior Subordinate Debt Service Reserve Account is less than the applicable Debt Service Reserve Requirement, instruct the Trustee to transfer such excess to such Senior Subordinate Debt Service Reserve Account to the extent of such deficiency, and otherwise retain any remaining excess in the Senior Subordinate Interest Account or instruct the Trustee to transfer any such remaining

excess to the Senior Subordinate Principal Account or Senior Subordinate Sinking Fund Account to be credited against subsequent required deposits thereto, as determined by the Authority.

(e) In the event the amount on deposit in the Senior Subordinate Principal Account or Senior Subordinate Sinking Fund Account on any principal or mandatory redemption payment date exceeds the amount required on such date to pay Senior Subordinate Indebtedness at maturity or pursuant to mandatory sinking fund requirements, the Authority shall, if the amount on deposit in any Senior Subordinate Debt Service Reserve Account is less than the applicable Debt Service Reserve Requirement, instruct the Trustee to transfer such excess to such Senior Subordinate Debt Service Reserve Account to the extent of such deficiency, and otherwise retain such excess in the Senior Subordinate Principal Account or Senior Subordinate Sinking Fund Account, as the case may be, or instruct the Trustee to transfer such excess to the Senior Subordinate Interest Account to be credited against subsequent required deposits thereto, as determined by the Authority.

(f) In the event the balance on deposit in the Senior Subordinate Principal Account, the Senior Subordinate Sinking Fund Account or the Senior Subordinate Interest Account is insufficient for the purposes thereof, the Trustee shall deposit in such Accounts such amounts as may be necessary therefor, after any transfers required under paragraph (f) of “Senior Bond Fund” above, first, from other legally available funds of the Authority not subject to the lien of the Trust Agreement; second, from the Surplus Fund; third, from the Commonwealth Payments Fund; fourth, from the Capital Improvement Fund; fifth, from the Operating Reserve Fund; sixth, from the Current Expense Fund and last, from the applicable Senior Subordinate Debt Service Reserve Account pursuant to the section entitled “Senior Subordinate Debt Service Reserve Fund” below. (Section 5.05 of the Trust Agreement).

#### **Senior Subordinate Debt Service Reserve Fund.**

(a) In each month the Trustee shall deposit to each Account in the Senior Subordinate Debt Service Reserve Fund (i) beginning on the first Business Day of such month, after making the deposits required by the Trust Agreement, an amount of Authority Revenues equal to (x) 1/60 of the amount (or such greater amount specified in the Supplemental Agreement authorizing any Senior Subordinate Bonds), if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of an increase in the applicable Debt Service Reserve Requirement upon the issuance of additional Senior Subordinate Bonds, and (y) except as provided in paragraph (c) below, 1/12 of the amount, if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of any other deficiency and (ii) the amount of proceeds of any Senior Subordinate Bonds as required by the applicable Supplemental Agreement.

(b) Amounts in each Account in the Senior Subordinate Debt Service Reserve Fund shall be used to pay debt service on the related Series of Senior Subordinate Bonds on the dates such debt service is due when insufficient funds for that purpose are available in the Senior Subordinate Bond Fund, after making any transfers pursuant to subsection (f) of the section entitled “Senior Subordinate Bond Fund” above and all cash and investments in an Account in the Senior Subordinate Debt Service Reserve Fund shall be used, together with other amounts available for such purpose under the Trust Agreement, to provide for payment in full of the related Series of Senior Subordinate Bonds when the aggregate of such amounts is sufficient for such purpose. Amounts in each Account of the Senior Subordinate Debt Service Reserve Fund shall be pledged to Holders of the Senior Subordinate Bonds to which such Account relates. In no event shall amounts on deposit in the Senior Subordinate Debt Service Reserve Fund be used to pay principal of, interest on, or any other amounts due with respect to Other System Indebtedness.

(c) In lieu of or in addition to cash or investments, at any time the Authority may cause to be deposited to the credit of any Senior Subordinate Debt Service Reserve Account, a Debt Service Reserve Facility, in the stated amount equal to all or a portion of the applicable Debt Service Reserve Requirement, irrevocably payable to the Trustee, as beneficiary for the Holders of the Senior Subordinate Bonds to which such Account relates. If (x) the Authority receives an expiration notice and the applicable Enhancement Facility Provider does not extend the expiration date of a Debt Service Reserve Facility, (y) the Authority receives notice of the termination of a Debt Service Reserve Facility, or (z) the Authority receives notice that the Enhancement Facility Provider of a Debt Service Reserve Facility no longer has the required credit rating, the Authority immediately shall (i) provide a substitute Debt Service Reserve Facility, (ii) deposit a sum equal to the applicable Debt Service Reserve Requirement to the credit of the Senior Subordinate Debt Service Reserve Account to which such Debt Service

Reserve Facility relates (A) in equal monthly installments over the next succeeding 12 months in the case of receipt of an expiration notice, (B) prior to the termination date in the case of receipt of a termination notice, or (C) immediately in the case of such reduction in credit rating, or (iii) instruct the Trustee to draw on such Debt Service Reserve Facility (A) 12 months prior to expiration of the Debt Service Reserve Facility in the case of receipt of an expiration notice, (B) prior to the termination date in the case of receipt of a termination notice, or (C) immediately in the case of such reduction in credit rating and deposit the proceeds of such drawing to the credit of the Senior Subordinate Debt Service Reserve Account to which such Debt Service Reserve Facility relates.

If a disbursement is made pursuant to a Debt Service Reserve Facility, the Authority shall either (i) reinstate such Facility in full or (ii) deposit to the credit of the Senior Subordinate Debt Service Reserve Account a sum equal to the amount of the disbursement made under such Facility in accordance with its provisions.

(d) On or within five days after each Reserve Determination Date, the Trustee shall determine whether the balance on deposit in each Senior Subordinate Debt Service Reserve Account was, as of the Reserve Determination Date, at least equal to the applicable Debt Service Reserve Requirement. In making such determination, any obligations in a Senior Subordinate Debt Service Reserve Account shall be valued in accordance with the section entitled "Investment of Funds" below.

In the event the amount on deposit in a Senior Subordinate Debt Service Reserve Account exceeds the applicable Debt Service Reserve Requirement, the Trustee shall transfer such excess as directed in writing by an Authorized Representative of the Authority, such direction to be accompanied by an Opinion of Bond Counsel that such transfer will not adversely affect the exclusion (if applicable) from gross income of interest on the respective Series of Senior Subordinate Bonds to which such excess relates, (i) to the subaccount of the Senior Subordinate Principal Account corresponding to such Series of Senior Subordinate Bonds, or (ii) to fund the Operating Reserve Fund at the Operating Reserve Requirement, or (iii) to the Authority to be used to pay all or any portion of the Costs of Improvements designated by the Authority and approved by Bond Counsel. If an Authorized Representative of the Authority calls for a Reserve Determination Date in connection with the refunding and/or defeasance of a Series of Senior Subordinate Bonds, then the Trustee is authorized to take such refunding and/or defeasance into account in valuing the Senior Subordinate Debt Service Reserve Account securing such Series of Senior Subordinate Bonds and is further authorized to apply the amount of any surplus arising from such valuation to reduce the amount of the refunding bonds and/or to provide for the refunding or defeasance of the Series of Senior Subordinate Bonds in such manner as such Authorized Representative may direct.

(e) In connection with any issuance of Senior Subordinate Bonds, the Authority may, in the applicable Supplemental Agreement, provide that no deposit to the Senior Subordinate Debt Service Reserve Fund shall be made for or with respect to such additional Senior Subordinate Bonds, in which case: (i) the lien of and pledge on the Senior Subordinate Debt Service Reserve Fund shall not extend to or be for the benefit of the Holders of such Senior Subordinate Bonds, and (ii) the Annual Debt Service on such Senior Subordinate Bonds shall not be taken into account in determining the applicable Debt Service Reserve Requirement.

In the event that a Supplemental Agreement so provides, then such Supplemental Agreement may also provide for the creation of a special reserve account solely for the Senior Subordinate Bonds to which such Supplemental Agreement relates, separate from the Senior Subordinate Debt Service Reserve Fund, and may provide for the deposit therein, at the time of issuance or from time to time thereafter, of an amount specified in the applicable Supplemental Agreement as the required reserve for such Senior Subordinate Bonds, or may require the Authority to deposit to the credit of such special reserve account a Debt Service Reserve Facility to enhance the security for such Senior Subordinate Bonds in lieu of a funded reserve account. (Section 5.06 of the Trust Agreement).

### **Subordinate Bond Fund.**

(a) Deposits to the Subordinate Bond Fund. In accordance with the provisions of the Trust Agreement relating to Disposition of Authority Revenues (except that no distinction or preference shall exist in making the following deposits into the Subordinate Interest Account, the Subordinate Principal Account or the Subordinate Sinking Fund Account of the Subordinate Bond Fund, in each case, such accounts being on a parity with each other as to the deposits therein under the provisions of the Trust Agreement relating to Disposition of

Authority Revenues), beginning on the first Business Day of the month, after making the deposits required by the Trust Agreement, the Trustee shall make the following deposits:

(1) to the subaccounts established for each issue of Subordinate Indebtedness in the Subordinate Interest Account, (i) an amount of Authority Revenues equal to the Interest Accrual on all the outstanding Subordinate Indebtedness to and including the last day of the next calendar month; (ii) the amount of any payments or reimbursements due in the next ensuing month to each Enhancement Facility Provider to the extent such payment or reimbursement obligation constitutes Subordinate Indebtedness under the Trust Agreement; and (iii) the amount of any payments due in the next ensuing month under any Hedge Agreement or Qualified Swap secured on a parity with Subordinate Indebtedness; provided, further, that any such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose; and

(2) to the subaccounts established for each issue of Subordinate Indebtedness in the Subordinate Principal Account and Subordinate Sinking Fund Account, an amount of Authority Revenues equal to the Principal Accrual on the outstanding Subordinate Indebtedness to and including the last day of the next calendar month; provided, however, such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose.

(b) Use of Moneys in Subordinate Bond Fund. (1) On or before each Interest Payment Date, the Trustee shall pay to the Holders of Subordinate Indebtedness from funds on deposit in the Subordinate Interest Account, the amount required for the payment of the interest becoming due on Subordinate Indebtedness on such Interest Payment Date; provided, however, if the Trustee is not the Fiduciary for such Subordinate Indebtedness, the Trustee will withdraw from the Subordinate Interest Account and transfer to the Fiduciary therefor not later than one (1) Business Day prior to the applicable Interest Payment Date the amount required for the payment of interest becoming due on the Subordinate Indebtedness to which the Fiduciary so serves. On or before the date on which (x) regularly scheduled payments under a Hedge Agreement or Qualified Swap are due or (y) payments or reimbursements to an Enhancement Facility Provider are to be made, in each case relating to Subordinate Indebtedness, the Trustee shall pay to the persons entitled thereto from funds on deposit in the Subordinate Interest Account the corresponding amounts owing to such persons on such date.

(2) On or before each payment date, the Trustee shall pay to the Holders of Subordinate Indebtedness from funds on deposit in the Subordinate Principal Account, the amount required for the payment of principal becoming due on and any termination payment due in respect of Subordinate Indebtedness on such payment date and with respect to Subordinate Indebtedness as to which the Trustee is not the Fiduciary therefor, the Trustee shall pay to each such Fiduciary not later than one (1) Business Day prior to the applicable payment date from funds on deposit in the Subordinate Principal Account the corresponding amounts required for the payment of principal becoming due on and any termination payment due in respect of such Subordinate Indebtedness.

(3) On or before each mandatory redemption date, the Trustee shall pay to the Holders of Subordinate Indebtedness from funds on deposit in the Subordinate Sinking Fund Account, the amount required for the payment of mandatory sinking fund installments becoming due on Subordinate Indebtedness on such mandatory redemption payment date and with respect to Subordinate Indebtedness as to which the Trustee is not the Fiduciary therefor, the Trustee shall pay to each such Fiduciary not later than one (1) Business Day prior to the applicable mandatory redemption payment date from funds on deposit in the Subordinate Sinking Fund Account the corresponding amounts required for the payment of mandatory sinking fund installments becoming due on such Subordinate Indebtedness.

(4) Any amount in the Subordinate Sinking Fund Account not applied in accordance with subsection (c) below to the purchase of Subordinate Indebtedness by the forty-fifth (45th) day prior to the next date on which such Subordinate Indebtedness is so redeemable shall be applied to the redemption of such Subordinate Indebtedness on such redemption date. Any amounts deposited in the Subordinate Sinking Fund Account and not applied within twelve (12) months of their date of deposit to the purchase or redemption of Subordinate Indebtedness (except if held in accordance with the section entitled "Discharge of Agreement" below) shall be transferred to the Subordinate Interest Account. The Subordinate Indebtedness to be purchased or redeemed

shall be selected by the Trustee in the manner provided in the section entitled "Selection of Bonds to be Redeemed" above. Amounts in the Subordinate Sinking Fund Account to be applied to the redemption of Subordinate Indebtedness shall be paid to the respective Trustee or Fiduciary on or before the redemption date and applied by them on such redemption date to the payment of the redemption price of the Subordinate Indebtedness being redeemed.

(c) Notwithstanding the provisions of this section, the Authority may, at any time but in no event less than forty-five (45) days prior to the date on which a mandatory sinking fund installment is scheduled to be due on Subordinate Indebtedness, direct the Trustee or Fiduciary to purchase, with money on deposit in the Subordinate Sinking Fund Account, at a price not in excess of par plus interest accrued and unpaid to the date of such purchase, term bonds to be redeemed on such date. At the direction of the Authority, any term bond so purchased may be cancelled upon receipt thereof by the Trustee or the Fiduciary and evidence of such cancellation shall be given to the Authority. The principal amount of each term bond so canceled shall be credited against the sinking fund installment due on such date as long as that such term bond is canceled by the Trustee or Fiduciary prior to the date on which notice of redemption is given.

(d) In the event the amount on deposit in the Subordinate Interest Account on any Interest Payment Date exceeds the amount required to pay interest on the Subordinate Indebtedness on such Interest Payment Date, the Authority shall, if the amount on deposit in any Subordinate Debt Service Reserve Account is less than the applicable Debt Service Reserve Requirement, instruct the Trustee to transfer such excess to such Subordinate Debt Service Reserve Account to the extent of such deficiency, and otherwise retain any remaining excess in the Subordinate Interest Account or instruct the Trustee to transfer any such remaining excess to the Subordinate Principal Account or Subordinate Sinking Fund Account to be credited against subsequent required deposits thereto, as determined by the Authority.

(e) In the event the amount on deposit in the Subordinate Principal Account or Subordinate Sinking Fund Account on any principal or mandatory redemption payment date exceeds the amount required on such date to pay Subordinate Indebtedness at maturity or pursuant to mandatory sinking fund requirements, the Authority shall, if the amount on deposit in any Subordinate Debt Service Reserve Account is less than the applicable Debt Service Reserve Requirement, instruct the Trustee to transfer such excess to such Subordinate Debt Service Reserve Account to the extent of such deficiency, and otherwise retain such excess in the Subordinate Principal Account or Subordinate Sinking Fund Account, as the case may be, or instruct the Trustee to transfer such excess to the Subordinate Interest Account to be credited against subsequent required deposits thereto, as determined by the Authority.

