Puerto Rico Aqueduct and Sewer Authority

FINAL REPORT

Fiscal Year 2015
Consulting Engineer's Report
for the Puerto Rico Aqueduct and Sewer Authority

ARCADIS Design & Consultancy for natural and built assets

DECEMBER 2016

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FISCAL YEAR 2015 CONSULTING ENGINEER'S REPORT FOR THE PUERTO RICO AQUEDUCT AND SEWER AUTHORITY

To satisfy the requirements of Section 7.07 of the 2012 Master Agreement of Trust by and between PRASA and Banco Popular de Puerto Rico as Trustee; and Section 3.5 of the 2012 Fiscal Oversight and Support Agreement by and between PRASA, the Commonwealth of Puerto Rico and the Government Development Bank for 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.

Acronym	Definition
ABT	Additional Bonds Test
AMR/AMI	Automatic Meter Reading and/or Advanced Metering Infrastructure
AOP	All Other Perils
ASD	Automatic Shutdown
AWWA	American Water Works Association
BFP	Belt Filter Plan
BNR	Biological Nutrient Removal
BOR	Broker of Record
CAA	Coefficient of Annual Adjustment
CAB	Coefficient of Annual Base
CAGR	Compound Annual Growth Rate
CAT	Catastrophe Modelling
CT	Contact Time
CBA	Collective Bargaining Agreement
CCL	Contaminant Candidate List

Acronym	Definition
CD	Coefficient of Deficiency
CER	Consulting Engineer's Report
CIP	Capital Improvements Program
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DACO	Department of Consumer Affairs of Puerto Rico (by its Spanish Acronym)
DBP	Disinfection Byproducts
DBPR	Disinfection Byproducts Rule
DMR	Discharge Monitoring Report
DNER	Department of Natural and Environmental Resources
DSC	Debt Service Coverage
ECRC	Environmental Compliance and Regulatory Charge
EPC	Energy Performance Contract
EPL	Excess Employment Liability
ESCO	Energy Service Companies
FEMA	Federal Emergency Management Agency
FOA	Fiscal Oversight and Support Agreement
FY	Fiscal Year
GDB	Government Development Bank for Puerto Rico
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
GWUDI	Groundwater Under the Direct Influence of Surface Water
HAA	Haloacetic Acid
HIEPAAA	Hermandad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados
ILI	Infrastructure Leakage Index
IMP	Integrated Maintenance Program
KPI	Key Performance Indicators
kWh	Kilowatt-Hour
LOC	Line of Credit
LTCP	Long-Term Control Plan
M	Million
MAPFRE	MAPFRE PRAICO Insurance Company
MARSH	Marsh Saldaña
MAT	Master Agreement of Trust (as amended)

Acronym	Definition
MG	Million Gallons
MGD	Million Gallons per Day
NMC	Nine Minimum Controls
NPDES	National Pollutant Discharge Elimination System
NRW	Non-Revenue Water
OCIP	Owner Controlled Insurance Program
O&M	Operation and Maintenance
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OTC	Operator Training Center
PAN	Programa de Asistencia Nutricional
PCC	Plant Control Center
PMC	Program Management Consultant
PML	Probable Maximum Loss
PPA	Power Purchase Agreement
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRDOH	Puerto Rico Department of Health
PREPA	Puerto Rico Electric Power Authority
PROMESA	Puerto Rico Oversight, Management, and Economic Stability Act
PRPB	Puerto Rico Planning Board
PWS	Potable Water Systems
RFP	Request for Proposal
R&R	Renewal and Replacement
SAP	Systems, Applications, and Products in Data Processing
SBR	Sequencing Batch Reactor
SDWA	Safe Drinking Water Act
SEC	Securities and Exchange Commission
SIR	Self-Insured Retention
SMP	Surveillance and Monitoring Plans
SRF	State Revolving Funds
SSOMP	Sewer System Operation & Maintenance Plan
STS	Sludge Treatment System
SWTR	Surface Water Treatment Rule
TANF	Programa de Asistencia Temporal para Familias Necesitadas
TIV	Total Insurable Value
TOC	Total Organic Carbon

Acronym	Definition
TTHM	Total Tri-halomethane
UIA-AAA	Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados
U.S.	United States
USDA	U.S. Department of Agriculture
USDOJ	U.S. Department of Justice
USEPA	U.S. Environmental Protection Agency
UV	Ultraviolet
VAT	Value Added Tax
WPS	Water Pump Station
WTP	Water Treatment Plant
WWPS	Wastewater Pump Station
WWTP	Wastewater Treatment Plant
XCU	Explosion, Collapse or Underground

Executive Summary

E.1. Introduction

Arcadis Caribe, PSC (formerly MP Engineers of Puerto Rico, PSC) in collaboration with Arcadis U.S., Inc. has been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in the preparation of a Consulting Engineer's Report (CER) to satisfy the reporting requirements specified in Section 7.07 of the 2012 amended and restated Master Agreement of Trust by and between PRASA and Banco Popular de Puerto Rico as Trustee (MAT), and Section 3.5 of the 2012 amended and restated Fiscal Oversight and Support Agreement (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the Government Development Bank for Puerto Rico (GDB) as Fiscal Agent to PRASA. However, pursuant to Act 21 of 2016, the Puerto Rico Fiscal Agency and Financial Advisory Authority (PRFAFAA) was established as an independent public corporation and governmental instrumentality that assumed all fiscal agency responsibilities previously assigned to GDB. PRFAFAA also acts as financial advisor and reporting agent of the Commonwealth and its public corporations, including PRASA.

As required by Section 7.07 of the MAT, unless the Senior Bonds have been rated investment grade by at least two Rating Agencies for 24 consecutive months, the Consulting Engineer shall prepare a CER to document the current condition and changes, if any, in PRASA's operation and the performance of the water and wastewater systems (the System). Also, as required by Section 3.5 of the 2012 FOA, PRASA must maintain a continuous disclosure policy with the Fiscal Agent and satisfy certain reporting requirements throughout the fiscal year (FY).

Arcadis has prepared this CER for fiscal year 2015 (2015 CER). The submittal of this report was delayed because of PRASA's on-going efforts during FY2015 and FY2016 to issue bonds to finance its Capital Improvements Program (CIP) and settling on a concrete Financial Plan under the current fiscal situation.

Unless otherwise indicated, Arcadis's opinion with respect to the technical, operational and financial situation and related matters of PRASA's System is presented for FY2015. Any statements contained in this report involving estimates or matters of opinion, whether or not so specifically designated, are intended as such, and not as representations of fact. Arcadis 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 Arcadis by PRASA is not accurate, the conclusions and recommendations contained in this report may vary and are subject to change. Changed conditions occurring or becoming known after the issuance of or beyond the period covered by this 2015 CER could affect the material presented to the extent of such changes. Arcadis has no responsibility for updating this report for changes that occur beyond the date of its issuance.

Recent federal legislation, including enactment of the Securities and Exchange Commission (SEC) Dodd-Frank Act Amendments (the Exchange Act) requires disclosures and documentation between Arcadis, PRASA and PRASA's registered municipal advisor. PRASA is aware of the "Municipal Advisor Rule" of the SEC and the "independent municipal advisor" exemption from the definition of "advice." PRASA has acknowledged that it wishes Arcadis to continue to provide recommendations to PRASA as per the Consulting Engineer's requirements stipulated in the 2012 MAT. PRASA will rely on its registered municipal advisor for advice; as well as its Fiscal Agent and/or the registered municipal advisors currently engaged by the Fiscal Agent, as necessary. Refer to the Section 1.5 of this 2015 CER for Arcadis's *Statement of Disclosure.*

E.2. Organizational Updates and Changes

PRASA is organized into five operational Regions (North, South, East, West and Metro) and is managed by an Executive Management Team that provides the day to day management oversight and coordination for all institutional activities. It is supported by various departments in the organization including, but not limited to finance, human resources, customer services, purchasing and logistics, and information systems.

During FY2015, PRASA's Governing Board, as per Act No. 15 of May 6, 2013, was composed by nine members: the Secretary of the Puerto Rico Department of Transportation and Public Works and the Puerto Rico Planning Board Director; one engineer licensed to practice the engineering profession in Puerto Rico; one lawyer with at least seven years of experience authorized to practice law in Puerto Rico; one member with a wide knowledge and experience in corporate finances; two ex-officio members, the Executive Director of the Mayors Association and the Executive Director of the Mayors Federation; and two customer (consumer) representatives. The two customer representatives are elected through a public selection process under jurisdiction of and directed by the Department of Consumer Affairs of Puerto Rico (DACO, by its Spanish acronym). Since Act No. 92 was enacted in 2004, PRASA has gone through several management changes at many levels of its organization including the executive level. It is Arcadis's opinion that these changes and their resulting successions and transitions have been adequately executed and have not affected the stability of the organization or the continuity of the operations.