(f) In the event the balance on deposit in the Subordinate Principal Account, the Subordinate Sinking Fund Account or the Subordinate Interest Account is insufficient for the purposes thereof, the Trustee shall deposit in such Accounts such amounts as may be necessary therefor, after any transfers required under paragraph (f) of "Senior Bond Fund" and of "Senior Subordinate Bond Fund" above, first, from other legally available funds of the Authority not subject to the lien of the Trust Agreement; second, from the Surplus Fund; third, from the Commonwealth Payments Fund; fourth, from the Capital Improvement Fund; fifth, from the Operating Reserve Fund; sixth, from the Current Expense Fund and last, from the applicable Subordinate Debt Service Reserve Account pursuant to the section entitled "Subordinate Reserve Fund" below. (Section 5.07 of the Trust Agreement).

#### **Subordinate Reserve Fund.**

(a) In each month the Trustee shall deposit to each Account in the Subordinate Debt Service Reserve Fund (i) beginning on the first Business Day of such month, after making the deposits required by the Trust Agreement, an amount of Authority Revenues equal to (x) 1/60 of the amount (or such greater amount specified in the Supplemental Agreement authorizing such additional Subordinate Bonds), if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of an increase in the applicable Debt Service Reserve Requirement upon the issuance of additional Subordinate Bonds, and (y) except as provided in paragraph (c) below, 1/12 of the amount, if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of any other deficiency and (ii) the amount of proceeds of any Subordinate Bonds as required by the applicable Supplemental Agreement.



(b) Amounts in each Account in the Subordinate Debt Service Reserve Fund shall be used to pay debt service on the related Series of Subordinate Bonds on the dates such debt service is due when insufficient funds for that purpose are available in the Subordinate Bond Fund, after making any transfers pursuant to subsection (f) of the section entitled "Subordinate Bond Fund" above and all cash and investments in an Account in the Subordinate Debt Service Reserve Fund shall be used, together with other amounts available for such purpose under the Trust Agreement, to provide for payment in full of the related Series of Subordinate Bonds when the aggregate of such amounts is sufficient for such purpose. Amounts in each Account of the Subordinate Debt Service Reserve Fund shall be pledged to Holders of the Subordinate Bonds to which such Account relates. In no event shall amounts on deposit in the Senior Subordinate Debt Service Reserve Fund be used to pay principal of, interest on or any other amounts due with respect to Other System Indebtedness.

(c) In lieu of or in addition to cash or investments, at any time the Authority may cause to be deposited to the credit of any Subordinate Debt Service Reserve Account, a Debt Service Reserve Facility, in the stated amount equal to all or a portion of the applicable Debt Service Reserve Requirement, irrevocably payable to the Trustee, as beneficiary for the Holders of the Subordinate Bonds to which such Account relates. If (x) the Authority receives an expiration notice and the applicable Enhancement Facility Provider does not extend the expiration date of a Debt Service Reserve Facility, (y) the Authority receives notice of the termination of a Debt Service Reserve Facility, or (z) the Authority receives notice that the Enhancement Facility Provider of a Debt Service Reserve Facility no longer has the required credit rating, the Authority immediately shall (i) provide a substitute Debt Service Reserve Facility, (ii) deposit a sum equal to the applicable Debt Service Reserve Requirement to the credit of the Subordinate Debt Service Reserve Account to which such Debt Service Reserve Facility relates (A) in equal monthly installments over the next succeeding 12 months in the case of receipt of an expiration notice, (B) prior to the termination date in the case of receipt of a termination notice, or (C) immediately in the case of such reduction in credit rating, or (iii) instruct the Trustee to draw on such Debt Service Reserve Facility (A) 12 months prior to expiration of the Debt Service Reserve Facility in the case of receipt of an expiration notice, (B) prior to the termination date in the case of receipt of a termination notice, or (C) immediately in the case of such reduction in credit rating and deposit the proceeds of such drawing to the credit of the Subordinate Debt Service Reserve Account to which such Debt Service Reserve Facility relates.

If a disbursement is made pursuant to a Debt Service Reserve Facility, the Authority shall either (i) reinstate such Facility in full or (ii) deposit to the credit of the Subordinate Debt Service Reserve Account a sum equal to the amount of the disbursement made under such Facility in accordance with its provisions.

(d) On or within five days after each Reserve Determination Date, the Trustee shall determine whether the balance on deposit in each Subordinate Debt Service Reserve Account was, as of the Reserve Determination Date, at least equal to the applicable Debt Service Reserve Requirement. In making such determination, any obligations in a Subordinate Debt Service Reserve Account shall be valued in accordance with the section entitled "Investment of Funds" below.

In the event the amount on deposit in a Subordinate Debt Service Reserve Account exceeds the applicable Debt Service Reserve Requirement, the Trustee shall transfer such excess as directed by an Authorized Representative of the Authority, such direction to be accompanied by an Opinion of Bond Counsel that such transfer will not adversely affect the exclusion (if applicable) from gross income of interest on the respective Series of Subordinate Bonds to which such excess relates, (i) to the subaccount of the Subordinate Principal Account corresponding to such Series of Subordinate Bonds, or (ii) to fund the Operating Reserve Fund at the Operating Reserve Requirement, or (iii) to the Authority to be used to pay all or any portion of the Costs of Improvements designated by the Authority and approved by Bond Counsel. If an Authorized Representative of the Authority calls for a Reserve Determination Date in connection with the refunding and/or defeasance of a Series of Subordinate Bonds, then the Trustee is authorized to take such refunding and/or defeasance into account in valuing the Subordinate Debt Service Reserve Account securing such Series of Subordinate Bonds and is further authorized to apply the amount of any surplus arising from such valuation to reduce the amount of the refunding bonds and/or to provide for the refunding or defeasance of the Series of Subordinate Bonds in such manner as such Authorized Representative may direct.

(e) In connection with any issuance of Subordinate Bonds, the Authority may, in the applicable Supplemental Agreement, provide that no deposit to the Subordinate Debt Service Reserve Fund shall be

made for or with respect to such additional Subordinate Bonds, in which case: (i) the lien of and pledge on the Subordinate Debt Service Reserve Fund shall not extend to or be for the benefit of the Holders of such Subordinate Bonds, and (ii) the Annual Debt Service on such Subordinate Bonds shall not be taken into account in determining the applicable Debt Service Reserve Requirement.

In the event that a Supplemental Agreement so provides, then such Supplemental Agreement may also provide for the creation of a special reserve account solely for the Subordinate Bonds to which such Supplemental Agreement relates, separate from the Subordinate Debt Service Reserve Fund, and may provide for the deposit therein, at the time of issuance or from time to time thereafter, of an amount specified in the applicable Supplemental Agreement as the required reserve for such Subordinate Bonds, or may require the Authority to deposit to the credit of such special reserve account a Debt Service Reserve Facility to enhance the security for such Subordinate Bonds in lieu of a funded reserve account. (Section 5.08 of the Trust Agreement).

#### **Current Expense Fund.**

(a) In accordance with the provisions of the Trust Agreement, beginning on the first Business Day of the month and after making the deposits required by the Trust Agreement, the Trustee shall transfer to the Current Expense Fund, Authority Revenues in an amount equal to the amount set forth in the Disbursement Schedule delivered on the most recent Deposit Date to pay Current Expenses of the Systems for the current and each of the next two succeeding months.

(b) Amounts on deposit in the Current Expense Fund shall be available (i) to pay Current Expenses and (ii) subject to the provisions of the Trust Agreement, to satisfy any deficiencies in the Debt Service Reserve Funds to the extent that moneys on deposit in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund are insufficient to make the required interest and principal payments, prior to any withdrawal from the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund. In accordance with the provisions of the Trust Agreement, in the event that amounts on deposit in the Current Expense Fund are transferred to pay a termination payment or to fund a deficiency in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund, the Trustee shall provide notice of such transfer to the Consulting Engineer, any other Consultants identified by the Authority, if any, and to Government Development Bank. (Section 5.09 of the Trust Agreement).

#### **Operating Reserve Fund.**

(a) In accordance with the provisions of the Trust Agreement relating to Disposition of Authority Revenues, beginning on the first Business Day of the month and after making the deposits required by the Trust Agreement, the Trustee shall transfer to the credit of the Operating Reserve Fund, an amount of Authority Revenues equal to that which is necessary to make the balance on deposit therein equal to the Operating Reserve Requirement and to pay interest on and reimbursement obligations due with respect to an Operating Reserve Facility. Earnings on moneys held in the Operating Reserve Fund shall be retained therein.

(b) Amounts on deposit in the Operating Reserve Fund shall be available (i) to be requisitioned by the Authority to pay Current Expenses, (ii) to pay any termination payment due under a Qualified Swap or Hedge Agreement, (iii) to pay interest or any reimbursement obligation due with respect to an Operating Reserve Facility, and (iv) subject to certain provisions of the Trust Agreement, to satisfy any deficiencies in the Debt Service Reserve Funds to the extent that moneys on deposit in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund are insufficient to make the required interest and principal payments, prior to any withdrawal from the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund. In accordance with the provisions of the Trust Agreement, in the event that (i) there is no deposit required to be made to the Commonwealth Payments Fund and (ii) amounts on deposit in the Operating Reserve Fund are transferred to pay a termination payment or to fund a deficiency in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund, the Trustee shall provide notice of such transfer to the Consulting Engineer, other Consultants, if any, and to Government Development Bank for Puerto Rico.

(c) In lieu of or in addition to cash or investments, at any time the Authority may cause to be deposited to the credit of the Operating Reserve Fund, an Operating Reserve Facility, in the stated amount equal to all or a portion of the applicable Operating Reserve Requirement. Any withdrawals from the Operating Reserve Fund made in accordance with the above paragraph (b), shall be made first from any cash or investments on deposit therein and then, to the extent no such cash or investments are available, from a draw on any Operating Reserve Facility. If at any time an Operating Reserve Facility shall have a term of less than one year remaining, the Authority shall deposit from Authority Revenues to the credit of the Operating Reserve Fund until the Operative Reserve Requirement is satisfied.

(d) For so long as the provisions of subsection (a) of the section entitled “Other Remedies; Rights of Bondholders” below remain in effect, from the time during any Fiscal Year at which aggregate Current Expenses for such year exceed the amount therefor set forth in the applicable Annual Budget, each requisition from the Operating Reserve Fund must be approved in writing by the Consulting Engineer. (Section 5.10 of the Trust Agreement).

### **Capital Improvement Fund.**

(a) There shall be credited to the Capital Improvement Fund (i) beginning on the first Business Day of the month and after making the deposits required by the Trust Agreement, an amount of Authority Revenues equal to that which may be necessary to make the balance on deposit therein equal to the Capital Improvement Fund Requirement for the Fiscal Year as set forth in the applicable Annual Budget in equal monthly deposits over such Fiscal Year, (ii) the proceeds of any condemnation awards, (iii) proceeds of insurance (other than use and occupancy insurance), (iv) the proceeds of sales of property constituting a part of the Systems and (v) the proceeds of any termination or similar payment received by the Authority under any interest rate swap or similar hedge agreement. Earnings on moneys held in the Capital Improvement Fund shall be retained therein.

(b) Amounts on deposit in the Capital Improvement Fund shall be available (i) to pay or reimburse the Authority for Costs of Improvements, such Costs of Improvements to be paid in accordance with the procedures established in the Trust Agreement and (ii) subject to certain provisions of the Trust Agreement, to the extent that moneys on deposit in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund are insufficient to make the required interest and principal payments on Bonds prior to any withdrawal from the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund, to satisfy any such deficiencies. (Section 5.11 of the Trust Agreement).

### **Commonwealth Payments Fund.**

(a) There shall be credited to the Commonwealth Guaranteed Indebtedness Account (i) any Authority Revenues received by the Authority from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness and (ii) beginning on the first Business Day of the month and after making the deposits required by the Trust Agreement an amount of Authority Revenues sufficient to pay:

(i) the Interest Accrual on Commonwealth Guaranteed Indebtedness in respect of the next Interest Payment Date; provided, however, that such deposits shall be adjusted to give credit for any other available money then in such account or otherwise available and designated to be used for such purpose; and

(ii) the Principal Accrual on Commonwealth Guaranteed Indebtedness in respect of the next principal payment date; provided, however, that such deposits shall be adjusted to give credit for any other available money then in such account or otherwise available and designated to be used for such purpose.

(b) There shall be credited to the Commonwealth Supported Obligations Account (i) any Authority Revenues received by the Authority from the Commonwealth of Puerto Rico on account of Commonwealth Supported Obligations and (ii) after the deposits required by paragraph (a) have been made in full, beginning on the first Business Day of the month and after making the deposits required by the Trust Agreement an amount of Authority Revenues sufficient to pay:

(i) the Interest Accrual on Commonwealth Supported Obligations in respect of the next Interest Payment Date; provided, however, that such deposits shall be adjusted to give credit for any other available money then in such account or otherwise available and designated to be used for such purpose; and

(ii) the Principal Accrual on Commonwealth Supported Obligations in respect of the next principal payment date; provided, however, that such deposits shall be adjusted to give credit for any other available money then in such account or otherwise available and designated to be used for such purpose.

(c) Amounts on deposit in the Commonwealth Guaranteed Indebtedness Account and Commonwealth Supported Obligations Account within the Commonwealth Payments Fund will be transferred by the Trustee to the respective Fiduciaries therefor not later than one (1) Business Day prior to the applicable interest or principal payment date; provided, however, to the extent that moneys on deposit in the Commonwealth Guaranteed Indebtedness Account are insufficient to make the required interest and principal payments on Commonwealth Guaranteed Indebtedness, moneys in the Commonwealth Supported Obligations Account (other than amounts received from the Commonwealth of Puerto Rico to pay principal or interest on Commonwealth Supported Obligations) shall be used to satisfy any such deficiency.

(d) (1) Amounts on deposit in the Commonwealth Payments Fund, excluding Authority Revenues received from the Commonwealth to pay bonds, shall be available to replenish any deficiencies in the Operating Reserve Fund, including any payments with respect to any Operating Reserve Facility or to pay any amounts due under any other operating line of credit of the Authority.

(2) Subject to certain provisions of the Trust Agreement, to the extent that moneys on deposit in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund are insufficient to make the required interest and principal payments on Bonds, moneys in the Commonwealth Supported Obligations Account (other than Authority Revenues received from the Commonwealth of Puerto Rico to pay principal or interest on Commonwealth Supported Obligations) and in the Commonwealth Guaranteed Indebtedness Account (other than Authority Revenues received from the Commonwealth of Puerto Rico to pay principal or interest on Commonwealth Guaranteed Indebtedness) shall be used, in that order of priority, prior to any withdrawal from the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund, to satisfy any such deficiencies.

(e) Authority Revenues received by the Authority from the Commonwealth of Puerto Rico to pay principal or interest when due on Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations shall be used only for such purpose. Any Authority Revenues received from the Commonwealth of Puerto Rico by the Authority which represents a reimbursement for principal or interest previously paid by the Authority on Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations shall be transferred to the Surplus Fund for application in accordance with the section entitled "Surplus Fund" below.

(f) If the amounts so deposited on or before any Deposit Date to the credit of the foregoing Accounts in the Commonwealth Payment Fund shall be less than the respective required amounts for such month, the Trustee shall provide notice of such insufficiency to the 1995 Resolution Trustee, the Consulting Engineer, other Consultants, if any, and to Government Development Bank for Puerto Rico.

(g) On each September 15 and February 15 and at any other time requested by the 1995 Resolution Trustee, the Trustee shall provide the 1995 Resolution Trustee with the respective amounts on deposit in each of the accounts within the Commonwealth Payments Fund.

(h) At the request of the Fiduciary for any Commonwealth Supported Obligations, the Trustee shall provide such trustee with the amount on deposit in the Commonwealth Supported Obligations Account. (Section 5.12 of the Trust Agreement).

## **Surplus Fund.**

(a) After all the deposits as described in “Flow of Funds” in the front section of this Official Statement have been made in accordance with the provisions of the Trust Agreement relating to Disposition of Operating Revenues and Authority Revenues, any remaining moneys shall be deposited to the credit of the Surplus Fund.

(b) From the amounts deposited in the Surplus Fund, there shall be credited to the Rate Stabilization Account, an amount equal to one twelfth (1/12) of the amount, if any, necessary to fund the Rate Stabilization Account at the amount set forth in the applicable Annual Budget.

(c) At any time the Authority may direct the Trustee to withdraw amounts on deposit in the Rate Stabilization Account and (i) transfer such amounts to any other Fund or Account established under the Trust Agreement, (ii) use such amounts to purchase or redeem Indebtedness, or (iii) use such amounts to otherwise provide for the payment of Indebtedness and interest thereon. Subject to certain provisions of the Trust Agreement, to the extent that moneys on deposit in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund are insufficient to make the required interest and principal payments on Bonds, moneys in the Rate Stabilization Account shall be used prior to any withdrawal from the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund, to satisfy any such deficiencies.

(d) Subject to certain provisions of the Trust Agreement, to the extent that moneys on deposit in the Senior Bond Fund, the Senior Subordinate Bond Fund or the Subordinate Bond Fund are insufficient to make the required interest and principal payments on Bonds, moneys in the Surplus Fund shall be used prior to any withdrawal from the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund, to satisfy any such deficiencies.

(e) At such time as all purposes described in paragraphs (a) through (d) above of this section are satisfied, amounts remaining to the credit of the Surplus Fund may be applied to any lawful purpose of the Authority, including the payment of principal of and interest on any Operating Reserve Facility issued by Government Development Bank for Puerto Rico.

(f) On each September 15 and February 15 and at any other such time requested by the 1995 Resolution Trustee, the Trustee shall provide the 1995 Resolution Trustee with the respective amounts on deposit in each of the accounts within the Surplus Fund.

(g) At the request of the Fiduciary for any Commonwealth Supported Obligations, the Trustee shall provide such trustee with the amount on deposit in the Surplus Fund. (Section 5.13 of the Trust Agreement).

## **Investment of Funds.**

(a) Any moneys held to the credit of the Construction Fund shall be invested or reinvested by the Trustee as directed by the Authority in Investment Obligations that shall mature, or that shall be subject to redemption by the holder thereof at the option of such holder, not later than the respective dates when moneys held for the credit of said Account will be required for the purposes intended. The Authority shall give written directions to the Trustee, specifying the maturity date, interest rate, principal amount and the nature of such investments. Prior to the filing of a certificate of completion related to Improvements, all earnings on moneys held in the Construction Fund related to such Improvements shall be retained therein. Subsequent to the filing of such certificate of completion, the Trustee shall (i) deposit any remaining proceeds of Senior Bonds or investment earnings thereon to the related subaccount of the Senior Interest Account of the Senior Bond Fund, (ii) deposit any remaining proceeds of Senior Subordinate Bonds or investment earnings thereon to the related subaccount of the Senior Subordinate Interest Account of the Senior Subordinate Bond Fund, and (iii) deposit any remaining proceeds of Subordinate Bonds or investment earnings thereon in the Construction Fund to the related subaccount of the Subordinate Bond

Fund. The Authority shall direct the investment of amounts held in the Construction Account, and such investments shall have maturities consonant with the need for funds as estimated by the Authority.

(b) Any moneys held to the credit of the Senior Bond Fund, Senior Subordinate Bond Fund, the Subordinate Bond Fund or the Commonwealth Payments Fund, shall be invested or reinvested by the Trustee as directed by the Authority in Investment Obligations that shall mature, or that shall be subject to redemption by the holder thereof at the option of such holder, not later than the respective dates when moneys held for the credit of said Accounts will be required for the purposes intended. The Authority shall give written directions to the Trustee, specifying the maturity date, interest rate, principal amount and nature of such investments. Earnings on moneys held in any Account in a Bond Fund shall be transferred when received to the related subaccount of the Interest Account of such Bond Fund and earnings on moneys held in the Commonwealth Payments Fund shall be retained therein.

(c) Any moneys held as part of the Operating Revenue Fund, the Operating Reserve Fund, the Capital Improvement Fund and the Surplus Fund, shall be invested and reinvested by the Trustee as directed by the Authority in Investment Obligations that shall mature, or that shall be subject to redemption by the holder thereof at the option of such holder, not later than the respective dates when moneys held for the credit of said Accounts will be required for the purposes intended.

(d) Any moneys held as part of the Current Expense Fund shall be invested or reinvested by the Authority in Investment Obligations that shall mature, or that shall be subject to redemption by the holder thereof at the option of such holder, not later than the respective dates when moneys held for the credit of said Fund will be required for the purposes intended. Earnings on moneys held in the Current Expense Fund shall be retained therein.

(e) Any moneys held as part of the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund or the Subordinate Debt Service Reserve Fund shall be invested or reinvested by the Trustee as directed by the Authority in Investment Obligations that shall mature, or that shall be subject to redemption by the holder thereof at the option of such holder, not later than the respective dates when moneys held for the credit of said Accounts will be required for the purposes intended. Earnings on moneys held in any Account in a Debt Service Reserve Account shall be retained therein.

(f) In computing the amount in any Fund or Account created by the Trust Agreement, except for the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund, obligations purchased as an investment of moneys therein shall be valued at the lower of market value and the amortized value thereof. Amortized value, when used with respect to an obligation purchased at par, means the par amount thereof, and, when used with respect to an obligation purchased at a premium above or a discount below par, means the value as of any given time obtained by dividing the total premium or discount at which such obligation was purchased by the number of interest payments remaining on such obligation after such purchase and deducting the amount thus calculated for each Interest Payment Date after such purchase from the purchase price in the case of an obligation purchased at a premium and adding the amount thus calculated for each Interest Payment Date after such purchase to the purchase price in the case of an obligation purchased at a discount. Except as set forth in the following sentence, valuations shall be made by the party holding each such Fund or Account at least annually not later than the end of each Fiscal Year and at such other times as the Authority may deem appropriate. Investments in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund shall be valued at least semiannually at the fair market value thereof, plus accrued interest. In computing the value of the assets of any Fund or Account established under the Trust Agreement, investments and accrued interest thereon shall be deemed a part thereof.

(g) For the purposes of this section, each investment agreement shall be valued at par if amounts thereunder may be withdrawn without penalty in accordance with the terms thereof.

(h) The Trustee may sell or redeem any obligation in which moneys shall have been invested as provided in the Trust Agreement to the extent necessary to provide cash in the respective funds or accounts, to make any payments required to be made therefrom or to facilitate the transfers of money between various funds and accounts as may be required or permitted from time to time pursuant to the provisions of the Trust Agreement.

(i) Notwithstanding provisions in the Trust Agreement for transfer to or holding in particular funds and accounts amounts received or held by the Trustee under the Trust Agreement, investments in any and all funds and accounts created by the Trust Agreement may be commingled (except amounts held in any arbitrage rebate fund), provided that, notwithstanding any such commingling, the Trustee shall at all times account for such investments in the funds and accounts to which they are credited and otherwise as provided in the Trust Agreement.

(j) The Authority, each Qualified Depository and the Trustee shall not be liable for any depreciation in the value of any investments held in the funds or accounts created by the Trust Agreement, or for any loss arising from any investment permitted by the Trust Agreement. The investments authorized by the Trust Agreement shall at all times be subject to the provisions of applicable law, as amended from time to time. In the event that the Authority, upon the written opinion of Bond Counsel, addressed to the Trustee and the Authority, is of the opinion that it is necessary to restrict or limit the yield on the investment of any money or securities held in any fund in order to avoid the Bonds being considered “arbitrage bonds” within the meaning of Section 148 of the Code, the Authority may direct the Trustee in writing to take whatever action is necessary to properly restrict or limit the yield on such investment in accordance with such instructions, in which event the Trustee shall follow such directions. If the Trustee has not received directions from the Authority on how to invest any of the Funds and Accounts established under the Trust Agreement, the Trustee shall invest the moneys in such Funds and Accounts in Government Obligations. (Section 6.01 of the Trust Agreement).

### **Annual Budget and Disbursement Schedule**

(a) Before the beginning of each Fiscal Year, (i) the Authority shall adopt a budget for the operation of the Systems for the ensuing Fiscal Year, which budget shall be called the Annual Budget and (ii) the chief financial officer of the Authority shall prepare a certified Disbursement Schedule for the payment of Current Expenses for the ensuing Fiscal Year.

(b) The Authority covenants that on or before April 15 of each year, it will cause a preliminary Annual Budget and a preliminary Disbursement Schedule to be prepared and delivered to the Consulting Engineer and Government Development Bank. Within forty-five (45) days of receipt of the preliminary budget and Disbursement Schedule, the Consulting Engineer shall deliver to the Authority and the Government Development Bank for Puerto Rico any comments thereon.

(c) The Authority covenants that on or before June 30th of each year it will cause to be adopted a final Annual Budget and prepared a final Disbursement Schedule for the ensuing Fiscal Year and that it will file such budget and schedule with the Trustee, the Government Development Bank and the Consulting Engineer.

(d) Each Annual Budget shall be prepared in such manner as to show in reasonable detail (1) Authority Revenues estimated to be received during such Fiscal Year, (2) the amount of Annual Debt Service that will become due during such Fiscal Year, (3) the amount, if any, required to be deposited in the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund to make the amount on deposit in each respective Account therein equal to the applicable Debt Service Reserve Requirement (provided that such Accounts will be deemed to be funded at the applicable Debt Service Reserve Requirement so long as the deposits to the Senior Debt Service Reserve Fund, the Senior Subordinate Debt Service Reserve Fund and the Subordinate Debt Service Reserve Fund as required by the Trust Agreement are being made), (4) the Current Expenses expected to be incurred during such Fiscal Year (calculated on an accrual basis), (5) the amount, if any, required to be deposited in the Operating Reserve Fund to make the amount on deposit therein equal to the amount of the Operating Reserve Requirement, (6) the amount, if any, required to be deposited in the Capital Improvement Fund, (7) the amount, if any, required to be deposited in the Rate Stabilization Account of the Surplus Fund, and (8) the amount of Operating Revenues and Authority Revenues that will be sufficient to meet the Rate Covenant required pursuant to the Trust Agreement for such Fiscal Year. The Annual Budget shall be prepared in sufficient detail to show also the amounts to be deposited in the various funds, accounts and subaccounts created by or under the Trust Agreement or funds and accounts otherwise required to be maintained on behalf of the Systems.

(e) Each annual Disbursement Schedule shall be prepared in such manner as to show in reasonable detail, the Current Expenses expected to be incurred during such Fiscal Year (calculated on a cash basis), including (i) all cash disbursements contained in the Annual Budget for the Fiscal Year, (ii) expenses that may have accrued in prior years and are expected to be paid in the current Fiscal Year, (iii) amounts that are necessary to pay for or result from an emergency condition, (iv) amounts that are necessary to pay judgments or otherwise result from the settlement of litigation, (v) project expenditures that the Authority had determined to capitalize, (vi) amounts that are necessary to be advanced for Costs of Improvements and (vii) other similar disbursements.

(f) On or before each Deposit Date, the chief financial officer shall revise the Disbursement Schedule and deliver a certified copy of such revised Disbursement Schedule to the Trustee and the Government Development Bank, which schedule shall include the information required by paragraph (b) of the section entitled "Accounts and Records" below.

(g) The Authority may amend the Annual Budget at any time during the Fiscal Year and any amendment which decreases Operating Revenues by 5% or more in the aggregate for such Fiscal Year shall be accompanied by a report of the Consulting Engineer. A copy of each amendment to the Annual Budget shall be filed promptly with the Trustee and the Consulting Engineer.

(h) If for any reason an Annual Budget is not adopted by the time required by subsection (c) of this section, the last previously adopted Annual Budget shall be deemed to provide for and regulate and control expenditures during each subsequent Fiscal Year until an Annual Budget for such Fiscal Year has been adopted.

(i) If for any reason a Disbursement Schedule is not delivered by the time required by subsection (c) or (f) of this Section, the last previously certified Disbursement Schedule shall be deemed to provide for cash expenditures during the current and subsequent months until a certified revised Disbursement Schedule has been delivered.

(j) Upon the occurrence and continuance of an Event of Default (other than an Event of Default specified in subsection (f) of the section entitled "Events of Default" below) and until delivery of the documents set forth in subsection (b) of the section entitled "Other Remedies; Rights of Bondholders" below, the Authority shall prepare and deliver to the Trustee a Disbursement Schedule which sets forth on a monthly cash basis the operating and maintenance expenses of the Systems, which Disbursement Schedule must be approved by the Consulting Engineer. (Section 7.02 of the Trust Agreement).

### **Construction of Improvements.**

The Authority covenants that it will construct or cause the construction of Improvements reasonable and desirable for the operation of the Systems in a safe, and efficient manner, and that upon the completion of any Improvements, the Authority will operate and maintain or cause the operation and maintenance of the Improvements as part of the Systems. If deemed advisable by the Authority, the Consulting Engineer shall review any plans and specifications for the Improvements and such construction shall proceed only after the Consulting Engineer approves the plans and specifications. (Section 7.04 of the Trust Agreement).

### **Maintenance of the Systems.**

The Authority further covenants that it will establish and enforce reasonable rules and regulations governing the use of the Systems and the operation thereof, that all compensation, salaries, fees and wages paid by it in connection with the maintenance, repair and operation of said Systems will be reasonable, that no more persons will be employed by it than are necessary, that it will operate said Systems or cause the Systems to be operated in a reasonable efficient and economical manner, that it will at all times maintain said Systems or cause said Systems to be maintained in good repair and in sound operating condition and will make or cause to be made all necessary repairs, renewals and replacements, and that it will comply and cause compliance with all valid acts, rules, regulations, orders and directions of any legislative, executive, administrative or judicial body applicable to said Systems, except to the extent that such non-compliance does not result in a material adverse effect or has not



otherwise been provided for as an operational contingency and the Authority is exercising commercially reasonable efforts to comply therewith. The Authority may transfer, to the extent permitted by law and the section entitled “No Sale, Lease, or Encumbrances; Exception” below, the day-to-day operations of the Systems to another entity or any program that would be carried out by the Authority; as long as the Authority shall cause such other entity to undertake such operations or programs so that the Authority does not violate the terms of the Trust Agreement and so that the Authority is not rendered unable to observe its covenants under the Trust Agreement. (Section 7.05 of the Trust Agreement).