PRASA continues to have some staffing needs at individual facilities or departments and despite notable improvements over recent fiscal years, PRASA's overall staff levels continue to be high when compared to the Executive Management Team's baseline staffing (4,693). Notwithstanding, as per the American Water Works Association (AWWA) 2015 Benchmarking Performance indicators PRASA's customer account per employee ratio falls within the lower end of the industry median, which can be attributed to PRASA's System size and complexity.

PRASA's staff totaled 4,989 at the end of FY2015, and 4,944 as of September 30, 2015. In FY2014 PRASA conducted an organizational study to provide the necessary information to the Executive Management Team regarding its human resources, to identify opportunities that will enable and

contribute to its effective management and to optimize its deployment. The study, performed by Vision to Action, a strategic management consulting firm, identified that PRASA requires 4,693 employees (251 less than current staff levels) to operate the System at current levels of quality and efficiency. PRASA has indicated that this baseline staffing level will be achieved through a combination of the staffing control policies that have been employed, the regular annual employee attrition, and focused hiring practices to balance understaffed areas/departments while striving to meet the effective number of employees.

In FY2012, PRASA and its larger union, the *Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados* (UIA-AAA), signed a new Collective Bargaining Agreement (CBA), effective from January 2012 through December 2015. It included certain retroactive and future economic agreements that have an impact on PRASA's payroll and benefits expense projections which started in FY2013. Also, PRASA and the HIEPAAA signed a new CBA effective from May 2012 through June 2016. It also contains certain economic agreements (i.e., salary increases) that also have an impact on PRASA's Payroll and Benefits expenses. However, the Commonwealth of Puerto Rico, through the enactment of Act 66 of June 17, 2014 – Fiscal and Operational Sustainability Act for the Commonwealth of Puerto Rico (Act 66-2014), declared a fiscal emergency and required that its instrumentalities (i.e., utilities, government agencies, and public corporations such as PRASA) implement certain measures to reduce its expenses.

Act 66-2014 has primacy over any other law and will remain in place for three years or until certain economic and financial conditions are met. Under Act 66-2014, PRASA negotiated some terms included under the CBAs with both UIA-AAA and HIEPAAA. Both UIA-AAA and HIEPAAA unionized personnel agreed with PRASA that the CBAs will continue as stipulated except for some terms which include: the saving plans, salary increases, holiday and sick days' benefits, among others. Cost savings projected to be achieved from the CBAs together with health benefits and the additional cost savings measures implemented by PRASA, including reductions to benefits of management employees and reductions in contracted services were initially expected to provide approximately $37 million (M) in savings. However, actual savings in FY2015 were approximately $31M: $18M in accrued expenses and $13M in reductions in cash payments related to vacations, sick and retirement bonuses, which were accrued but not paid pursuant to the provisions of Act 66-2014. The difference of $6M is primarily the result of a delay in the implementation of flexibility of works through the universal-brigades[1] that were expected to generate savings in overtime and maintenance expenses and which implementation is currently being negotiated with the UIA-AAA.

Savings in future years will vary, depending on the projected increases that were to take place, but will not because of the freeze in payroll and benefits. These savings will help offset the revenue reduction from certain government accounts, since billings will be based on the rate structure that was in place prior to July 15, 2013 instead of the existing rate structure resulting from Act 66-2014.

[1] Refers to repair crews that can work on either potable water distribution systems as well as wastewater collection systems provided they maintain quality control protocols.

Furthermore, due to the ongoing fiscal situation, the Puerto Rico Government Enacted Act 211-2015 (an early retirement law), which might help PRASA reduce expenses but needs to be leverage with the replacement or balancing of the experience that would be lost. PRASA is evaluating impacts and benefits of this law.

Additionally, PRASA's unions and Executive Management Team agreed to certain non-economic agreements which include, among others: implementation of performance metrics to evaluate performance and productivity, the incorporation of computerized handheld meter readers and use of global positioning system (GPS) data for disciplinary actions, and flexibilization of work shifts and functions in certain areas, as well as agreeing to certain modifications to disciplinary actions and the conversion of temporary employees (expected to be approximately 300) to regular positions, but with the benefits established by law rather than under the CBAs. These agreements shall remain in effect through June 30, 2017, when the reductions mandated by the Act 66-2014 cease to be in effect. However, its effectiveness may end earlier if certain parameters are met. Conversely, if the fiscal emergency does not improve, the Commonwealth's Legislative Assembly could extend the effectiveness of Act 66-2014 beyond 2017, maintaining its cost savings and restrictions. PRASA's management continues to maintain a positive working relationship and open communication channels with the unions.

PRASA's organization will likely undergo further changes in leadership and management because of the November 2016 election as, traditionally, the elected party appoints their representatives in trusted governmental positions and entities. Therefore, there is a potential for a transitional period if the impending changes in leadership within PRASA materialize.

Finally, PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer service, System performance, and budget controls as stipulated in its Strategic Plan.

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. Between August and November of 2015 and on January 2016, Arcadis assessed the condition of PRASA's System through an inspection program of a sample of facilities that included a selection of the major elements of the 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. Arcadis is conducting these facility inspections approximately every two years. As part of this effort, Arcadis evaluated the compliance results for all PRASA water treatment plants (WTP) and wastewater treatment plants (WWTP) for the period of January 1, 2014 through June 30, 2015.

Regarding the 2015 inspections, the condition of the facilities visited varied from new to those requiring capital upgrades and/or operational/process improvements. Compliance with discharge permit limits and drinking water standards varied depending on the plant age, condition and experience of operators. In general, the condition of the facilities averaged an adequate rating, and an overall improvement from previous results was observed as shown in Table ES-1.

Table ES-1:
FY2015 Asset Condition Ratings by Facility

Asset Category	Overall Condition Ratings						2015 vs. 2014	
	2008 CER	2009 CER	2010 CER	2012 CER	2014 CER	2015 CER	Change in Overall Score	Percent Change
Regulated Dams	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	0.0	-
Water Treatment Plants	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	-0.3.	-13.0%
Wastewater Treatment Plants	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	-0.1	-5.0%
Wells	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	-0.3	-13.6%
Water Pump Stations	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	0.0	-
Wastewater Pump Stations	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	0.1	4.3%
Water Storage Tanks	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	-0.1	-4.2%

Based on the regulatory compliance results evaluated for the 2015 CER, despite some operational (process control) and compliance issues, the treatment facilities are generally producing and delivering potable water and conveying and treating wastewater adequately.

Cidra Dam, which was rated as adequate in the previous inspection, was degraded to poor. Thus, only one dam was graded as poor during this inspection period, same quantity of dams with poor rating as the previous inspection. Cidra, is utilized by PRASA as a raw water source and represents a high hazard in the event of an uncontrolled release of impounded water or in the ability to provide constant quality drinking water. Las Curías, which was rated as poor in the last inspection improved to adequate. Finally, addressing the priority items indicated in PREPA's inspection reports and the additional observations made by Arcadis included in the asset conditioning report, would give the dams a higher level of safety, and would help maintain the physical conditions of the structures so that they can continue serving the water supply system as expected.

A small number of WTPs declined from good to adequate, performing slightly worse with respect to compliance with limits of effluent discharge parameters. This was mostly driven by a decrease in the compliance criteria and, more specifically, because of the implementation of Stage 2 Disinfection Byproducts Rule (D/DBPR). PRASA acknowledges that it has some challenges ahead to bring these facilities (systems) into compliance with the new regulation as future regulations

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. However, PRASA has begun conducting evaluations, water quality modeling, developing action plans and implementing remedial actions to minimize these non-compliance events but efforts have been hindered due to the fiscal situation. Furthermore, facility ratings decreased in all criteria compared to the 2014 inspections, except operations/process control which remain the same. This decline in ratings is an effect of the slowing down of the capital improvement, renewal and replacement (R&R) programs and operational expenses due to the fiscal situation and budget limitations. Furthermore, the financial stress PRASA has undergone for the last few years has not only affected issues related or needing capital investment. Management has been forced into prioritizing operational expenses as well. Given the results in compliance and existing condition of the facilities, it is evident that capital improvements are needed to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, allow continued economic development and help bring the System into compliance with all regulatory agencies. In addition, PRASA should continue to standardize processes and providing more tools and training to operators regarding process controls and actions, to facilitate and improve plant operations and performance. Finally, PRASA should address the shortcomings identified during inspections to bring these facilities into continuous and consistent compliance.