#### **Payment of Lawful Charges.**

The Authority further covenants that, from the Authority Revenues, it will pay all municipal or other governmental charges lawfully levied or assessed upon the Systems or any part thereof or upon any Authority Revenues when the same shall become due, that it will not create or suffer to be created any lien or charge upon the Systems or any part thereof or upon the Authority Revenues ranking equally with or prior to the Indebtedness, except to the extent and in the manner otherwise permitted in the Trust Agreement, and that, from the Authority Revenues, it will pay or cause to be discharged, or will make adequate provision to satisfy and discharge, within sixty (60) days after the same shall accrue, all lawful claims and demands for labor, materials, supplies or other objects which, if unpaid might by law become a lien upon the Systems or any part thereof or the Authority Revenues; provided, however, that nothing contained in this section shall require (i) the Authority to pay or cause to be discharged, or make provision for, any such lien or charge so long as the validity thereof shall be contested in good faith and by appropriate legal proceedings or (ii) Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations to be used for any purpose other than those specified in the section entitled “Commonwealth Payments Fund” above. (Section 7.06 of the Trust Agreement).

#### **Retention of Consulting Engineer and Other Consultants.**

Unless the Senior Bonds shall have been rated investment grade by at least two Rating Agencies for twenty-four (24) consecutive months, the Authority covenants and agrees that it will, for the purpose of performing and carrying out the duties imposed on the Consulting Engineer and other Consultants by this section, retain the Consulting Engineer and other Consultants. Except for fees and expenses incurred in connection with the issuance of Indebtedness or the construction of Improvements, the cost of retaining the Consulting Engineer and other Consultants shall be treated as a part of Current Expenses.

It shall be the duty of the Consulting Engineer to prepare and file reports with the Authority and the Trustee, no later than thirty (30) days after receipt of the Annual Budget, setting forth the following:

(a) the recommendations of the Consulting Engineer as to the proper maintenance, repair and operation of the Systems during the ensuing Fiscal Year, and an estimate of the amounts of money necessary for such purposes;

(b) the recommendations of the Consulting Engineer as to the amount that should be deposited in each month during the ensuing Fiscal Year to the credit of the Capital Improvement Fund;

(c) the recommendations of the Consulting Engineer as to the Improvements which should be made during the ensuing Fiscal Year, and an estimate of the amounts of money necessary for such purposes, showing separately (i) the amount to be expended during such Fiscal Year from moneys to the credit of the Capital Improvement Fund, and the Surplus Fund (ii) the amount to be expended during such Fiscal Year from the proceeds of Bonds and other Indebtedness;

(d) the recommendations of other Consultants retained by or relied upon by the Consulting Engineer as to the insurance to be carried under the provisions as set forth in the section entitled “Insurance” below;

(e) a statement by the Consulting Engineer of the cost of all additions made to the Systems and of the cost (if the cost cannot be accurately determined, the estimated cost) of all retirements of property made in such Fiscal Year;

(f) a report of the Consulting Engineer (which may retain other Consultants as necessary) as to the adequacy of existing rates and charges for purposes of the Rate Covenant as described under "Rate Covenant" in the front section of this Official Statement for the then current Fiscal Year to date and recommendations as to any necessary or advisable revisions of rates and charges and such other advices and recommendations as they may deem desirable; and

(g) the findings of the Consulting Engineer whether the properties of the Systems have been maintained in good repair and sound operating condition, and their estimate of the amount, if any, required to be expended to place such properties in such condition and the details of such expenditures and the approximate time required therefor.

The Authority further covenants that the Consulting Engineer and other Consultants shall at all times have free access to all properties of the Systems and every part thereof for the purposes of inspection and examination, and that its books, records and accounts may be examined by the Consulting Engineer and other Consultants at all reasonable times. (Section 7.07 of the Trust Agreement).

### **Insurance.**

The Authority covenants that it will at all times carry or cause to be carried insurance, with a responsible insurance company or companies, approved by an Insurance Consultant, authorized and qualified under the laws of the Commonwealth of Puerto Rico to assume the risk thereof, covering such properties belonging to the Systems as are customarily insured, and against loss or damage from such causes as are customarily insured against, by the Authority in its insurance program. The Authority shall employ an Insurance Consultant to review the insurance program of the Authority from time to time (but not less frequently than biennially). If the Insurance Consultant makes recommendations for the increase of any coverage, the Authority shall increase or cause to be increased such coverage in accordance with such recommendations, subject to a good faith determination of the Authority that such recommendations, in whole or in part, are in the best interests of the Authority. Notwithstanding anything in this section to the contrary, the Authority shall have the right, without giving rise to an Event of Default, solely on such account, (i) to maintain insurance coverage below that most recently recommended by Insurance Consultant, if the Authority furnishes to the Trustee a report of the Insurance Consultant to the effect that the issuance so provided, affords either the greatest amount of coverage available for the risk being insured against at rates which in the judgment of the Insurance Consultant are reasonable in connection with reasonable and appropriate risk management.

All insurance policies shall be to the extent practicable for the benefit of the Authority, the Trustee and other interested parties, as their interests may appear, shall be made payable to the Authority or other owners of portions of the Systems, and shall be deposited with the Authority or other officer of the Board designated for said purpose. The proceeds of any and all such insurance shall be deposited by the Authority in the name of the Authority with a Qualified Depositary.

The Authority covenants that, immediately after any loss or damage to any properties of the Systems resulting from any cause, whether or not such loss or damage shall be covered by insurance, it will cause its engineers to prepare plans and specifications for repairing, replacing or reconstructing (either in accordance with the original or a different design) the damaged or destroyed property, and that it will forthwith commence or cause to be commenced and diligently prosecute or cause to be diligently prosecuted the repair, replacement or reconstruction of the damaged or destroyed property unless it shall determine that the repair, replacement or reconstruction of such property is not essential to the efficient operation of the Systems, in which case the proceeds of insurance shall be deposited in the Capital Improvement Fund.

Except as provided in the foregoing paragraph, the proceeds of all insurance referred to in this section shall be available for, and shall to the extent necessary be applied to, the repair, replacement or reconstruction of the damaged or destroyed property, and shall be paid out in such manner provided above for

payments from the Construction Fund. If such proceeds are more than sufficient for such purpose, the balance remaining shall be deposited to the credit of the Capital Improvement Fund. If such proceeds shall be insufficient for such purpose, the deficiency may be supplied out of moneys in the Capital Improvement Fund.

Notwithstanding the foregoing provisions of this section, the Authority may institute a self-insurance program with regard to such risks as shall be consistent with the practices of utilities operating in a manner similar to the Systems as shall be approved by a Consultant. (Section 7.08 of the Trust Agreement).

### **Insurance Policies.**

Within the first ninety (90) days of each Fiscal Year the Authority shall mail to the Trustee and the Consulting Engineer a schedule of all insurance policies referred to in the section entitled "Insurance" above which are then in effect, stating with respect to each policy the name of the insurer, the amount, number and expiration date, and the hazards and risks covered thereby. All insurance policies shall be open to the inspection of the Holders of Bonds and their representatives at all reasonable times. The Authority is authorized to demand, collect, sue and receipt for any insurance money which may become due and payable under any policies payable to the Authority. (Section 7.09 of the Trust Agreement).

### **Protection of Security; No Impairment.**

(a) The Authority Revenues and other moneys, securities and funds pledged under the Trust Agreement are and will be free and clear of any pledge, lien, charge or encumbrance thereon or with respect thereto prior to, or of equal rank with, the pledge created by the Trust Agreement, except as otherwise expressly provided in the Trust Agreement, and all action on the part of the Authority to that end has been duly and validly taken. The Bonds are and will be valid and legally enforceable obligations of the Authority in accordance with their terms and the terms of the Trust Agreement. The Authority shall at all times, to the extent permitted by law, defend, preserve and protect the pledge of the Authority Revenues and other moneys, securities and funds pledged under the Trust Agreement and each Supplemental Agreement and all the rights of the holders of Indebtedness to the Trust Agreement against all claims and demands of all persons whomsoever. In no event shall Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations be subject to the lien of the Trust Agreement or be used for any purpose other than those specified in the section entitled "Commonwealth Payments Fund" above.

(b) The Authority further covenants and agrees that, so long as any Indebtedness shall be Outstanding, none of the Authority Revenues will be used for any purpose other than as provided in the Trust Agreement, and that no contract or contracts will be entered into or any action taken by which the rights of the Trustee or of the Holders might be impaired or diminished. Any resolution adopted by the Board authorizing the issuance of a Series of Bonds or any Supplemental Agreement executed by the Authority for such purpose shall, for all purposes, be deemed part of the Trust Agreement and shall constitute a contract for the benefit of the Holders of said Series. The Trust Agreement and any such resolution may be supplemented and amended only in accordance with the provisions relating to Supplemental Agreements in the Trust Agreement, except for supplements and amendments adopted prior to the issuance of the applicable Series of Bonds, which may be adopted without restriction. (Section 7.10 of the Trust Agreement).

### **Accounts and Records.**

(a) The Authority further covenants that its accounts will be kept according to standard practices for public utility systems similar to the properties and business of the Authority and applicable in such circumstances, and in such manner as appropriate to segregate, insofar as advisable, the accounts in respect of the different classes of its operations, projects, undertakings and activities, that it will keep accurate records and accounts of all items of cost and expenditures relating to the Systems and to each integral unit of said Systems, the Authority Revenues and the application of such Authority Revenues, and the number of consumers, and that it will keep such records and accounts with respect to the physical properties comprising part of the Systems in such manner that it will be possible at all times to identify both the amounts and the items of all additions and retirements.

(b) The Authority further covenants that on or before each Deposit Date, it shall provide to the Trustee, the Consulting Engineer, other Consultants, if any, and Government Development Bank for Puerto Rico as part of the Disbursement Schedule required to be delivered pursuant to paragraph (f) of the section entitled “Annual Budget and Disbursement Schedule” above (i) for the period commencing on the prior Deposit Date to the Business Day prior to such current Deposit Date a statement of (x) Authority Revenues, (y) cash payments for operating and maintenance expenses, and proceeds from the sale of property or other extraordinary revenue items (to the extent not included in Authority Revenues) and (ii) a reconciliation of Authority Revenues and cash payments for operating and maintenance expenses to Current Expenses and Operating Revenues for the monthly period ending on the preceding Deposit Date and Fiscal Year-to-date period through such preceding Deposit Date.

(c) The Authority further covenants that in the first month of each Fiscal Year it will cause an audit to be made of its books and accounts relating to the Systems by an independent firm of certified public accountants of suitable experience and responsibility to be chosen by the Executive President. Before the first day of the sixth month following the making of such audit, reports of such audits shall be filed with the Trustee and the Authority, and copies of such reports shall be mailed to the Consulting Engineer and the other Consultants. Such audit reports shall set forth in respect of the preceding Fiscal Year the same matters as are required above for the monthly reports, the findings of such public accountants as to whether the moneys received by the Authority under the provisions of the Trust Agreement during such Fiscal Year or portion of such Fiscal Year for which Bonds have been issued and Outstanding under the Trust Agreement have been applied in accordance with the provisions of the Trust Agreement, whether any obligations for Current Expenses were incurred in the preceding Fiscal Year or portion of such Fiscal Year for which Bonds have been issued and Outstanding under the Trust Agreement, whether the Authority Revenues for the preceding Fiscal Year or portion of such Fiscal Year for which Bonds have been issued and Outstanding under the Trust Agreement, have exceeded or were less than the amount for such Fiscal Year or such portion thereof required pursuant to Rate Covenant as described under “Rate Covenant” in the front section of this Official Statement and whether the Authority is in default in the performance of any of the other covenants contained in the provisions as set forth in the Trust Agreement.

(d) The Authority further covenants that it will cause any additional reports or audits relating to the Systems to be made as required by law and by any applicable rules or regulations of any governmental authority or of any securities exchange on which the Bonds may be listed or traded, and that, as often as may be requested, it will furnish to the Trustee such other information concerning said Systems or the operation thereof as any of them may reasonably request.

(e) The cost of such audits shall be treated as a part of Current Expenses. (Section 7.11 of the Trust Agreement).

#### **No Sale, Lease, or Encumbrances; Exceptions.**

Except as expressly permitted in the Trust Agreement, the Authority irrevocably covenants, binds, and obligates itself not to sell, lease, encumber, or in any manner dispose of the Systems as a whole or in part until all of the Indebtedness and all interest thereon shall have been paid in full or provision for such payment has been duly made in accordance with the section entitled “Discharge of Agreement” below. The Authority shall have and reserves the right, however, to sell, lease, or otherwise dispose of any of the property comprising a part of the Systems in the following manner, if any one of the following conditions exists: (i) such property is not necessary for the operation of the Systems; (ii) such property is not useful in the operation of the Systems; (iii) such property is not profitable in the operation of the Systems; or (iv) the disposition of such property will be advantageous to the Systems and will not adversely affect the security for the Bondholders. All proceeds of any such sale shall be deposited in the Capital Improvement Fund.

Prior to the sale or lease of assets constituting in excess of 3% of the net assets on the Authority’s most recent audited balance sheet to an entity other than a political subdivision, authority or agency of the Commonwealth the Authority shall:

(i) obtain a written report of the Consultant, describing the financial impact of any such sale or lease on the Authority Revenues, Operating Revenues, and balance sheet of the Authority;

(ii) obtain a written report of the Consultant, setting forth alternatives to the proposed sale or lease of such assets and comparing such alternatives to the proposal;

(iii) obtain an opinion of the Consultant to the effect that such sale or lease will not, in the current or any future Fiscal Year, result in the Authority not meeting the Rate Covenant required by the Trust Agreement after such sale or lease. In reaching its conclusion, the Consultant shall take into consideration such factors affecting the Authority Revenues as the Consultant may deem significant, including (A) anticipated diminution of Operating Revenues or Authority Revenues, (B) anticipated increases or decreases in Current Expenses whether or not attributable to such sale or lease, and (C) the reduction in the Annual Debt Service attributable to the application of the sale proceeds to the provision for payment of Indebtedness theretofore Outstanding; and

(iv) make a written determination, approved by the Board that the proposed sale or lease is more beneficial than (a) not entering into such sale or lease and (b) entering into one of the alternatives reviewed and presented by the Consultant.

The Authority reserves the right to sell any portion of the Systems to any political subdivision or authority or agency of one or more political subdivisions of the Commonwealth of Puerto Rico, provided that there shall be first filed with the Authority: (i) an opinion of Bond Counsel to the effect that such sale will not adversely affect the extent to which interest on any tax-exempt bonds is excluded from gross income for federal income tax purposes; and (ii) an opinion of a Consultant to the effect that such sale will not, in the current or any future Fiscal Year, result in Operating Revenues or Authority Revenues not meeting the required Rate Covenant required by the Trust Agreement after such sale. In reaching its conclusion, the Consultant shall take into consideration such factors as the Consultant may deem significant, including (i) anticipated diminution of Operating Revenues or Authority Revenues, (ii) anticipated increases or decreases in Current Expenses whether or not attributable to such sale, and (iii) reduction in the Annual Debt Service attributable to the application of the sale proceeds to the provision for payment of Indebtedness theretofore Outstanding. Such sale may include a partial interest in a water or sewer facility owned or to be owned in whole or in part by the Authority. All proceeds of any such sale shall be deposited in the Capital Improvement Fund.

The Authority reserves the right to transfer the Systems as a whole to any political subdivision or authority or agency of one or more political subdivisions of the Commonwealth of Puerto Rico to which may be delegated the legal authority to own and operate the Systems, or any portion thereof, on behalf of the public, and which undertakes in writing, filed with the Authority, the Authority's obligations under the Trust Agreement, provided that there shall be first filed with the Authority: (i) an opinion of Bond Counsel to the effect that such transfer will not adversely affect the extent to which interest on any tax-exempt bonds is excluded from gross income for federal income tax purposes; and (ii) an opinion of a Consultant expressing the view that such transfer will not result in any diminution of Operating Revenues or Authority Revenues to the extent that the Authority could not meet the Rate Covenant required by the Trust Agreement after such transfer, in the then current or any succeeding Fiscal Year. In reaching this conclusion, the Consultant shall take into consideration such factors as the Consultant may deem significant, including any rate schedule to be imposed by the transferee political subdivision, authority, or agency. (Section 7.12 of the Trust Agreement).

**Authority Not to Furnish Free Service; Enforcement of Accounts Due.**

So long as any Bonds issued pursuant to the Trust Agreement are Outstanding, the Authority will not furnish or supply water or any other commodity, service or facility furnished by it or in connection with the operation of the Systems, free of charge to any person, firm or corporation, public or private, and the Authority will promptly enforce the payment of any and all accounts owing to the Authority by reason of the ownership and operation of the Systems. (Section 7.13 of the Trust Agreement).

**Events of Default.**

Each of the following events shall be an Event of Default:

(a) default in the due and punctual payment of the principal of or premium, if any, on any Bonds or Other System Indebtedness whether at maturity, upon termination or call for redemption or otherwise; or

(b) default in the due and punctual payment of the interest on any Bonds or Other System Indebtedness; or

(c) the Authority shall for any reason be determined to be incapable by a court, governmental entity or agency of competent jurisdiction of fulfilling or shall not have full power and authority to fulfill its obligations under the Trust Agreement; or

(d) an order or decree shall be entered, with the consent or acquiescence of the Authority, appointing a receiver or receivers of the Systems or any part thereof or of the Authority Revenues, or if such order or decree, having been entered without the consent or acquiescence of the Authority, shall not have been vacated, discharged or stayed on appeal within ninety (90) days after the entry thereof; or

(e) any proceeding shall be instituted, with the consent or acquiescence of the Authority, for the purpose of effecting a composition between the Authority and its creditors or for the purpose of adjusting the claims of such creditors, pursuant to any Federal or Commonwealth of Puerto Rico statute now or hereafter enacted, if the claims of such creditors are under any circumstances payable out of the Authority Revenues and if said proceeding shall not have been discharged within ninety (90) days after the institution thereof, or if any such proceeding, having been instituted without the consent or acquiescence of the Authority, shall not be contested in good faith; or

(f) the Authority shall default in the due and punctual performance of any other of the covenants, conditions, agreements and provisions contained in the Bonds or in the Trust Agreement on the part of the Authority to be performed, and such default shall continue for thirty (30) days after written notice specifying such default and requiring same to be remedied shall have been given to the Authority by the Trustee, which may give such notice in its discretion and shall give such notice at the written request of the Holders of not less than ten per cent (10%) in principal amount of the Senior Bonds then Outstanding; provided, however, if the default specified in this clause (f) shall be of a type that cannot be remedied within thirty (30) days, it shall not constitute an event of default if the Authority shall begin diligently to remedy such default within such thirty-day period.

In no event shall the failure to pay principal of or interest on Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations be an Event of Default under the Trust Agreement. (Section 8.01 of the Trust Agreement).

**Extended Interest Payments.**

In case the time for the payment of the interest on any Bond shall be extended, whether or not such extension be by or with the consent of the Authority, such interest so extended shall not be entitled in case of default under the Trust Agreement to the benefit or security of the Trust Agreement except subject to the prior payment in full of the principal of all Indebtedness then Outstanding and of all interest the time for the payment of which shall not have been extended. (Section 8.03 of the Trust Agreement).

**Acceleration.**

Upon the occurrence and continuation of an Event of Default, except for an Event of Default described in clause (f) of the section entitled "Events of Default" above, the Trustee may (and if requested by the Holders of not less than 25% in aggregate principal amount of Senior Indebtedness (or if no Senior Indebtedness are then Outstanding, of Senior Subordinate Indebtedness) then Outstanding shall) by written notice to the Authority,

declare the entire unpaid principal of the Bonds due and payable and, thereupon, the entire unpaid principal of the Bonds shall forthwith become due and payable. Upon any such declaration, on the first Business Day of each month, the Trustee (i) shall pay to the Authority, an amount of Authority Revenues equal to the amount set forth in the applicable Annual Budget prepared in accordance with subsection (d) of the section entitled “Annual Budget and Disbursement Schedule” above to pay Current Expenses of the Systems for such month and (ii) shall pay to the Holders of the Bonds and Other System Indebtedness, but only from the remaining Authority Revenues and other moneys in the Trust Agreement specifically pledged for payments of Bondholders, the entire unpaid principal of and premium, if any, and accrued interest on the Bonds and Other System Indebtedness. If at any time after such a declaration and before the entry of a final judgment or decree in any suit, action or proceeding instituted on account of such default or before the completion of the enforcement of any other remedy under the Trust Agreement, the principal of all Bonds and Other System Indebtedness that have matured or been called for redemption pursuant to any sinking fund provision and all arrears of interest have been paid and any other Events of Default which may have occurred have been remedied, then the Trustee may, by written notice to the Authority, rescind or annul such declaration and its consequences. No such rescission or annulment shall extend to or affect any subsequent default or impair any right consequent thereon. Senior Subordinate Indebtedness may not be accelerated if any Senior Indebtedness are Outstanding. Subordinate Indebtedness may not be accelerated if any Senior Indebtedness or Senior Subordinate Indebtedness are Outstanding. (Section 8.04 of the Trust Agreement).

#### **Other Remedies; Rights of Bondholders.**

(a) Upon the occurrence of an Event of Default (other than an Event of Default specified in subsection (f) of the section entitled “Events of Default” above) and until delivery of the documents set forth in subsection (b) below, amounts on deposit in the Operating Revenue Fund shall be applied in accordance with the section entitled “Application of Moneys” below.

(b) Amounts on deposit in the Operating Revenue Fund shall continue to be applied in accordance with the section entitled “Application of Moneys” below until there shall have been filed with the Trustee (i) a certificate signed by the Executive President and approved by the Consulting Engineer that (x) the Authority complied with the Rate Covenant for the most recent complete Fiscal Year and (y) no Event of Default (other than an Event of Default under subsection (f) of the section entitled “Events of Default” above) is continuing under the Trust Agreement and (ii) a report of the Consulting Engineer as to the adequacy of existing rates and charges of the Rate Covenant for the then current Fiscal Year and the following Fiscal Year.

(c) Upon the occurrence and continuance of an Event of Default, the Trustee may (and if requested by the holders of not less than 25% in aggregate principal amount of Outstanding Senior Bonds then Outstanding (or if no Senior Bonds are then Outstanding, of Senior Subordinate Bonds) shall proceed to protect and enforce the rights of the Holders by mandamus or other suit, action or proceeding at law or in equity, including an action for specific performance of any covenant or agreement contained in the Trust Agreement.

(d) No remedy conferred by the Trust Agreement upon or reserved to the Trustee and Bondholders is intended to be exclusive of any other remedy, but each such remedy shall be cumulative and shall be in addition to any other remedy given to the Trustee and Bondholders under the Trust Agreement or now or hereafter existing at law, in equity or by statute.

(e) The Holders of a majority in aggregate principal amount of the Senior Bonds then Outstanding under the Trust Agreement shall have the right, subject to the provisions of the Trust Agreement, by an instrument or concurrent instruments in writing executed and delivered to the Trustee, to direct the time, method and place of conducting all remedial proceedings to be taken by the Trustee under the Trust Agreement or exercising any trust or power conferred upon the Trustee, provided that (i) such direction shall not be otherwise than in accordance with law and the provisions of the Trust Agreement, (ii) subject to the provisions of the Trust Agreement, that the Trustee may take any other action deemed proper by the Trustee which is not inconsistent with such direction and (iii) the Trustee shall have the right not to follow such direction if the Trustee in good faith shall determine that such direction would be prejudicial to Holders not giving such direction or would involve the Trustee in personal liability.

Notwithstanding any other provision in the Trust Agreement, the owner of any Bond shall have the right which is absolute and unconditional to receive payment of the principal of and premium, if any, and interest

on such Bond when due (whether at maturity, upon redemption or otherwise) and to institute suit for the enforcement of any such payment, and such right shall not be impaired without the consent of such owner. (Section 8.05 of the Trust Agreement).

### **Application of Moneys.**

(a) Unless the principal of all Bonds shall have become due or shall have been declared due and payable, all amounts on deposit in the Operating Revenue Fund, after payment of the cost and expenses of the proceedings resulting in the collection of such moneys, the expenses, liabilities and advances incurred or made by the Trustee and its fees and the expenses in carrying out the Trust Agreement, shall be applied beginning on the first Business Day of each month in the following order of priority:

**First** - To the subaccounts established for each issue of Senior Indebtedness in the Senior Interest Account, (i) an amount of Authority Revenues equal to the Interest Accrual on all the Outstanding Senior Indebtedness to and including the first day of the next calendar month; (ii) the amount of any payments or reimbursements due in the next ensuing month to each Enhancement Facility Provider to the extent such payment or reimbursement obligation constitutes Senior Indebtedness under the Trust Agreement; and (iii) the amount of any payments due in the next ensuing month under any Hedge Agreement or Qualified Swap secured on a parity with Senior Indebtedness, and all such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose;

**Second** - To the subaccounts established for each issue of Senior Indebtedness in the Senior Principal Account and Senior Sinking Fund Account, an amount of Authority Revenues equal to the Principal Accrual on the Outstanding Senior Indebtedness to and including the first day of the next calendar month, and all such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose;

**Third** - To each Account in the Senior Debt Service Reserve Fund, (i) an amount of Authority Revenues equal to (x) 1/60 of the amount (or such greater amount specified in the Supplemental Agreement authorizing any Senior Bonds), if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of an increase in the applicable Debt Service Reserve Requirement upon the issuance of additional Senior Bonds, and (y) except as provided in subsection (c) of the section entitled "Senior Debt Service Reserve Fund" above, 1/12 of the amount, if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of any other deficiency and (ii) the amount of proceeds of any Senior Bonds as required by the applicable Supplemental Agreement;

**Fourth** - To the subaccounts established for each issue of Senior Subordinate Indebtedness in the Senior Subordinate Interest Account, (i) an amount of Authority Revenues equal to the Interest Accrual on all the Outstanding Senior Subordinate Indebtedness to and including the first day of the next calendar month; (ii) the amount of any payments or reimbursements due in the next ensuing month to each Enhancement Facility Provider to the extent such payment or reimbursement obligation constitutes Senior Subordinate Indebtedness under the Trust Agreement; (iii) the amount of any payments due in the next ensuing month under any Hedge Agreement or Qualified Swap secured on a parity with Senior Subordinate Indebtedness, and all such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose;

**Fifth** - To the subaccounts established for each issue of Senior Subordinate Indebtedness in the Senior Subordinate Principal Account and Senior Subordinate Sinking Fund Account, an amount of Authority Revenues equal to the Principal Accrual on the outstanding Senior Subordinate Indebtedness to and including the first day of the next calendar month, and all such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose;



**Sixth** - To each Account in the Senior Subordinate Debt Service Reserve Fund (i) an amount of Authority Revenues equal to (x) 1/60 of the amount (or such greater amount specified in the Supplemental Agreement authorizing any Senior Subordinate Bonds), if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of an increase in the applicable Debt Service Reserve Requirement upon the issuance of additional Senior Subordinate Bonds, and (y) except as provided in subsection (c) of the section entitled “Senior Subordinate Debt Service Reserve Fund” above, 1/12 of the amount, if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of any other deficiency and (ii) the amount of proceeds of any Senior Subordinate Bonds as required by the applicable Supplemental Agreement;

**Seventh** - To the subaccounts established for each issue of Subordinate Indebtedness in the Subordinate Interest Account, (i) an amount of Authority Revenues equal to the Interest Accrual on all the Outstanding Subordinate Indebtedness to and including the first day of the next calendar month; (ii) the amount of any payments or reimbursements due in the next ensuing month to each Enhancement Facility Provider to the extent such payment or reimbursement obligation constitutes Subordinate Indebtedness under the Trust Agreement; and (iii) the amount of any payments due in the next ensuing month under any Hedge Agreement or Qualified Swap secured on a parity with Subordinate Indebtedness, and all such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose;

**Eighth** - To the subaccounts established for each issue of Subordinate Indebtedness in the Subordinate Principal Account and Subordinate Sinking Fund Account, an amount of Authority Revenues equal to the Principal Accrual on the Outstanding Subordinate Indebtedness to and including the first day of the next calendar month, and all such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose;

**Ninth** - To each Account in the Subordinate Debt Service Reserve Fund (i) an amount of Authority Revenues equal to (x) 1/60 of the amount (or such greater amount specified in the Supplemental Agreement authorizing such additional Subordinate Bonds), if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of an increase in the applicable Debt Service Reserve Requirement upon the issuance of additional Subordinate Bonds, and (y) except as provided in subsection (c) of the section entitled “Subordinate Reserve Fund” above, 1/12 of the amount, if any, necessary to restore the amount on deposit therein to the related Debt Service Reserve Requirement in the event of any other deficiency and (ii) the amount of proceeds of any Subordinate Bonds as required by the applicable Supplemental Agreement;

**Tenth** - To the credit of the Current Expense Fund, an amount of Authority Revenues equal to the amount set forth in the most recent Disbursement Schedule prepared in accordance with subsection (j) of the section entitled “Annual Budget and Disbursement Schedule” to pay Current Expenses of the Systems for the current and next two succeeding months;

**Eleventh** - To the credit of the Operating Reserve Fund, an amount of Authority Revenues equal to that which is necessary to make the balance on deposit therein equal to the Operating Reserve Requirement;

**Twelfth** - To the Capital Improvement Fund (i) an amount of Authority Revenues equal to that which is necessary to make the balance on deposit therein equal to the Capital Improvement Fund Requirement for the Fiscal Year as set forth in the applicable Annual Budget in equal monthly deposits over such Fiscal Year;

**Thirteenth** - To the Commonwealth Payments Fund (i) (A) any Authority Revenues received by the Authority from the Commonwealth of Puerto Rico on account of Outstanding Commonwealth Guaranteed Indebtedness and (B) an amount of Operating Revenues sufficient to pay (x) the Interest Accrual on Commonwealth Guaranteed Indebtedness in respect of the next Interest Payment Date and (y) the Principal Accrual on Commonwealth Guaranteed Indebtedness in respect of the next principal payment date, and all such deposits in this paragraph shall be adjusted to give credit for any other available money then in such

account or otherwise available and designated to be used for such purpose and (ii) (A) any Authority Revenues received by the Authority from the Commonwealth of Puerto Rico on account of Outstanding Commonwealth Supported Obligations and (B) an amount of Operating Revenues sufficient to pay (x) the Interest Accrual on Commonwealth Supported Obligations in respect of the next Interest Payment Date and (y) the Principal Accrual on Commonwealth Supported Obligations in respect of the next principal payment date, and all such deposits in this paragraph shall be adjusted to give credit for any other available money then in such account or otherwise available and designated to be used for such purpose; and

**Fourteenth** - To the Surplus Fund, any remaining balance.

(b) If the principal of all the Bonds shall have become due or shall have been declared due and payable, all such moneys shall be applied to the payment of the principal and interest then due and unpaid on the Senior Indebtedness, including, to the extent permitted by law, interest on overdue installments of interest, without preference or priority of principal over interest or of interest over principal, or of any installment of interest over any other installment of interest, or of any Senior Indebtedness over any other Senior Indebtedness, ratably, according to the amounts due respectively for principal and interest, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in the Senior Indebtedness.