Regarding the WWTPs, some of the facilities that obtained a low rating/score have at least one project identified in PRASA's CIP, or PRASA has indicated that is working on identifying operational measures to improve the facilities. Some of the facilities which have being rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters. There were nine facilities rated as poor compared to only two in the 2014 inspections. Furthermore, the equipment/maintenance ratings decreased 0.3 from the 2014 inspections and the staffing reflected the need of staff in some facilities by its 1.0 decrease in ratings. The decline in WWTP condition and ratings is an effect of recurring observations from previous inspections that have yet to be addressed and the slowing down of the capital improvement and R&R programs due to the fiscal situation and budget limitations. Furthermore, process control continues to be a challenge in some of the facilities, even though standard operating procedures and control strategies are said to be followed. Bringing these facilities into consistent and sustained compliance with discharge parameters, address the shortcomings identified during inspections and additional operational improvements including new process equipment, process automation and process control optimization are some of the measures that PRASA must undertake to continue to maintain the condition of these facilities.

Regarding the ancillary assets, inspections were about doubled, two operational areas within each region were visited thus a larger sample was obtained. There was an equivalent or slight improvement in overall scores for WWPS and WPS and a slight decrease for water tanks. A

significant lower rating in wells overall scores compared to the 2014 results. Most of the deficiencies noted can be addressed through PRASA's R&R program and may not require major capital improvements. Note, however, that implementation of PRASA's R&R program also depends on PRASA's ability to identify and obtain financing. In addition, future regulatory requirements may require either the implementation of significant capital improvements to include and achieve additional treatment capabilities at well facilities, or the closure of certain wells. Furthermore, in light of the recent drought in 2015 and activation of wells as an action by PRASA to mitigate the effects of the drought and the probability of additional activation of wells in the future, it is imperative that the facilities are considered in the R&R program or by the CIP if need be. Note, however, that financing of PRASA's R&R program has also been negatively affected given PRASA's fiscal situation.

Arcadis analyzed the PRASA-reported data on water leaks and sewer overflows. Reported active leaks and sewer overflows remain at high levels when compared to other utilities in the United States (U.S.) and Canada[2]; however, it must be noted that PRASA owns and operates a much more complex network of water and sewer infrastructure. In FY2015, PRASA improved its metrics for percent repaired and backlog days of pending repairs with duration greater than seven days for leaks and overflows. Also, PRASA reports that, on average, 97% of island-wide weekly reported leaks were repaired resulting in a decrease in PRASA's pending leaks general backlog. In a similar trend, 99% of island-wide weekly reported overflows were repaired. PRASA also decreased its backlog days of pending leaks and overflows with duration greater than seven days from 0.4 days (FY2014 result) down to 0.3 days and from 0.17 days (FY2014) down to 0.09 days, respectively. PRASA reports that during FY2015, leaks were repaired, on average, within 62.03 hours of identification (or receiving notice from client). The average for the first three months of FY2016 increase slightly up to 63.43 hours and overflows, which were previously not measured, on average, were repaired within 33.04 hours of identification. This demonstrates improvement in PRASA's response practices and time and validates PRASA's commitment to strive for transforming into a World Class Agency by aggressively pursuing its mission of providing quality water and wastewater services at the lowest possible cost.

PRASA reports to have reduced the amount of water produced, the amount of Non-Revenue Water (NRW), and the amount of water losses. Since FY2012, PRASA's NRW levels have been consistently declining. In FY2015, of the total 557 million gallons per day (MGD) produced, approximately 307 MGD was NRW (55.1%). Of this amount of NRW, 299 MGD (97.4%) was due to water losses (both apparent and real) and 8 MGD (2.6%) was due to unbilled authorized consumption. Of the total amount of water losses in FY2015, approximately 64 MGD (21.4%) was due to apparent (commercial) losses, while approximately 235 MGD (78.6%) was due to real (physical) losses. The percentage amount of water losses and NRW in FY2015 both reduced by about 3.6%, compared to FY2014 results; and by about 5.2% and 6.4%, respectively when

[2] Refer to Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, AWWA (2015)

compared to FY2012. Also, from FY2012 to FY2015, PRASA reports to have reduced the amount (volume) of water produced (72 MGD reduction), amount of water losses (71 MGD reduction), and NRW (80 MGD reduction).

Also, since FY2012, PRASA began measuring the Infrastructure Leakage Index (ILI) which is an indicator that is used to measure the level of physical losses in the water distribution system. More specifically, the ILI is defined as the current annual real losses divided by the unavoidable annual real losses. The unavoidable annual real losses represent the lowest technically achievable annual real losses for a well-maintained, well-managed system and is the likely lower bound on water losses. As a performance indicator, the ILI represents a measure of the combined performance of three infrastructure management methods for real losses: the speed and quality of repairs, active leakage control, and assets management. Factors that affect the ILI include the pipe age and material, customer density, and system pressure. The ILI was introduced in 2000[3] and is also defined and calculated in AWWA's M36 Water Audits and Loss Controls manual. The ILI has been adopted around the world, although it is mostly used in Europe. An ILI between 1 and 3 is considered excellent. U.S. utilities currently measuring the ILI for their systems reported values ranging from 0.7 to 11.2. Globally, systems in developed countries report lower values of 5; while in developing countries values range from 10 up to about 50. In FY2012, PRASA reported an ILI of about 18. However, since then, PRASA's ILI has reduced by about 40%: reported values for FY2013, FY2014 and FY2015 were about 13, 11 and 10, respectively. PRASA has indicated that these reductions have been achieved through the implementation of the following measures:

- Improvements in data management and quality (better production measurement).
- Reduction in events and duration of water storage tank overflows.
- Reduction in the time to repair leaks.
- Leak detection with specialized equipment.
- Pressure management in the distribution system.

Finally, PRASA reports to have treated, on average, 233 MGD of wastewater during FY2015 which shows a reduction (about 11 MGD less) from the amount treated in FY2014.

E.4. O&M Practices and Strategic Plan

Arcadis assessed the adequacy of PRASA's Operation and Maintenance (O&M) practices based on compliance with regulatory requirements, interviews with PRASA personnel, and facility observations by field inspectors obtained through the 2015 asset condition assessment effort previously described. Overall, Arcadis found PRASA's O&M practices to be adequate and noted

[3] Source: Alegre, H. Hirner, W., Bapista, J., and Parena, R. (2000). "Performance indicators for water supply services" IWA Manual of Best Practices

that during FY2015, through the roll-out, deployment and stewardship of PRASA's Strategic Plan, changes and improvements in PRASA's O&M practices made positive impacts on the System.

Most WTPs and WWTPs were found to be adequately operated and maintained. However, there were a few WTP and WWTP facilities that lacked the appropriate operational tools (i.e., O&M manuals, process controls, and laboratory equipment) at the moment inspections were conducted. Also, even though PRASA has improved its processes for prioritizing, scheduling, and executing preventive, corrective and routine maintenance activities; there is still room for further improvement, particularly for buried infrastructure. Overall, Arcadis observed that, throughout time, PRASA's O&M efforts have improved. Arcadis also found that ancillary facilities, for the most part, are being adequately operated and maintained. Nevertheless, several these facilities were found to have at least one operational and/or maintenance shortcoming.

PRASA continues its mission of providing quality water and wastewater services at the lowest possible cost. As previously reported, PRASA's Executive Management Team developed and implemented a Strategic Plan that is comprised of five key strategic initiatives: 1) Fiscal Health, 2) Operational Excellence, 3) Infrastructure and Sustainability, 4) Organizational Transformation, and 5) Technological Innovation; it also includes programs involving projects to be executed between FY2014 through FY2018. The Strategic Plan also includes key performance indicators (KPI) and metrics established by PRASA's Executive Management Team to track and improve operational performance. PRASA's Executive Management Team is currently in the process of revising and refining certain aspects of its Strategic Plan considering the lessons learned during FY2014 and FY2015 with realignment of strategic initiatives such as Fiscal Health (to include a plan to self-finance PRASA's CIP in the future, and reduce the dependency on bonds within a 10-year period) and Organizational Transformation. Key Performance Indicator (KPI) goals were adjusted (made stricter) for FY2015; and the methodology for calculating certain KPIs was revised to better align these with Management's goals.

Arcadis evaluated PRASA's annual System O&M costs. PRASA's FY2015 O&M expenses were approximately $635M, of which $558M were directly related to the O&M of the System. The other $77M were 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. PRASA estimates that approximately 75% of its System O&M budget ($418M) is allocated to the water system and the remaining 25% ($140M) to the wastewater system. PRASA continues its effort to become more efficient by exercising greater management controls to reduce its O&M costs and by implementing various operational programs and initiatives, now contained within its five-year Strategic Plan.