(c) If the principal of all the Bonds shall have become due or shall have been declared due and payable and there is no Senior Indebtedness Outstanding under the Trust Agreement, all such moneys shall be applied to the payment of the principal and interest then due and unpaid on the Senior Subordinate Indebtedness, including, to the extent permitted by law, interest on overdue installments of interest, without preference or priority of principal over interest or of interest over principal, or of any installment of interest over any other installment of interest, or of any Senior Subordinate Indebtedness over any other Senior Subordinate Indebtedness, ratably, according to the amounts due respectively for principal and interest, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in the Senior Subordinate Indebtedness.

(d) If the principal of all the Bonds shall have become due or shall have been declared due and payable and there is no Senior Indebtedness or Senior Subordinate Indebtedness Outstanding under the Trust Agreement, all such moneys shall be applied to the payment of the principal and interest then due and unpaid on the Subordinate Indebtedness, including, to the extent permitted by law, interest on overdue installments of interest, without preference or priority of principal over interest or of interest over principal, or of any installment of interest over any other installment of interest, or of any Subordinate Indebtedness over any other Subordinate Indebtedness, ratably, according to the amounts due respectively for principal and interest, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in the Subordinate Indebtedness.

(e) If the principal of all the Bonds shall have become due or shall have been declared due and payable and there is no Senior Indebtedness, Senior Subordinate Indebtedness or Subordinate Indebtedness Outstanding under the Trust Agreement, all such moneys shall be applied to the payment of the principal and interest then due and unpaid on the Commonwealth Guaranteed Indebtedness, including, to the extent permitted by law, interest on overdue installments of interest, without preference or priority of principal over interest or of interest over principal, or of any installment of interest over any other installment of interest, or of any Commonwealth Guaranteed Indebtedness over any other Commonwealth Guaranteed Indebtedness, ratably, according to the amounts due respectively for principal and interest, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in the Commonwealth Guaranteed Indebtedness.

(f) If the principal of all the Bonds shall have become due or shall have been declared due and payable and there is no Senior Indebtedness, Senior Subordinate Indebtedness, Subordinate Indebtedness or Commonwealth Guaranteed Indebtedness Outstanding under the Trust Agreement, all such moneys shall be applied to the payment of the principal and interest then due and unpaid on the Commonwealth Supported Obligations, including, to the extent permitted by law, interest on overdue installments of interest, without preference or priority of principal over interest or of interest over principal, or of any installment of interest over any other installment of interest, or of any Commonwealth Supported Obligations over any other Commonwealth Supported Obligations,

ratably, according to the amounts due respectively for principal and interest, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in the Commonwealth Supported Obligations.

(g) Whenever moneys are to be applied pursuant to the provisions of this section, such moneys shall be applied at such times and from time to time as the Trustee shall determine, having due regard to the amount of such moneys available for application and the likelihood of additional moneys becoming available for such application in the future. Whenever the Trustee shall apply such moneys, it shall fix the date (which shall be an Interest Payment Date unless it shall deem another date more suitable) on which such application is to be made and on such date interest on the amounts of principal to be paid and shall cease to accrue. The Trustee shall give such notice as it may deem appropriate of the deposit with it of any such moneys and of the fixing of any such date.

Whenever the principal of and premium, if any, and interest on all Indebtedness have been paid under the provisions of this section, all payments required by the terms of any Supplemental Agreement have been paid and all expenses and charges of the Trustee have been paid, any balance remaining in the several funds created by the Trust Agreement shall be paid to the Authority as provided in the Trust Agreement. (Section 8.06 of the Trust Agreement).

#### **Limitation on Suits.**

Except to enforce the rights given under the sections entitled "Acceleration" and "Other Remedies; Rights of Bondholders" above, no Bondholder shall have the right to institute any action, suit or proceeding at law or in equity for the enforcement of the Trust Agreement or for the execution of any trust thereof or any other remedy under the Trust Agreement, unless (a) a default has occurred and is continuing of which the Trustee has been notified as provided in subsection (h) of the section entitled "Acceptance of Trusts and Obligations" of the Trust Agreement, or of which by such section it is deemed to have notice, (b) such default has become an Event of Default and the holders of 25% in aggregate principal amount of Senior Bonds (or if no Senior Bonds are then Outstanding, of Senior Subordinate Bonds) then Outstanding have made written request to the Trustee and offered it reasonable opportunity either to proceed to exercise the powers hereinbefore granted or to institute such action, suit or proceeding in its own name, (c) such requesting Bondholders have offered to the Trustee indemnity as provided in the section entitled "Other Remedies; Rights of Bondholders" above, (d) the Trustee has thereafter failed or refused to exercise the powers hereinbefore granted, or to institute such action, suit or proceeding in its own name, (e) no direction inconsistent with such written request has been given to the Trustee by the holders of a majority in aggregate principal amount of Senior Bonds (or if no Senior Bonds is then Outstanding, of Senior Subordinate Bonds) then Outstanding, and (f) notice of such action, suit or proceeding is given to the Trustee; it being understood and intended that no one or more holders of the Bonds shall have any right in any manner whatsoever to affect, disturb or prejudice the Trust Agreement by its or their action or to enforce any rights under the Trust Agreement except in the manner provided in the Trust Agreement, and that all proceedings at law or in equity shall be instituted and maintained in the manner provided in the Trust Agreement and for the equal benefit of the holders of all Bonds then Outstanding. The notification, request and offer of indemnity set forth above, at the option of the Trustee, shall be conditions precedent to the execution of the powers and trusts of the Trust Agreement and to any action or cause of action for the enforcement of the Trust Agreement or for any other remedy under the Trust Agreement. (Section 8.08 of the Trust Agreement).

#### **Waivers of Events of Default.**

The Trustee may in its discretion waive any Event of Default under the Trust Agreement or any action taken pursuant to any Event of Default and rescind any acceleration of maturity of principal of and interest on the Bonds, and shall do so at the request of the Holders of (a) a majority in aggregate principal amount of Senior Bonds then Outstanding in respect of which default in the payment of principal and/or premium, if any, and/or interest exists, or (b) a majority in aggregate principal amount of Senior Bonds then Outstanding in the case of any other default; provided, however, that:

(1) there shall not be waived without the consent of the Holders of all Senior Bonds then Outstanding (A) any Event of Default in the payment of the principal of any Outstanding Bonds (whether at

maturity or by sinking fund redemption), or (B) any default in the payment when due of the interest on any such Bonds unless, prior to such waiver or rescission,

(i) there shall have been paid or provided for all arrears of interest with interest, to the extent permitted by law, at the rate borne by the Bonds on overdue installments of interest, all arrears of principal and premium, if any, and all expenses of the Trustee in connection with such default, and

(ii) in case of any such waiver or rescission or in the case of any discontinuance, abandonment or adverse determination of any proceeding taken by the Trustee on account of any such default, the Authority, the Trustee, and the Holders of Bonds shall be restored to their former positions and rights under the Trust Agreement respectively; and

(2) no acceleration of maturity under the section entitled "Acceleration" above made at the request of the Holders of 25% in aggregate principal amount of Senior Bonds (or if no Senior Bonds is then Outstanding, of Senior Subordinate Bonds) then Outstanding shall be rescinded unless requested by the Holders of at least 25% in aggregate principal amount of Senior Bonds (or if no Senior Bonds are then Outstanding, of Senior Subordinate Bonds) then Outstanding.

No such waiver or rescission relating to the Bonds shall extend to any subsequent or other default or impair any right consequent thereon. (Section 8.10 of the Trust Agreement).

#### **Supplemental Agreements Not Requiring Consent of Holders of Bonds.**

The Authority and the Trustee may, without the consent of, or notice to, any of the Bondholders, enter into such Supplemental Agreements as shall not be inconsistent with the intent of the terms and provisions of the Trust Agreement for any one or more of the following purposes:

- (a) To cure any ambiguity, formal defect or omission in the Trust Agreement;
- (b) To grant to or confer upon the Bondholders any additional rights, remedies, powers or authority that may lawfully be granted to or conferred on the Bondholders;
- (c) To add to the covenants and agreements of the Authority in the Trust Agreement other covenants and agreements to be observed by the Authority;
- (d) To modify, amend or supplement the Trust Agreement in such manner as required to permit the Authority to comply with the provisions of the Code relating to the rebate to the United States of America of earnings derived from the investment of the proceeds of any Bonds, provided that such modification, amendment or supplement does not materially adversely affect the holders of all Outstanding Bonds;
- (e) To modify, amend or supplement the Trust Agreement in such manner as may be required by a Rating Agency to maintain or enhance its rating on the Senior Bonds, provided that such modification, amendment or supplement does not materially adversely affect the Holders of all Outstanding Bonds;
- (f) To modify, amend or supplement the Trust Agreement to make any change to the role of the Consulting Engineer as set forth in the section entitled "Retention of Consulting Engineer and Other Consultants" above;
- (g) To authorize the issuance of and to secure one or more issues of Bonds pursuant to the provisions of the Trust Agreement;
- (h) To notify, amend or supplement the Trust Agreement in such manner as required to implement any agreement with a securities depository relating to a book-entry system to be maintained with respect to any Bonds; and

(i) To modify, amend or supplement the Trust Agreement in any manner that the Trustee concludes is not materially adverse to the Holders of all Outstanding Bonds.

For purposes of this section, any modification, amendment or supplement to the Trust Agreement shall not be deemed to be materially adverse to the Holders of all Outstanding Bonds unless such modification, amendment or supplement results in a downgrade or withdrawal of any then existing rating on Outstanding Bonds. (Section 9.01 of the Trust Agreement).

### **Supplemental Agreements Requiring Consent of Bondholders.**

(a) Exclusive of Supplemental Agreements authorized by the section entitled “Supplemental Agreements Not Requiring Consent of Holders of Bonds” above and subject to the terms and provisions contained in this section, the Holders of not less than a majority in aggregate principal amount of Outstanding Bonds shall have the right from time to time, notwithstanding anything in the Trust Agreement to the contrary, to consent to the execution by the Authority and the Trustee of such other Agreements supplemental to the Trust Agreement as shall be deemed necessary or desirable by the Authority for the purpose of modifying, altering, amending, adding to or rescinding, in any particular, any of the terms or provisions contained in the Trust Agreement and any Supplemental Agreement; provided, however, that nothing in the Trust Agreement shall permit, or be construed as permitting, (i) an extension of the time for payment of the principal of or the interest on any Bonds, (ii) a preference or priority of any Senior Bonds over any other Senior Bonds, (iii) a preference or priority of any Senior Subordinate Bonds over any other Senior Subordinate Bonds, (iv) a preference or priority of any Subordinate Bonds over any other Subordinate Bonds, (v) a reduction in the aggregate principal amount of Bonds required for consent to such Supplemental Agreement, (vi) a reduction in the principal amount of or premium, if any, on any Bonds or the rate of interest thereon, (vii) the creation of any lien or pledge upon the Authority Revenues and the moneys and securities in the funds and accounts under the Trust Agreement other than the lien and pledge permitted by the Trust Agreement or (viii) an extension of time or a reduction in amount of any payment required by any sinking fund that may be applicable to any Bonds, without the consent of the Holders so affected.

(b) If at any time the Authority shall request the Trustee to enter into any such Supplemental Agreement, the Trustee shall cause notice of the proposed execution of such Supplemental Agreement to be sent by registered or certified mail to the registered owner of each Bond at his address as it appears on the registration books. Such notice shall briefly set forth the nature of the proposed Supplemental Agreement and shall state that a copy thereof is on file at the corporate trust office of the Trustee for inspection by all Bondholders. If, within ninety (90) days or such longer period as shall be prescribed by the Authority following the giving of such notice, the Holders of not less than a majority in aggregate principal amount of Outstanding Bonds, or in the case of (a) through (h) above, the holders of all affected Bonds, shall have consented to and approved the execution thereof as provided in the Trust Agreement, no Holder of any Bond shall have any right to object to any of the terms and provisions contained therein, or the operation of the Trust Agreement, or in any manner to question the propriety thereof, or to enjoin or restrain the Trustee or the Authority from executing such Supplemental Agreement or from taking any action pursuant to the provisions thereof. Upon the execution of any such Supplemental Agreement as in this section permitted and provided, the Trust Agreement shall be and be deemed to be modified and amended in accordance therewith.

(c) Bonds owned or held by or for the account of the Authority shall not be deemed Outstanding for the purpose of consent or any calculation of Outstanding Bonds provided for in the Trust Agreement. At the time of any such calculation, the Authority shall furnish the Trustee a certificate of an Authorized Representative of the Authority upon which the Trustee may rely, describing all Bonds so to be excluded.

(d) It shall not be necessary for the consent of the Holders of Bonds under this section to approve the particular form of any proposed supplement or amendment, but it shall be sufficient if such consent shall approve the substance thereof.

(e) For the purposes of the provisions of the Trust Agreement relating to Supplemental Agreements, the purchasers of the Bonds of a Series, whether purchasing as underwriters, for resale or otherwise, upon such purchase, may consent to a modification or amendment permitted by this section in the manner provided

in the Trust Agreement, except that no proof of ownership shall be required, and with the same effect as a consent given by the Holder of such Bonds; provided, however, that, if such consent is given by a purchaser who is purchasing as an underwriter or for resale, the nature of the modification or amendment and the provisions for the purchaser consenting thereto shall be described in the official statement, prospectus, offering memorandum or other offering document prepared in connection with the primary offering or remarketing of the Bonds of such Series by the Authority.