PRASA's O&M budgets are comparable to the most recently published median benchmark results published by the AWWA in 2015[4].

Table ES-2 provides a comparison of PRASA's metrics to several key O&M benchmarks. Table ES-3 presents a summary of PRASA's KPIs goals and results. In FY2015, PRASA achieved approximately 54% of its KPIs on an island-wide basis. Note though, that this was only the second full fiscal year of KPI measurement and that, as indicated by PRASA's Management, some of the established goals were made stricter and even more challenging due to the 2015 drought and the current fiscal situation.

Table ES-2:
PRASA Metrics vs. Water/Wastewater Utilities Benchmarks

Benchmark Category	2013 Benchmarks[1]			PRASA[2]
	Top Quartile	Median	Bottom Quartile	
Water O&M Cost per Account	$243	$361	$542	FY2010: $292 FY2011: $309 FY2012: $321 FY2013: $357 FY2014: $350 FY2015: $338
Water O&M Cost per MG Processed	$1,549	$2,240	$3,544	FY2010: $1,555 FY2011: $1,702 FY2012: $1,777 FY2013: $1,991 FY2014: $1,993 FY2015: $2,061
Water O&M Cost per 100 miles of pipe	$1,407,499	$2,123,944	$3,244,327	FY2014: $2,948,365 FY2015: $2,840,100
Wastewater O&M Cost per Account	$238	$344	$476	FY2010: $214 FY2011: $225 FY2012: $236 FY2013: $199 FY2014: $192 FY2015: $184
Wastewater O&M Cost per MG Processed	$1,535	$2,233	$3,793	FY2010: $1,949 FY2011: $2,067 FY2012: $2,151 FY2013: $1,692 FY2014: $1,628 FY2015: $1,646
Wastewater O&M Cost per 100 miles of pipe	$1,772,328	$2,386,572	$3,369,531	FY2014: $2,418,931 FY2015: $2,335,669

[4] Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, AWWA (2015)

[1] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, AWWA (2015)
[2] 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 O&M contract fee, insurance and other expenses, less capitalized operating expenses.

Table ES-3:
PRASA Operations Key Performance Indicators for FY2015 and for the first three months of FY2016

Key Performance Indicators	FY2015 Goals	Results as of June 2015	FY2016 Goals	Results of first three months of FY2016
Employees per Connection	3.03 or less Employees/ 1,000 connections	2.85	3.28 or less Employees/ 1,000 connections	3.46
Overtime	Reduce to 8%	11%	Reduce to 8%	12%
Budget Compliance (excludes electricity costs)	Below 100%	92%	Below 100%	95%
Collections vs. Billings	Increase to 93.75% or Above	91.79%	Increase to 96% or Above	92%
Compliance - Water System	Increase to 98% or Above	99.4%	Increase to 99% or Above	99.4%
Compliance - Wastewater System	Increase to 97% or Above	97.2%	Increase to 97% or Above	97.8%
Billing Adjustments	Increase to 97.5% or Above	96.8%	Increase to 97.5% or Above	97.9%
Complaints in Customer Service (per 1000 active accounts)	Reduce to 16.68	19.9	Reduce to 16.68	19.5
Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers)[1]	Reduce to 6.5%	5.3%	Reduce to 5%	-
Customer Attention Time (Commercial Office)	Maintain below 25 min.	26.39 min	Maintain below 30 min.	20.00 min
Vehicle Availability	Increase to 90% or Above	87%	Increase to 92% or Above	87%
Average Processing Time of Purchase Orders	Less than 15 days	14 days	Less than 25 days	19 days
Preventive vs. Corrective Maintenance Ratio	Increase to 80%: 20%	78	Increase to 80%: 20%	78
Average Time for Equipment Repairs	Less than 20 days	30 days	Less than 25 days	23 days
Reported Overflows	Reduce to 2,512 monthly or less	2,378	Reduce to 2,221 monthly or less	2,437 per month
Reported Leaks	Reduce to 4,509 monthly or less	5,225	Reduce to 3,296 monthly or less	4,736 per month
Repair time for leaks	Reduce to 60.0 hrs.	62.03 hrs.	Reduce to 58.0 hrs.	63.43 hrs.
Repair time for overflows	(New KPI for FY2016)		Reduce to 36.0 hrs.	33.04 hrs.
Average Water Production (MGD)[2]	Reduce to 565 MGD	557 MGD	Reduce to 558 MGD	477 MGD
Energy Consumption (Annual)	Reduce to 710.28MKwH	684.42 MKwH	Reduce to 660.34MKwH	149.71[5] MKwH
Project Progress (CIP)	Greater or equal to 0.9	1.0	Greater or equal to 0.9[3]	-

Key Performance Indicators	FY2015 Goals	Results as of June 2015	FY2016 Goals	Results of first three months of FY2016
Cost Performance (CIP)	Greater or equal to 0.9	1.0	Greater or equal to 0.9[3]	-
Training (cumulative hours per employee)	More than 24 hrs. per year	26.88	More than 25 hrs. per year	3.78 first 3 months
Unplanned Work Effectiveness (Absenteeism)	Reduce to 1.5 days	2.82 days	Reduce to 2 days	2.23 days
Planned Work Effectiveness	Reduce to 10%	5%	Reduce to 10%	4%
Percent of NRW[4]	Reduce to 56.9%	57.8%	-	-

[1]The Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers) does not include the months of May and June 2015 to exclude the service interruptions due to the 2015 drought event rationing plan. Also, this indicator was not evaluated for the first three months of FY2016 due to the rationing plan in effect during these months.
[2] The Average Water Production (MGD) KPI was not used by PRASA for the evaluation of the overall KPI score because of the 2015 drought event rationing plan and constant modification of the metric goal during the evaluated period.
[3] According to PRASA, the Project and Cost Performance KPIs for FY2016 are being measured only by Region, as such, no overall goal and result is presented for the first three months of FY2016.
[4] The Percent of NRW KPI is only measured annually and island-wide.
[5] Cumulative for the first three months of 2016.

E.5. Capital Improvement Program and Regulatory Compliance

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 includes projects that 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 R&R to the System. The purpose of the CIP is to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, permit continued economic development and help bring the System into compliance with all regulatory requirements.

PRASA's projected FY2015 approved CIP totaled approximately $291M; however, PRASA's preliminary CIP expenditure results amounted to approximately $251M. As required by PRASA's Governing Board, PRASA's Infrastructure Department must annually submit for its approval an updated five-year CIP plan. PRASA's Governing Board under Board Resolution No. 2909, approved PRASA's CIP plan for FY2016 through FY2020. The CIP provided by PRASA for this 2015 CER covers the period from FY2016 through FY2020 and amounts to $1,383.1M. Approximately 38% of projected expenditures are compliance driven (mandatory and non-mandatory) projects. To this approved amount, a revised amount of approximately $40M in additional CIP uses for FY2016 was added, due to delays in the implementation of certain CIP projects during FY2015 caused by the difficulty in obtaining CIP funds. Therefore, the total available for FY2016 through FY2020 amounts to $1,423.1M. PRASA continues to evaluate its CIP projections and will likely be re-adjusted if funding delays continue.

PRASA and the Regulatory Agencies entered in discussions to modify certain requirements of the existing consent decrees and agreements to re-align compliance priorities and, in turn, help alleviate

PRASA's financial burden. In general terms, these modifications are expected to result in the postponement, elimination or advancement of the implementation of certain projects currently included in the CIP, and/or the modification of their scopes of work. After an extensive negotiation process and under the terms agreed upon by PRASA and the U.S. Environmental Protection Agency (USEPA), on September 15, 2015 the U.S. Department of Justice (USDOJ) filed the 2015 USEPA Consent Decree executed among USEPA, PRASA and the Commonwealth of Puerto Rico in settlement of the matters addressed in a complaint brought against PRASA by USDOJ on behalf of USEPA (the Complaint) also filed on such date. The 2015 USEPA Consent Decree will be subject to the approval of the Federal District Court after a thirty-day public comment which expired on November 8, 2015. The new consent decree supersedes the 2006 USEPA Consent Decree. In terms of the negotiation process of the 2006 PRDOH Drinking Water Settlement Agreement between PRASA and Puerto Rico Department of Health (PRDOH), after a period of low activity, discussions started to advance in December 2015. PRASA continues the Proposed Drinking Water Settlement Agreement negotiations with the PRDOH.

Finally, because of the CIP suspension and the delays in the issuance of bonds, PRASA accumulated and outstanding debt in excess of $150M owed to its contractors. In addition, in July 1, 2016 PRASA entered forbearance agreements related to payments for certain loans granted under the Clean Water and Drinking Water State Revolving Funds (SRF) and the U.S. Department of Agriculture (USDA) Rural Development bonds. Payments on these obligations are subordinate to the payment of PRASA's Senior Bonds and Operating Expenses. Furthermore, PRASA's Revitalization Act (Act 68-2016) was enacted on July 12, 2016, which encourages the restructuring of a portion of PRASA's existing Senior Lien Debt and provides for the issuance of up to $900M in new bonds to be issued by an independent securitization vehicle. As part of this revitalization, PRASA has updated its CIP to cover a 10-year period (FY2017-FY2026). However, as of the date of this report, this proposed CIP has not yet been approved by PRASA's Governing Board.

E.6. Insurance Program

Arcadis contracted MARSH Saldaña, Inc. (MARSH) on November 25, 2014 to review PRASA's current insurance coverage and determine its adequacy considering the type and value of PRASA's fixed assets. MARSH also provided a professional opinion on the appropriateness of such coverage and recommendations related to PRASA's insurance coverage. In the opinion of MARSH, the insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage and provided several recommendations for PRASA's consideration. AON, as PRASA's insurance Broker of Record (BOR) addressed most of MARSH's recommendations.

E.7. System Assets and Financial Analysis

Due to PRASA's continuing efforts to identify financing, the delays in PRASA's intended bond issuance, and the uncertainty regarding future additional sources of funds reflected in PRASA's

financial plan, Arcadis's financial analysis for this 2015 CER is limited to presenting the financial results prepared and provided by PRASA for FY2015, the preliminary results for FY2016, and the Board-approved Annual Budget for FY2017 as amended. Compliant with the MAT and 2012 FOA, Arcadis has reviewed and assessed the appropriateness of rates and charges for FY2017. An updated financial forecast will be provided by PRASA to be evaluated by Arcadis, as Consulting Engineer, and to be included in the 2016 CER.

As of June 30, 2015, PRASA had an estimated total book value of fixed (capital) assets of approximately $6,633M (See table ES-4). Additionally, PRASA had approximately $795M of assets that were under construction or as "Work in Progress". Including land and other non-depreciable assets, the book value of PRASA's total fixed assets amounts to $7,502M (net of accumulated depreciation).

Table ES-4:
Estimated Fixed Assets Summary through June 30, 2015 ($, Millions)

	Original Cost	Accumulated Depreciation	Book Value
Fixed Assets	$10,435	($3,799)	$6,633
Work in Process	795	-	795
Land and other Non-Depreciable Assets	74	-	74
Total Fixed (Capital) Assets	$11,304	($3,799)	$7,502

PRASA's Total Assets are estimated at $8,210M, as of September 30, 2015, including: current assets (approximately $298M), restricted assets (approximately $378M in restricted cash and cash equivalents), total capital assets ($7,502M as previously mentioned), and other assets ($32M in deferred loss resulting from debt refunding).

The Operating Revenues (presented on a cash basis as required by the MAT) include Service Revenues (net of subsidies), incremental revenues from the rate increase, adjustments for uncollectible accounts, revenues from operational initiatives including the Revenue Optimization Program and additional NRW Reduction Initiatives, as well as other sources of revenues such as interest income, developer fee contributions, fines, reconnecting charges, bulk water sales and new revenue from PRASA's holding company, if any. Operating Revenues also include transfers to and from the Rate Stabilization Account. Authority Revenues include PRASA's Operating Revenues plus funds from the Budgetary Reserve Fund, special assignments from the Central Government, and reimbursements for the Cost of Improvements from prior years.

FY2015 results show that PRASA's Operating Revenues were approximately $1,080M. While PRASA's FY2015 actual results are higher than those previously projected by PRASA and included in the 2014 CER, projections for FY2016 through FY2017 are lower because of lower Base Fee and Service Charges (Service Revenues). Additionally, FY2015 actual results show that PRASA collected $115M in additional revenue from its Operational Initiatives. PRASA's FY2016

preliminary results for Operating Revenues is about $1,108M given that PRASA has included: (1) a reduction of approximately $60M to account for the reduction in Services Revenues resulting from the drought water rationing plan first announced on May of 2015 and that ended on October of 2015; and (2) a $90M transfer from the Rate Stabilization Account. PRASA is projecting Operating Revenues of $1,023M in FY2017.

In FY2015 PRASA did not include additional revenues from other sources. Although in FY2016 PRASA included a total amount of $83M in its revised annual budget, no additional revenues from other sources were received. During FY2017, PRASA projects to receive $151M in additional revenues from proceeds of external sources of revenue or financing, bringing its projected Authority Revenues up to $1,174M. These additional revenues depend on PRASA's ability to obtain these funds through the proposed securitization bond transaction or a rate increase. However, it is likely that the projected schedule of said transaction may not be completed until the last quarter of FY2017 at the earliest. If the bonds are not issued in FY2017, PRASA will find itself forced to further delay: (1) the reactivation of its CIP maintaining it only at the minimum levels of renovation and replacement investment, and (2) projected past due payments to its CIP contractors.

The Operating (Current) Expenses projections (presented on an accrual basis as required by the MAT, as amended), include Payroll and Benefits costs, as well as Electric Power, Chemicals, Maintenance and Repair, among others. Expenses take into consideration the conditions of PRASA's negotiations of the CBAs with its unions and the projected savings to be achieved from the enactment of Act 66-2014 and reached agreements. Other expense projections such as Chemicals, Maintenance and Repair, and Other Expenses include provisions to account for possible inflation costs. Finally, PRASA's Operating Expenses Forecast considers that the preferential electricity all-in-rate approved for PRASA under Act 50 of June 2013 was revoked effective July 1, 2016. Actual results for Operating Expenses in FY2015 totaled $634.9M, while preliminary results for FY2016 total $636.7M. PRASA has budgeted Operational Expenses of $673.8M in FY2017.

PRASA had a loan agreement (the GDB Loan Agreement) with the GDB under which the GDB provides a revolving line of credit (LOC) to PRASA in the amount of $180M (previously $150M) that satisfied the balance that PRASA is required to maintain in the Operating Reserve Fund under the MAT. Given that bonds were not issued on or before August 31, 2015, the facility matured on June 30, 2016. In accordance with the Sixth Supplemental Agreement to the MAT, PRASA is projecting to deposit $36M in the Operating Reserve Fund during FY2017 (funding of 1/5 of the Operating Reserve Fund). This deposit should continue recurrently for four additional years, until PRASA achieves the reserve fund of $180M.

No deposits to the Capital Improvement Fund were made in FY2015 and, even though, PRASA budgeted a $50M deposit to the Capital Improvement Fund in FY2016, no deposit was made. PRASA projects to deposit $60M in the Capital Improvement Fund during FY2017 to finance a portion of its projected CIP and to partially repay its outstanding debt with contractors. Funding

proceeds include Other Sources of Revenues to be obtained from either external financing, debt restructuring or a rate increase. PRASA has also included a deposit of $151.3M to the Construction Fund in its FY2017 Annual Budget from Other Sources of Revenues (no deposits were made in FY2015 or FY2016 to the Construction Fund). However, as previously mentioned, at this time no assurances can be made that the securitization transaction currently being pursued will be achieved, or that PRASA will be able to implement a rate increase during FY2017. As such, Arcadis believes PRASA's projected amount to be obtained from Other Revenue Sources will likely not materialize during FY2017 and, therefore, the projected deposits to both the Capital Improvement Fund and the Construction Fund will not be made.

No deposits to the Budgetary Reserve Fund were made in FY2015 nor in FY2016, or is projected for FY2017. Also, after all the deposits required by the updated MAT have been accordingly made, any remaining moneys shall be deposited to the credit of the Surplus Fund which includes the Rate Stabilization Account. In FY2015, PRASA had an ending balance of $93M in its Rate Stabilization Account Fund. No deposit was made during FY2016 to the Rate Stabilization Account, while a $90M withdrawal was made to pay outstanding financing facilities. After payment of financial, interest and legal costs related to the payment of the outstanding line of credit and considering generated interest during the fiscal year, the FY2016 ending balance in the Rate Stabilization Account totaled $1.2M. PRASA is not projecting to make any deposits to the Rate Stabilization Account during FY2017.