(f) A Supplemental Agreement may provide that an Enhancement Facility Provider shall have the right to vote in lieu of the holders of the Bonds authorized thereunder. (Section 9.02 of the Trust Agreement).

#### **Intervention by Trustee.**

In any judicial proceeding to which the Authority is a party and which in the opinion of the Trustee has a substantial bearing on the interests of the Bondholders, the Trustee may intervene on behalf of the Bondholders and, subject to the provisions of the Trust Agreement, shall do so if requested by the holders of 25% in aggregate principal amount of Senior Bonds (or if no Senior Bonds is then Outstanding, Senior Subordinate Bonds) then Outstanding. (Section 10.09 of the Trust Agreement).

#### **Resignation by Trustee.**

The Trustee may at any time resign from the trusts created by the Trust Agreement by giving thirty (30) days' notice to the Authority, provided that such resignation shall not take effect until the appointment of a successor or temporary Trustee by the Bondholders, the Authority or a court of competent jurisdiction. (Section 10.11 of the Trust Agreement).

#### **Removal of Trustee.**

The Trustee may be removed at any time (a) by an instrument or concurrent instruments in writing delivered to the Trustee and the Authority, and signed by the owners of a majority in aggregate principal amount of Senior Bonds (or if no Senior Bonds is then Outstanding, Senior Subordinate Bonds) then Outstanding, or (b) by the Authority by notice in writing given by an Authorized Representative of the Authority to the Trustee thirty (30) days before the removal date; provided, however, that the Authority shall have no right to remove the Trustee during any time when an Event of Default has occurred or is continuing or when an event has occurred and is continuing or condition exists that with the giving of notice or the passage of time, or both, would be an Event of Default. The removed Trustee shall return to the Authority the amount of the Trustee's annual fee allocable to the portion of the current year remaining after the removal date. Notwithstanding the foregoing, nothing contained in the Trust Agreement shall relieve the Authority of its obligation to pay the Trustee's fees and expenses incurred to the date of such removal. Such removal shall take effect upon the appointment of a successor Trustee or the earlier appointment of a temporary Trustee by the Bondholders, the Authority or a court of competent jurisdiction. (Section 10.12 of the Trust Agreement).

#### **Appointment of Successor Trustee by Bondholders; Temporary Trustee.**

In case the Trustee under the Trust Agreement shall resign, be removed, be dissolved, be in course of dissolution or liquidation or otherwise become incapable of acting under the Trust Agreement, or in case it shall be taken under the control of any public officer or officers or of a receiver appointed by a court, a successor may be appointed by the owners of a majority in aggregate principal amount of Senior Bonds (or if no Senior Bonds is then Outstanding, Senior Subordinate) then Outstanding, by an instrument or concurrent instruments in writing signed by such owners; provided, however, that in case of such vacancy the Authority, by an instrument signed by its General Manager and attested by the Secretary of the Authority under its seal, may appoint a temporary Trustee to fill such vacancy until a successor Trustee shall be appointed by the bondholders in the manner provided above; and any such temporary Trustee so appointed by the Authority shall immediately and without further act be superseded by the Trustee so appointed by such bondholders. Every such Trustee appointed pursuant to this section shall be, if there be such an institution willing, qualified and able to accept the trust upon reasonable or customary terms, a bank or

trust company having a combined capital, surplus and undivided profits of not less than \$50,000,000 (or whose obligations under the Trust Agreement are guaranteed by a bank or trust company duly authorized to exercise corporate trust powers and subject to examination by federal or state authority, of good standing, and having at the time of the appointment of such Trustee, a combined capital and surplus of at least such amount). (Section 10.13 of the Trust Agreement).

#### **Discharge of Agreement.**

If (a) (1) all Bonds issued under the Trust Agreement shall have become due and payable in accordance with their terms or otherwise as provided in the Trust Agreement or have been duly called for redemption or irrevocable instructions to call the Bonds issued under the Trust Agreement for redemption have been given by the Authority to the Trustee, and (2) the Trustee holds for such purpose cash or Defeasance Obligations, the principal of and the interest on which, as verified by a licensed independent certified public accountant (that carries errors and omissions insurance) reasonably acceptable to the Trustee and the Authority, at maturity will be sufficient (without reinvestment) (A) to redeem all Bonds issued under the Trust Agreement that have been called for redemption, or for which such irrevocable instructions have been given, on the date set for such redemption, (B) to pay at maturity all Bonds issued under the Trust Agreement not irrevocably called for redemption, (C) to pay interest accruing on all Bonds issued under the Trust Agreement prior to their redemption or payment at maturity, (D) to make all payments required by the terms of any Supplemental Agreement, and (E) to pay the Trustee's fees and expenses and any other fees and expenses for which the Authority is responsible under the Trust Agreement, including the costs and expenses of canceling and discharging the Trust Agreement, and (b) the Trustee shall have received notification from the Holders of all other Indebtedness that such Indebtedness has been paid, or payment has been provided for such Indebtedness, in accordance with the documents related thereto, then the Trustee shall, at the expense of the Authority, cancel and discharge the Trust Agreement and execute and deliver to the Authority such instruments in writing as shall be necessary to cancel the lien of the Trust Agreement, and assign and deliver to the Authority any property at the time subject to the Trust Agreement that may then be in its possession, except moneys or securities in which such moneys are invested which are held by the Trustee for the payment of principal, or premium, if any, or interest on the Bonds issued under the Trust Agreement;

Any Outstanding Bond, or portion thereof in any denomination authorized by the Trust Agreement, shall be deemed to have been paid within the meaning and with the effect expressed in this section when the whole amount of the principal of and interest on such Bond or such portion shall have been paid or duly provided for and the conditions set forth in clause (c) below have been satisfied or when (a) in the event such Bond or such portion shall have been duly called for redemption or irrevocable instructions to call such Bond or such portion for redemption shall have been given to the Trustee by the Authority, (b) whether or not such Bond or portion thereof has been so called for redemption, there shall have been deposited with the Trustee either moneys in an amount which shall be sufficient, or Defeasance Obligations, which shall not contain provisions permitting the redemption thereof at the option of the issuer, the principal of and the interest on which when due, and without any reinvestment thereof, will provide moneys which, together with the moneys, if any, deposited with or held by the Trustee available therefor, shall be sufficient, to pay when due the principal of and premium, if any, and interest due and to become due on such Bond or such portion on or prior to the maturity or redemption date thereof, and (c) in the event such Bond or such portion does not mature and is not to be redeemed within the next succeeding 60 days, the Authority shall have given the Trustee irrevocable instructions to give, as soon as practicable, a notice to the Holder of such Bond or such portion by first-class mail, postage prepaid, stating that the deposit of moneys or Defeasance Obligations required by clause (b) of this paragraph has been made with the Trustee and that such Bond or such portion is deemed to have been paid in accordance with this section and stating the maturity or redemption date upon which moneys are to be available for the payment of the principal of and premium, if any, and interest on such Bond or such portion.

The moneys and Defeasance Obligations deposited with the Trustee pursuant to this section and all payments of principal of or interest on any such Obligations shall not be withdrawn or used for any purpose other than, and shall be held in trust for, the payment of the principal of and premium, if any, and interest on said Bonds, or portions thereof, deemed to have been paid in accordance with this section. If Bonds, or portions thereof, are deemed to have been paid in accordance with the provisions of the Trust Agreement by reason of the deposit with the Trustee of moneys or Defeasance Obligations and the Trustee has received an opinion of counsel satisfactory to

it as to such deemed payment, no amendment to the provisions of this section which would adversely affect the Holders of such Bonds, or portions thereof, shall be made without the consent of each Holder affected thereby.

For purposes of determining whether any Outstanding Variable Rate Indebtedness is deemed paid and discharged pursuant to this section, such Variable Rate Indebtedness shall be deemed to bear interest at the maximum rate of interest such Variable Rate Indebtedness may bear pursuant to the applicable Supplemental Agreement. (Section 11.01 of the Trust Agreement).

### **Subordination.**

(a) Senior Subordinated Indebtedness, Subordinated Indebtedness, Commonwealth Guaranteed Indebtedness and Commonwealth Supported Obligations (collectively, the “Subordinated Obligations”) shall to the extent provided in the Trust Agreement be subordinate and subject in right of payment to the prior payment in full of the Senior Indebtedness, and the Holder of any Subordinated Obligation, whether upon original issue or upon transfer or assignment thereof, accepts and agrees to be bound by such provision. The Indebtedness evidenced by Subordinated Indebtedness shall to the extent provided in the Trust Agreement be subordinate and subject in right of payment to the prior payment in full first of Senior Indebtedness and then of the Senior Subordinated Indebtedness, and the Holder of any Subordinate Indebtedness, whether upon original issue or upon transfer or assignment thereof, accepts and agrees to be bound by such provision.

(b) Upon any payment or distribution of assets of the Authority upon any dissolution or winding up or total or partial liquidation of the Authority whether in bankruptcy, insolvency or receivership proceedings, or otherwise,

(1) all Senior Indebtedness shall first be paid or duly provided for to the extent of such payment or distribution before any payment is made upon the indebtedness evidenced by the Subordinated Obligations;

(2) any payment or distribution of assets of the Authority of any kind or character, whether in cash, property or securities, to which the Holders of the Subordinated Obligations or the Trustee would be entitled except for the provisions in the Trust Agreement relating to subordination, including any such payment or distribution which may be payable or deliverable by reason of the payment of any other indebtedness of the Authority being subordinated to the payment of the Subordinated Obligations, shall be paid by the liquidating trustee or agent or other person making such payment or distribution, whether a trustee in bankruptcy, a receiver or liquidating trustee or otherwise, directly to the Holders of Senior Indebtedness, to the extent necessary to pay or provide for the payment of all Senior Indebtedness in full before any payment is made upon the indebtedness evidenced by the Subordinated Obligations; and

(3) in the event that, notwithstanding the foregoing, upon any such dissolution or winding up or liquidation any payment or distribution of assets of the Authority of any kind or character, whether in cash, property or securities, including any such payment or distribution which may be payable or deliverable by reason of the payment of any other indebtedness of the Authority being subordinated to the payment of the Subordinated Obligations, shall be received by the Trustee or by the Holders of the Subordinated Obligations before all Senior Indebtedness are paid or duly provided for in full, such payment or distribution shall be paid over to the Holders of such Senior Indebtedness for application to the payment thereof until such Senior Indebtedness shall have been paid or provision for such payment shall have been made in full.

Upon any payment or distribution of assets of the Authority referred to in this section, the Trustee and the Holders of the Subordinated Obligations shall be entitled to rely upon a certificate of the liquidating trustee or agent or other person making any payment or distribution to the Trustee or the Holders of the Subordinated Obligations for the purpose of ascertaining the persons entitled to participate in such payment or distribution, the Holders of Senior Indebtedness and other indebtedness of the Authority, the amount thereof or payable thereon, the amount or amounts paid or distributed thereon and all other facts pertinent thereto, or to the provisions of the Trust Agreement.



(c) (1) In the event that any Subordinated Obligation is declared due and payable before its expressed maturity because of the occurrence of an event of default (under circumstances when the provisions of subsection (b) above shall not be applicable), the owners of all Senior Indebtedness outstanding at the time such Subordinated Obligation becomes due and payable because of the occurrence of such an Event of Default shall be entitled to receive payment in full of all principal of and interest on all such Indebtedness then due and payable before the Holder of such Subordinated Obligation is entitled to receive any accelerated payment from the Authority Revenues and other moneys pledged to Senior Indebtedness under the Trust Agreement of principal (and premium, if any) or interest upon such Subordinated Obligation; provided, however, that any Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations are not subject to the lien of the Trust Agreement and shall only be used for the purposes set forth in the section entitled “Commonwealth Payments Fund” above.

(2) If any Event of Default specified in the section entitled “Events of Default” above with respect to the Senior Indebtedness shall have occurred and be continuing (under circumstances when the provisions of subsection (b) above shall not be applicable), the owners of all Senior Indebtedness then Outstanding shall be entitled to receive payment in full of all principal of and interest on all such Indebtedness as the same become due and payable before the Holders of the Subordinated Obligations are entitled to receive, subject to the provisions of (3) below, any payment from the Authority Revenues or other moneys pledged to Senior Indebtedness under the Trust Agreement of principal (and premium, if any) or interest upon the Subordinate Obligations; provided, however, that any Authority Revenues received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness or Commonwealth Supported Obligations are not subject to the lien of the Trust Agreement and shall only be used for the purposes set forth in the section entitled “Commonwealth Payments Fund” above.

(3) The Subordinated Obligations may provide that the provisions of subsection (b) and (c) are solely for the purpose of defining the relative rights of the owners of Senior Indebtedness on the one hand, and the Holders of Subordinated Obligations on the other hand, and that nothing therein shall impair, as between the Authority and the Holders of the Subordinated Obligations, the obligation of the Authority, which is unconditional and absolute, to pay to the Holders thereof the principal thereof and premium, if any, and interest thereon in accordance with their terms, nor shall anything therein prevent the Holders of the Subordinated Obligations from exercising all remedies otherwise permitted by applicable law or thereunder upon default thereunder, subject to the rights under subsections (b) and (c) of the owners of Senior Indebtedness to receive cash, property or securities from the funds pledged to Senior Indebtedness under the Trust Agreement otherwise payable or deliverable to the Holders of the Subordinated Obligations; and the Subordinated Obligations may provide that, insofar as a trustee or paying agent for such Subordinated Obligations is concerned, the foregoing provisions shall not prevent the application by such trustee or paying agent of any moneys deposited with such trustee or paying agent for the purpose of the payment of or on account of the principal (and premium, if any) and interest on such Subordinated Obligations if such trustee or paying agent did not have knowledge at the time of such application that such payment was prohibited by the foregoing provisions.

(d) No owner of Senior Indebtedness shall be prejudiced in this right to enforce subordination of the Subordinated Obligations by any act or failure to act on the part of the Authority.

(e) Any issue of Subordinated Obligations may have such rank or priority with respect to any other issue of Subordinated Obligations as may be provided in the Trust Agreement, in the applicable Supplemental Agreement or in the resolution, trust Agreement or other instrument securing such issue of Subordinated Obligations and may contain such other provisions as are not in conflict with the provisions of the Trust Agreement. (Section 12.01 of the Trust Agreement).