Table ES-5 through ES-7 below, summarizes PRASA's Debt Service Coverage (DSC) actual and projected results for FY2015 through FY2017. Estimated debt service amounts include projected payments on the 2008 and 2012 Bonds, other existing debt, future bond offerings, LOC payments, and payments for maintaining required debt service reserves, as applicable. The Senior bonds include existing Senior obligations and future bond offerings. The Senior Subordinated bonds include a Term Loan used for fleet renewal. Commonwealth Guaranteed Indebtedness (CGI) includes existing obligations of PRASA that are guaranteed by the Commonwealth of Puerto Rico including the 2008 Commonwealth Guaranteed Bonds, United States Department of Agriculture (USDA) Rural Development Bonds, and State Revolving Funds (SRF) Loans. In addition to the CGI, PRASA currently has a note outstanding held by the Puerto Rico Public Finance Corporation (PFC), the proceeds of which were used to finance the construction of the North Coast Superaqueduct System (the "PFC Superaqueduct Note"), which is considered a Commonwealth Supported Obligation (CSO) under the MAT, subordinate to the payment of Senior, Senior Subordinate and Subordinate Indebtedness. The PFC Superaqueduct Note secures, in part, PFC's 2011 Series B Bonds. The PFC Superaqueduct Note is contractually payable "solely" from Commonwealth budgetary appropriations.

Until 2006, the Commonwealth (directly or indirectly through budgetary appropriations) had made all of the debt service payments on the CGI and CSO, including the PFC Superaqueduct Note. In 2006, to help alleviate its budget constraints, the Commonwealth requested that PRASA, as part of its actions to restore its operations to financial self-sufficiency, recommence, in respect of the CGI

and begin, in respect of the PFC Superaqueduct Note, to make debt service payments on said obligation. In the case of the PFC Superaqueduct Note, under the MAT, funds on deposit in the CSO Account are required to be transferred by the Trustee to the trustee of the PFC Bonds prior to the applicable debt service payment date.

Finally, PRASA's FY2016 preliminary results and FY2017 Annual Budget consider a significant reduction in the projected debt service obligation payments considering: (1) the forbearance agreements with the USDA Rural Development/Rural Utilities Services and with the United States Environmental Protection Agency's (USEPA) SRF Loans; (2) the exclusion of the note outstanding debt service payment related to the North Coast Superaqueduct System; (3) the exclusion of the payment of an existing line of credit with the GDB not covered under the MAT; and (4) the elimination of the reimbursement to the Operating Reserve Fund for the advancement of Operating Revenues used for CIP investments in prior fiscal years.

Table ES-5:
FY2015 – FY2017 Debt Service Obligations ($, Thousands)

Debt Service Level	FY2015 Actual	FY2016 Preliminary without Forbearance Agreements[1]	FY2017 Annual Budget without Forbearance Agreements[1]
Senior Debt	$354,313	$325,883	$230,789
Senior Subordinate Debt	1,163	2,721	2,721
Subordinate Debt	-	-	-
Commonwealth Guaranteed Indebtedness	88,392	88,116	82,678
Commonwealth Supported Obligations	1,594	8,999	8,999
Debt not Covered under the MAT[2]	-	8,752	8,461
Total	**$445,463**	**$434,471**	**$333,648**

[1] Considers the full debt service obligations due in FY2016 per amortization schedule; excludes forbearance agreements.
[2] Term Loan with the GDB.

Table ES-6:
FY2015 – FY2017 Debt Service Deposits and Payments ($, Thousands)

Debt Service Level	FY2015 Actual	FY2016 Preliminary Results[1]	FY2017 Annual Budget[1]
Senior Debt	$354,313	$325,883	$230,789
Senior Subordinate Debt	1,163	2,721	2,721
Subordinate Debt	-	-	-
Commonwealth Guaranteed Indebtedness	88,392	53,198	19,626
Commonwealth Supported Obligations	1,594	-	-
Debt not Covered under the MAT[2]	-	2,393	-
Total	**$445,463**	**$384,195**	**$253,136**

[1] Considers the forbearance agreements and no payment of the PFC bonds under the CSO nor the Term-Loan with the GDB.
[2] Term-Loan with the GDB.

Table ES-7:
FY2015 – FY2017 Debt Service Coverage

Debt Service Level	DSC Requirement	FY2015 Actual	FY2016 Preliminary DSC without Forbearance Agreements[3]	FY2017 Annual Budget DSC without Forbearance Agreements[4]
Senior Debt[1]	2.5x	3.05	3.40	4.43
Senior Subordinated Debt[1]	2.0x	3.04	3.37	4.38
Subordinated Debt [1]	1.5x	3.04	3.37	4.38
All Obligations[2]	1.0x	1.00	1.03	0.94

[1] DSC calculated with respect to Operating Revenues.
[2] DSC calculated with respect to Authority Revenues.
[3] Considers the full debt service obligations due in FY2016 per amortization schedule; excludes forbearance agreements.
[4] Considers the full debt service obligations due in FY2017 per amortization schedule, including CGI debt, CSO debt and debt not covered per MAT (GDB Term-Loan); excludes forbearance agreements.

While PRASA met its Rate Covenant requirements in FY2015 and FY2016, as presented in Table ES-7, PRASA's budgeted Authority Revenues would not be sufficient to meet All Obligations during FY2017. Therefore, unless PRASA is able to restructure its CGI, CSO and GDB Term-Loan debts during FY2017, it is likely that PRASA will not meet the Rate Covenant requirement of 1.0x on All Obligations in FY2017. In order to meet the FY2017 Annual Budget as approved by the Board, and if (1) the budgeted levels of the CIP remain unchanged, and (2) the existing forbearance agreements remain in place for the remainder of FY2017, PRASA would need to implement either an emergency or a permanent rate increase if the securitization bond transaction is not completed in FY2017. The actual percentage may vary considering delays in implementation and billing cycle lags, and PRASA's ability to continue to extend its forbearance agreements.

E.8. Conclusions and Recommendations

In preparation of this Report and the conclusions contained herein, Arcadis 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. Arcadis 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 by others, the actual results will vary from those forecast.

In the preparation of this report, Arcadis has made several considerations and assumptions (as provided throughout this report); some of the most notable are as follows:

1. Arcadis has made no determination as to the validity and enforceability of any contracts, agreements, existing laws, rules, or regulations applicable to PRASA and its operations. However, for purposes of this report, Arcadis has assumed that all such contracts, agreements, laws, rules and regulations will be fully enforceable in accordance with their terms.

2. PRASA will 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, the CIP will be largely implemented as planned and reflected in this report, and PRASA will make modifications to the CIP investment forecast if the overall System condition is negatively affected by the lower capital investment levels projected in future years.

Set forth below are the most relevant opinions which Arcadis has reached regarding the review of PRASA's System, CIP and financial projections.

1. Although PRASA continues to have some staffing needs at individual facilities or departments, PRASA's current organization is adequate for the operation, management and maintenance of the System. Nevertheless, filling certain vacant position could help PRASA reduce overtime costs and address System O&M needs more efficiently. As per AWWA's 2015 Benchmarking Performance indicators, PRASA's customer account per employee ratio falls on the lower side of the industry median, which can be attributed to the larger size and higher complexity of PRASA's System compared to U.S. systems. To the extent that PRASA is able to accelerate its staff management plan, additional cost efficiencies could be achieved.

2. PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer service, System performance, and budget controls as stipulated in PRASA's Strategic Plan. KPI and metrics being measured, along with stronger management oversight have contributed to improvements and optimization of operations and overall organization.

3. The enactment of Act 66-2014 should help PRASA modify some of its O&M processes and lower O&M costs; however, expected O&M savings will be offset by lower revenues to be generated from certain government accounts. Also, enactment of Act 211-2015 may help PRASA reduce expenses but will likely affect PRASA's institutional knowledge and could have an adverse impact on PRASA's staff management plan.

4. In general, the condition of the facilities visited for the 2015 condition assessment, varied from those recently upgraded/rehabilitated to those requiring capital upgrades. Approximately 93% of the facilities inspected are in the adequate to good range. When compared to 2014 inspection results, there was a noticeable increase in facilities (11 facilities) in the poor rating. Comparing to the 2015-2016 assessment results by asset category with those of the 2014 condition assessment, some changes were found for Wells, WTPs, WPS and WWTPs. Only one dam, Cidra, was degraded to poor. Cidra is utilized by PRASA as a raw water source and represents a high hazard in the event of an uncontrolled release of impounded water or in the ability to provide constant quality drinking water. A small number of WTPs declined from good to

adequate, performing slightly worse with respect to compliance with limits of effluent discharge parameters. This was mostly driven by: (a) a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 D/DBPR; and (b) the reduction and ultimate suspension of the CIP. Regarding the WWTP, some of the facilities which have being rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters. There were nine facilities rated as poor compared to only two in the 2014 inspections. Also, process control continues to be a challenge in some of the facilities. Factor affecting the condition of WWTPs include (a) recurring observations identified in previous inspections of issues that have not yet been addressed and (b) the slowing down of the CIP and R&R programs due to the fiscal situation and budget limitations. Finally, as it pertains to the ancillary assets, there was an equivalent or slight improvement in overall scores for WWPS and WPS and a slight decrease for water tanks. A significant lower rating in wells overall scores compared to the 2014 results was observed. Most of the deficiencies noted can be addressed through PRASA's R&R program and may not require major capital improvements.

5. PRASA recognizes that the current amount of NRW is high and is implementing sound strategic programs and initiatives to measure, manage, and reduce water losses and NRW. PRASA continues to work on and improve its leak detection and monitoring practices. PRASA has established a resource fully dedicated to NRW monitoring and is working on the creation of a NRW management team. PRASA is now conducting periodic water audits which are used to implement the necessary controls and develop action items to address NRW. The decreasing trend reported by PRASA since FY2012 demonstrates a positive change in PRASA's efforts to reduce water losses and NRW. However, significant capital investments and R&R funded budgets are required to accelerate the NRW program and address leak occurrences in both a corrective and preventive manner.

6. Although the number of sanitary overflows is also high compared to the U.S., PRASA has continued to improve its response time and attention/repair effectiveness to minimize the duration of these overflow events and their environmental impact. However, it is important to indicate that the current fiscal situation can adversely affect the sewer overflow repair and attention rates as well.

7. PRASA's Operational Initiatives are well developed and address critical aspects of PRASA's operation such as NRW, energy management and efficiency, and revenue stream diversification. However, the development, implementation and overall schedules and benefits realization of these initiatives have been negatively affected due to funding issues. This, in turn, has affected the projected additional revenues and cost savings to be realized through some of these initiatives that had been projected for FY2016 and FY2017 and, more likely than not, for future fiscal years. Nevertheless, the Revenue Optimization Program has continued to provide significant benefits to PRASA in the form of increased revenues as evidenced by recent and historical financial results.

8. Except for buried infrastructure improvements, PRASA's Board-approved CIP along with the O&M initiatives are in alignment with the System needs. It is important that PRASA maintain an adequate level of R&R spend to maintain and renovate the System. U.S. industry guidelines recommend that assets, particularly buried infrastructure, be replaced at a rate of 1% of total assets (within an asset class) annually. PRASA's Board-approved CIP also adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies. While PRASA has begun to identify the potential impact of new regulations, 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. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. However, any additional CIP needs will be prioritized and implementation schedules will depend on PRASA's financial capacity. PRASA's CIP was suspended in FY2016 due to funding problems and PRASA accumulated an outstanding debt of approximately $150M owed to its contractors.

9. PRASA's Master Plan Update, which included the service area re-assessment evaluation and demands update; and the water and wastewater infrastructure needs and project scopes update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030 as a result of the projected continuing decline in population and demand. Thus, certain future infrastructure expansion and new infrastructure needs that had been previously planned for future years are no longer required. However, changes in Puerto Rico's long-term population projections may affect these results. In FY2015 the last two tasks of the Master Plan Update were completed; Task 3: CIP Reconciliation, and Task 4: Prioritization and Scheduling. However, the implementation and consolidation of the resulting projects with the CIP has yet to be performed. Additional modifications to PRASA's Master Plan may be warranted as conversations with Regulatory Agencies continue and additional regulatory requirements and needs arise.

10. During FY2015 PRASA completed a Vulnerability Study and Adaptation Plan for its entire infrastructure. The Vulnerability Study assessed PRASA's infrastructure to identify potential climate change risks and impacts caused by five indicators or stressors: temperature, precipitation, sea level rise, hurricanes and tropical storms, and ocean acidification. The overall infrastructure of PRASA was evaluated and individual risks were identified for each given stressor. In turn, each identified risk was qualitatively and quantitatively evaluated based on the scale of the impact, probability of occurrence, special scale and time lapse expected for occurrence. The Adaptation Plan analyzed all the climate change impacts identified in the Vulnerability Study and developed a set of actions and strategies to be performed in order to minimize its effects on facilities and operations. The Climate Change Vulnerability Study findings and the strategies selected in the Adaptation Plan will be further assessed and projects

shall then be developed and included in PRASA's CIP as needed. These projects shall follow the same guidelines set in the prioritization system. These climate change-based projects will serve as a roadmap for PRASA in the planning process and in its preparation towards the expected impacts of climate change in the near and not so distant future.

11. The insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. Also, the Owner Controlled Insurance Program (OCIP) covering PRASA's exposures to risks of accidental property and liability losses arising from construction activities provides reasonable coverage. PRASA should address the following key recommendations:

    - Re-Conduct a Probable Maximum Loss (PML) Study considering new Catastrophe (CAT) Modellings and parameters. AON is in the process of data gathering for the PML Analysis.
    - Complete a thorough evaluation of PRASA's current Professional Liability Programs.
    - Consider adding underground storage tank coverage to the pollution liability policy.
    - Consideration of Terrorism Coverage, which is excluded under all current PRASA's Insurance Programs.

12. Arcadis's financial review for this CER was limited to assessing the actual results for FY2015, preliminary results for FY2016 and FY2017 Annual Budget, as amended. PRASA met its Rate Covenant Requirements for FY2015 and FY2017. However, the probability of PRASA achieving its FY2017 Annual Budget and meeting both its DSC requirements and its Rate Covenant, is conditioned on the following key assumptions:

    - **PRASA's ability to secure future CIP financing sources at an affordable cost and ability to complete the intended proposed securitization bond transaction –** PRASA's FY2017 Annual Budget assumes that it will be able to secure future financing from either the proposed securitization bond transaction or through an emergency or permanent rate increase to finance its CIP and meet all obligations, including deposits to Debt Funds and Accounts. However, there is no certainty at this time that PRASA will be able to achieve either one of these during FY2017. PRASA's ability to meet its FY2017 Annual Budget assumes that the securitization bond transaction is successfully completed and PRASA is able to obtain the $151M it requires to balance its budget (currently reflected as an Other Source of Revenue under Authority Revenues). However, considering the timing and delay of the possible securitization bond transaction as the Financial Oversight and Management Board (formed under PROMESA) evaluates PRASA's Fiscal Plan, and PRASA's need to operate, maintain, renew and replace the System assets, PRASA should implement the following measures: (a) reduce its projected CIP spending to cover only the essential activities needed to continue to operate and maintain the System and renew and replace critical assets; (b) implement an emergency rate increase to cover these CIP expenditures and the deposits to its Debt Funds and Accounts, including the Commonwealth Payments

Fund, in order to meet all its obligations and comply with its Rate Covenant; and (c) decrease its Operating (Current) Expenses to the extent possible by postponing any non-essential expenses.

- **PRASA's ability to maintain its Service Revenues, billings, and collections in a very challenging economic environment** – Continued uncertainty and strain on the economy, and population shifts, and consumption patterns could continue to cause further declines in PRASA's billings (reflected in lower Service Revenues than budgeted) and collections (reflected in high Adjustment for Uncollectibles).

- **PRASA's ability to continue to successfully implement its Operational Initiatives –** PRASA's FY2017 Annual Budget includes results from select Operational Initiatives. The FY2017 Annual Budget also includes certain revenue enhancing and cost reduction initiatives that are currently underway. Any changes to the funding, framework and execution of the revenue optimization Operational Initiatives could significantly alter PRASA's projected Operational Revenues. Although PRASA has made a dedicated commitment to implement the initiatives described in this Report and as reflected in historical results, there is a possibility that the projected results and, more specifically, the timing of those results may not be achieved.

- **PRASA's ability to continue to extend the forbearance agreements or restructure its CGI debt –** PRASA's FY2017 Annual Budget considers a significant reduction in debt service obligations due to, among other factors, forbearance agreements entered by and between PRASA and USEPA as well as PRASA and USDA. These agreements are due to expire in March and June 2017, respectively. Even though PRASA will continue to work with these federal entities, further extensions of the terms currently negotiated are not guaranteed.

13. In order for PRASA to meet its Rate Covenant requirements and to continue to adequately maintain the water and sewer systems throughout FY2017, PRASA should implement an emergency rate increase that generates sufficient revenues to: meet All Obligations under the MAT (including its CGI and CSO in full amount), partially fund its CIP (covering at least the necessary/critical renewal and replacement investment needs), and pay off at least 50% of the outstanding payments owed to its CIP contractors. The amount of the rate increase would depend on the timing of its implementation and the CIP investment amount, among other factors that must be considered in a rate revision/adjustment process.

14. While a permanent rate increase could help PRASA meet its obligations and rate covenant requirements going forward, PRASA must consider the overall sustainability and affordability of its rates given the overall economic situation affecting Puerto Rico and recent trends affecting customer consumption profiles. As such, PRASA must develop and adopt a comprehensive fiscal plan that depends not only on rate adjustments as an additional revenue

source, but that also includes revenues from additional operational initiatives (as identified and recommended by its consultants), savings in operational expenses and reductions in long-term debt service obligations.