#### **Subrogation of Holders of Subordinated Obligations.**

Subject to the payment in full of all Senior Indebtedness as provided in the section entitled “Subordination” above, the Holders of the Subordinated Obligations shall be subrogated to the rights of the Holders of Senior Indebtedness to receive payments or distributions of assets of the Authority made on Senior Indebtedness until the Subordinated Obligations shall be paid in full, and no payments or distributions to the Holders of Senior Indebtedness by the Authority or by the Holders of the Subordinated Obligations shall, as between the Authority and

the Holders of the Subordinated Obligations, be deemed to be a payment by the Authority to or on account of the Subordinated Obligations, it being understood that the provisions in the Trust Agreement relating to subordination are intended solely for the purpose of defining the relative rights of the Holders of the Subordinated Obligations and of Senior Indebtedness and nothing in the provisions in the Trust Agreement relating to subordination shall or is intended to, as between the Authority and the Holders of the Subordinated Obligations, impair the obligation of the Authority, which is unconditional and absolute, to pay from the sources provided in the Trust Agreement to the Holders of the Subordinated Obligations the principal of and premium, if any, and interest on the Subordinated Obligations in accordance with their terms, nor shall anything in the provisions in the Trust Agreement relating to subordination prevent the Trustee or the Holder of any Subordinated Obligation from exercising all remedies otherwise permitted by applicable law upon default under the Trust Agreement, subject to the rights, if any, under the subordination provision of the Trust Agreement of the Holders of Senior Indebtedness in respect of cash, property or securities of the Authority received upon the exercise of any such remedy. (Section 12.04 of the Trust Agreement).

#### **Treatment of Enhancement Facilities.**

Any payment made under an Enhancement Facility, to the Holders of the Subordinated Obligations having the benefit of such Enhancement Facility, by the appropriate obligor thereof shall be retained by such Holders for their own account, and no Holder of Senior Indebtedness is to have any right with respect to any such payment so made.

As between the obligor whose Enhancement Facility secures any Subordinated Obligation and the Holder of such Subordinated Obligations, any payment made on such Subordinated Obligation by the Authority which, under the provisions in the Trust Agreement relating to subordination, is required to be paid over to the Holders of the Senior Indebtedness, shall not constitute a payment on such Subordinated Obligation but, instead, shall be treated for all purposes of such Enhancement Facility, as though such payment had not been made by the Authority. Until the Holder of the Subordinated Obligation so guaranteed has received from the Authority, or from such obligor, moneys which such Holder is entitled to retain for its own account, equal in the aggregate to the principal amount of his Subordinated Obligation and any accrued and unpaid interest thereon, such obligor shall remain liable on its Enhancement Facility, and, unless otherwise provided in such Enhancement Facility, shall not be subrogated to any of the rights of the Holder of such Subordinated Obligation. (Section 12.05 of the Trust Agreement).

#### **Amendments to Senior Indebtedness not Requiring Consent of Holders of Subordinate Obligations.**

Unless otherwise provided therefor in the Senior Indebtedness, the Holders of the Senior Indebtedness may extend, renew, modify or amend the terms of Senior Indebtedness or any security therefor and release, sell or exchange such security and otherwise deal freely with the Authority, all without notice to or consent of the Holders of the Subordinated Obligations and without affecting the liabilities and obligations of the Authority or the Holders of the Subordinated Obligations. (Section 12.06 of the Trust Agreement).

#### **SUMMARY OF PROPOSED AMENDMENT TO TRUST AGREEMENT**

The following is a summary of a certain amendment to the Trust Agreement which is expected to take effect upon the consent of Merrill Lynch, Pierce, Fenner & Smith Incorporated, as representative of and on behalf of the Underwriters upon the issuance of the 2012 Senior Bonds. This summary does not purport to be complete and reference is made to the Authority's Third Supplemental Agreement of Trust, adopted by the Authority on February 15, 2012, copies of which are available for examination at the principal corporate trust office of the Trustee.

### **Proposed Amendment**

The Authority is proposing an amendment to Section 8.04 of the Trust Agreement entitled “Acceleration”. Upon consent of the holders of a majority of the aggregate principal amount of the Bonds Outstanding, which is expected to occur upon the issuance of the 2012 Senior Bonds, this amendment would increase from 25% to a majority, the percentage of the aggregate principal amount of Senior Indebtedness (or if no Senior Indebtedness is then Outstanding, of Senior Subordinate Indebtedness) required to declare the entire unpaid principal of the Bonds due and payable upon written notice to the Authority and, thereupon, the entire unpaid principal of the Bonds shall forthwith become due and payable.

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**FORM OF OPINION OF BOND COUNSEL**

437 Madison Avenue  
New York, New York 10022-7001  
(212) 940-3000  
Fax: (212) 940-3111

February 29, 2012

Puerto Rico Aqueduct and Sewer Authority  
San Jan, Puerto Rico

Ladies and Gentlemen:

We have examined a record of proceedings relating to the issuance by Puerto Rico Aqueduct and Sewer Authority (the "Authority"), a governmental instrumentality of the Commonwealth of Puerto Rico (the "Commonwealth") created pursuant to Act No. 40 of the Legislature of Puerto Rico, approved May 1, 1945, as amended and reenacted (the "Act"), of its \$295,245,000 aggregate principal amount of Revenue Bonds, Series 2012B (Senior Lien) (the "Bonds").

The Bonds are being issued pursuant to a Master Agreement of Trust, dated as of March 1, 2008, as amended and restated as of February 15, 2012, and as further amended on February 29, 2012 (as so amended and restated, the "Master Trust Agreement"), by and between the Authority and Banco Popular de Puerto Rico, as trustee thereunder (the "Trustee"), and a series supplement thereto fixing the terms of the Bonds, dated as of February 15, 2012, by and between the Authority and the Trustee (the "2012 Supplement" and together with the Master Trust Agreement, the "Trust Agreements"). Capitalized terms used herein and not otherwise defined shall have the respective meanings ascribed thereto in the Trust Agreements.

The Bonds are being issued for the purpose of (i) repaying a bond anticipation note issued by the Authority, the proceeds of which were used to repay a certain outstanding credit line, (ii) repaying certain lines of credit provided by Government Development Bank for Puerto Rico to the Authority to finance operating expenses and as interim financing for a portion of the Authority's capital improvement program, (iii) paying capitalized interest on the Bonds through July 1, 2013, and (iv) paying certain costs of issuance of the Bonds.

The Authority is authorized to issue or incur Indebtedness, in addition to the Bonds, only upon the terms and conditions set forth in the Master Trust Agreement, and such Indebtedness, when issued or incurred, shall, with all the Bonds, be entitled to the equal benefit, protection and security of the provisions, covenants and agreements of the Master Trust Agreement.

The Bonds are dated, mature, are payable and bear interest in the manner and upon the terms set forth in the Trust Agreements. The Bonds are issuable in the form of fully registered bonds in denominations of \$5,000 each or any integral multiple thereof. The Bonds will be initially registered in the name of Cede & Co., as registered owner and nominee for The Depository Trust Company, New York, New York, which will act as securities depository therefor.

As Bond Counsel we have examined (i) the Act, (ii) certified copies of the proceedings of the Authority authorizing the issuance of the Bonds (iii) the Master Trust Agreement, (iv) the 2012 Supplement and (v) one of the Bonds, as executed and authenticated. We have also examined originals or copies, certified or otherwise identified to our satisfaction, of such instruments, certificates and documents as we have deemed necessary or appropriate for the purposes of rendering the opinions set forth below.

In such examinations, we have assumed the genuineness of all signatures, the authenticity of all documents tendered to us as originals and the conformity to original documents of all documents submitted to us as certified or photostatic copies. As to questions of fact material to our opinion we have relied upon the certified proceedings and

other certifications of public officials furnished to us without undertaking to verify the same by independent investigation.

Based upon the foregoing, we are of the opinion, under existing law, as follows:

1. The Act is valid.
2. The proceedings of the Authority in connection with the authorizing, issuance and sale of the Bonds and the authorization, execution and delivery of the Trust Agreements have been validly and legally taken.
3. The Trust Agreements have been duly authorized, executed and delivered by the Authority and constitute legal, valid and binding obligations of the Authority enforceable in accordance with their terms.
4. The Act and such proceedings show lawful authority of the issuance and sale of the Bonds by the Authority.
5. The Bonds have been duly authorized, executed and delivered by the Authority and constitute legal, valid, binding and enforceable obligations of the Authority payable solely from the Revenues and other available funds to the extent provided in the Trust Agreements, and are entitled to the benefit and security of the Trust Agreements.
6. The Bonds do not constitute a debt of the Commonwealth or of any of its municipalities or other political subdivisions, other than the Authority, and neither the Commonwealth nor any such municipality or other political subdivision, other than the Authority, is liable thereon.

We express no opinion as to any Federal, state, Commonwealth or local tax consequences of the ownership or disposition of the Bonds.

It is to be understood that the rights of the holders of the Bonds and the enforceability thereof may be subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore or hereafter enacted to the extent constitutionally applicable and that their enforcement may also be subject to the exercise of judicial discretion in appropriate cases.

Respectfully submitted,

## FORM OF OPINION OF SPECIAL PUERTO RICO TAX COUNSEL

[Closing Date]

Puerto Rico Aqueduct and Sewer Authority  
San Juan, Puerto Rico

Ladies and Gentlemen:

We have acted as Special Puerto Rico Tax Counsel in connection with the issuance by Puerto Rico Aqueduct and Sewer Authority (the “Authority”), a body corporate and politic constituting an instrumentality of the Commonwealth of Puerto Rico (the “Commonwealth” or “Puerto Rico”) created pursuant to Act No. 40-1945 of the Legislative Assembly of Puerto Rico, approved May 1, 1945, as amended (the “Enabling Act”), of its \$295,245,000 aggregate principal amount of Revenue Bonds, Series 2012B (Senior Lien) (the “Bonds”). As such counsel, we have examined the provisions of the Internal Revenue Code for a New Puerto Rico, Act No. 1-2011 of the Legislative Assembly of Puerto Rico, approved January 31, 2011, as amended (the “PR Code”) and of the United States Internal Revenue Code of 1986, as amended (the “US Code”).

From such examination and based on the provision of the laws of the Commonwealth and the United States of America as now in force, and having regard to legal questions we deem relevant, we are of the opinion that:

1. Interest on the Bonds is:
  - (a) exempt from Puerto Rico income taxes under Section 1031.02(a)(3)(B) of the PR Code and Article 15 of the Enabling Act;
  - (b) excluded under Section 1022.04(b)(2) of the PR Code from the “adjusted net book income” of a corporation for purposes of computing the alternative minimum tax imposed by Section 1022.03(a) of the PR Code;
  - (c) exempt from the Puerto Rico alternative basic tax under Section 1021.02(a)(2) of the PR Code; and
  - (d) exempt from Puerto Rico municipal license taxes under Section 9(25) of the Puerto Rico Municipal License Tax Act of 1974, as amended.
2. The Bonds are exempt from Puerto Rico personal property tax pursuant to Section 3.11 of the Puerto Rico Municipal Property Tax Act of 1991, as amended, and Section 3 of the Puerto Rican Federal Relations Act.
3. The Bonds are exempt from Puerto Rico (i) gift tax with respect to donors who are residents of Puerto Rico at the time the gift is made and (ii) estate tax with respect to estates of decedents who are residents of Puerto Rico at the time of death and who acquired their United States citizenship solely by reason of birth or residence in Puerto Rico.
4. The Bonds will be considered an obligation of an instrumentality of Puerto Rico for purposes of: (i) the non-recognition of gain rules under Section 1034.04(f)(2)(A) of the PR Code applicable to certain involuntary conversions; and (ii) the exemption from the surtax imposed by Section 1022.05 of the PR Code available to corporations and partnerships that have a certain percentage of their net income invested in obligations of instrumentalities of Puerto Rico and certain other investments pursuant to Section 1022.05(g) of the PR Code.

5. Interest on the Bonds constitutes industrial development income under Section 2(j) of the Economic Incentives for the Development of Puerto Rico Act, or under analogous provisions of similar prior acts (collectively referred to as the “Acts”), when received by a holder of a grant of tax exemption issued under any of the Acts that acquired the bonds with eligible funds, as such term is defined in the Acts.

The PR Code does not contain any provisions regarding the treatment of the excess of a Bond’s redemption price at maturity over its initial issue price (original issue discount). However, under the administrative practice followed by the Puerto Rico Treasury Department with respect to the repealed Puerto Rico Internal Revenue Code of 1994, original issue discount was treated as interest.

Prospective owners of the Bonds should be aware that, pursuant to Section 1033.17(a)(10) of the PR Code, ownership of the Bonds may, under certain circumstances, result in a disallowance, for Puerto Rico income tax purposes, of interest expense related to an investment in the Bonds.

**IRS Circular 230 Disclosure: The following tax discussion is not intended or written to be used, and cannot be used by any taxpayer, for purposes of avoiding penalties that may be imposed on a taxpayer by the Internal Revenue Service. This tax discussion was written in connection with the promotion or marketing of the Bonds. Each prospective purchaser of the Bonds should seek tax advice from an independent tax advisor based on its particular circumstances.**

Based upon the provisions of the US Code, now in force and the rules and regulations thereunder, it is our opinion that:

1. Interest or original issue discount on the Bonds owned by an individual is excludable from the gross income of the individual for United States federal income tax purposes under Section 933 of the US Code if (a) the individual is a bona fide resident of Puerto Rico during the entire taxable year in which such interest or original issue discount is to be recognized for purposes of the US Code and (b) such interest or original issue discount is not, and is not treated as, income effectively connected with, or attributable to, the conduct of a trade or business within the United States by such individual under the US Code.
2. Interest or original issue discount on the Bonds derived by a corporation organized under the laws of Puerto Rico or by any foreign corporation for purposes of the US Code is not subject to United States federal income tax under the US Code if: (a) such interest or original issue discount is not, and is not treated as, income effectively connected with, or attributable to, the conduct of a trade or business in the United States by such corporation under the US Code; (b) such corporation is not a controlled foreign corporation or a passive foreign investment company under the US Code; and (c) such corporation is not treated as a domestic corporation for purposes of the US Code.
3. United States taxpayers, other than individuals who comply with the requirements set forth below, may be subject to federal income tax on any gain realized upon sale of the Bonds. Pursuant to Notice 89-40, issued by the United States Internal Revenue Service on March 27, 1989, and the regulations issued under Section 937 of the US Code, the gain from the sale of the Bonds by an individual who is a bona fide resident of Puerto Rico will constitute Puerto Rico source income, and therefore will qualify for exclusion from gross income under Section 933 of the US Code, provided (i) said Bonds do not constitute inventory in the hands of such individual, (ii) such gain is not attributable to an office or fixed place of business of the individual located outside of Puerto Rico and (iii) the individual has been a bona fide resident of Puerto Rico for the shorter of (1) the full period during which the individual has owned the Bonds or (2) each of the ten years preceding the year of the sale. In the case the individual is a bona fide resident of Puerto Rico for the tax year for which the source of income must be determined and the individual was a United States citizen or resident (other than a bona fide resident of Puerto Rico) for any of the ten years preceding said year, the individual may elect to treat as gain from sources within Puerto Rico the portion of the gain attributable to the individual’s holding period in Puerto Rico.



Prospective owners of the Bonds should consult their tax advisors with respect to the precise determination of the Puerto Rico and United States federal tax consequences arising from ownership or disposition of the Bonds.

This opinion is limited to the above, and we do not express any other opinion regarding the Puerto Rico or United States federal tax consequences arising from ownership or disposition of the Bonds.

This letter is furnished by us solely for the benefit of the Authority and the holders from time to time of the Bonds and may not be relied upon by any other person.

Respectfully submitted,

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