UPDATED EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA [a] ($, Thousands)	FY2015 ACTUAL	FY2016 PRELIMINARY [b]	FY2017 ANNUAL BUDGET
	OPERATING REVENUES			
1.	Service Revenues (Base Fee and Service Charges, Net of Subsidies)	$1,006,467	$898,225	$977,132
2.	Transfer from Rate Stabilization Account [c]	-	90,000	-
3.	Operational Initiatives - Additional Billings	99,893	103,182	97,905
4.	Operational Initiatives - Collections from Prior Years	14,793	8,516	4,500
5.	Adjustment for Uncollectibles	(48,746)	(2,065)	(64,502)
6.	Other Income (Miscelaneous/Special Assessments/ZumFiber-PRASA Holdings)	7,920	10,025	8,000
7.	**Total Operating Revenues [Sum Lines 1-6]**	**$1,080,327**	**$1,107,883**	**$1,023,035**
	ADDITIONAL REVENUES			
8.	Transfer from Budgetary Reserve Fund	-	-	-
9.	General Fund Grants/Appropriations/Contributions	-	-	-
10.	Reimbursements to the Authority Revenues [c]	-	-	151,329
11.	**Total Other Sources of Revenue [Sum Lines 8-10]**	**$0**	**$0**	**$151,329**
12.	**Total Authority Revenues [Line 7 + Line 11]**	**$1,080,327**	**$1,107,883**	**$1,174,364**
	OPERATING EXPENSES			
13.	Payroll and Benefits	$292,253	$303,845	$317,824
14.	Electric Power	148,267	141,743	140,839
15.	Maintenance and Repair	39,416	39,229	44,060
16.	Chemicals	27,107	27,738	32,198
17.	Insurance	8,058	8,985	8,269
18.	Other Expenses	145,137	136,728	163,874
19.	Additional Savings from Operational Initiatives	-	-	-
20.	Capitalized Operating Expenses	(25,374)	(21,618)	(33,232)
21.	**Total Operating Expenses [Sum Lines 13-20]**	**$634,864**	**$636,650**	**$673,832**
22.	Adjustment for Non-Cash Reserves	-	-	-
23.	**Total Operating Expenses, Adjusted [Line 21 + Line 22]**	**$634,864**	**$636,650**	**$673,832**
	DEPOSITS			
24.	Deposit to the Senior Bond Fund	$354,313	$325,883	$230,789
25.	Deposit to the Senior Debt Service Reserve Fund	-	-	-
26.	Deposit to the Senior Subordinate Bond Fund	1,163	2,721	2,721
27.	Deposit to the Senior Subordinate Debt Service Reserve Fund	-	-	-
28.	Deposit to the Subordinate Bond Fund	-	-	-
29.	Deposit to the Subordinate Debt Service Reserve Fund	-	-	-
30.	Deposit to the Current Expense Fund	-	-	-
31.	Deposit to the Operating Reserve Fund	-	-	36,000
32.	Deposit to the Capital Improvement Fund	-	-	60,000
33.	Deposit to the Construction Fund	-	-	151,396
34.	Deposit to the Commowealth Payments Fund	89,986	53,198 [d,e]	19,626
35.	Deposit to the Surplus Fund	-	-	-
36.	Deposit to the Rate Stabilization Account		-	-
37.	**Total Deposits [Sum Lines 24-36]**	**$445,463**	**381,802**	**500,532**
38.	**Net Authority Revenues After Operational Expenses and Fund Deposits [Line 12-Line 23-Line 37]**	**$0**	**$89,431**	**-**
39.	**Net Authority Revenues Advanced to Pay CIP Related Expenses and Other Obligations**	**$0**	**($89,431)**	**-**
40.	**Final Balance [Line 38 - Line 39]**	**$0**	**$0**	**$0**
	DEBT SERVICE PAYMENT OBLIGATIONS AND COVERAGE CALCULATIONS PER MAT			
41.	Senior (S)	$354,313	$325,883	$230,789
42.	Senior Subordinated (SSUB)	1,163	2,721	2,721
43.	Subordinated (SUB)	-	-	-
44.	Commonwealth Guranteed Indebtedness (CGI)	88,392	88,116 [g]	82,678 [g]
45.	Commonwealth Supported Obligations (CSO)	1,594	8,999 [g]	8,999 [g]
46.	Debt Not Covered Under the MAT	-	8,752 [g,h]	8,461 [g,h]
47.	**Total Debt Service Including Debt Not Covered Under the MAT, Net of Existing Deposits**	**$445,463**	**$434,471**	**$333,649**
	RATE STABILIZATION ACCOUNT BALANCE			
48.	**Rate Stabilization Account Balance, ending balance** [i]	$93,000	$1,201 [i]	$1,201 [i]

[a] *Numbers may not add up due to rounding.*

[b] *Based on preliminary results through June 30, 2016.*

[c] *In accordance with the Sixth Supplemental Trust Agreement, any source of funding that does not otherwise constitute Authority Revenues as reimbursement for Costs of Improvements paid by PRASA in the current or the immediately preceding fiscal year from Operating Revenues, and may be used, at PRASA's discretion, to pay Current Expenses or to fund a deposit to the Senior Bond Fund or the Operating Reserve Fund.*

[d] *Not all budgeted funds were deposited in the Commonwealth Guaranteed Indebtness Account during FY2016 for payment of the Commonwealth obligations of PRASA included in the CGI for the payment of debt service that was due during the FY2016 ; a forebearance period was granted by USDA and USEPA on Rural Development and SRF loans, respectively. Per the MAT, this is not considered an Event of Default.*

[e] *No funds were deposited in the Commonwealth Supported Obligations Account during FY2016 for payment of the Puerto Rico Public Finance Corporation (PFC) debt included in the CSO; and, accordingly, no funds were transferred by PRASA to the trustee of the PFC Superaqueduct Bonds for the payment of debt service that was due in FY2016. Per the MAT, this is not considered an Event of Default.*

[f] *Considers only payments per existing forbearance agreeements with USDA and USEPA, and no payment of the CSO debt.*

[g] *Debt obligation due per debt amortization schedule.*

[h] *An existing Term Loan with GDB, which had been historically included under the CGI Debt, has been deemed as debt not covered under the MAT. PRASA did not make all payments due in FY2016 and did not budget for the payments amount due in FY2017.*

[i] *Net of transfers to/from, interests accrued, and other disbursements made by PRASA as provided in its Rate Stabilization Account rollforward balance.*

EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA DEBT SERVICE COVERAGE [a] ($, Thousands)	FY2015 ACTUAL	FY2016 PRELIMINARY	FY2017 ANNUAL APPROVED BUDGET
1.	Operating Revenues	$1,080,327	$1,107,883	$1,023,035
2.	Additional Revenues	-	-	151,329
3.	Authority Revenues [Line 1 + Line 2]	$1,080,327	$1,107,883	$1,174,364
4.	Senior Debt			
5.	Annual Debt Service Due	$354,313	$325,883	$230,789
6.	Deposit Available in Senior Bond Fund	-	-	-
7.	**DS Coverage Required = 2.50**	**3.05**	**3.40**	**4.43**
8.	Senior & Senior Subordinated Debt			
9.	Annual Debt Service	$355,476	$328,604	$233,510
10.	Deposits Available in Senior and Senior Subordinated Bond Funds	-	-	-
11.	**DS Coverage Required = 2.00**	**3.04**	**3.37**	**4.38**
12.	Senior, Subordinated Subordinated & Subordinated Debt			
13.	Annual Debt Service	$355,476	$328,604	$233,510
14.	Deposits Available in Senior, Senior Subordinated, and Subbordinated Bond Funds	-	-	-
15.	**DS Coverage Required = 1.50**	**3.04**	**3.37**	**4.38**
16.	Operating (Current) Expenses	$634,864	$636,650	$673,832
17.	Total CGI & CSO Debt	89,986	97,115	91,677
15.	Repayment from CIP to the Current Expense Fund	-	-	-
18.	Total Deposits to Other Funds, Accounts and Other Debt	-	8,752	255,857
19.	**Authority Revenues / All Obligations DS Coverage Required = 1.00**	**1.00**	**1.03**	**0.94**

[a] *Numbers may not add up due to rounding.*

1. Introduction

1.1. Introduction

Since 2008, Arcadis Caribe, PSC (formerly MP Engineers of Puerto Rico, PSC) in collaboration with Arcadis U.S., Inc. has been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in the preparation of a Consulting Engineer's Report (CER) to satisfy the reporting requirements specified in Section 7.07 of the 2012 amended and restated Master Agreement of Trust by and between PRASA and Banco Popular de Puerto Rico as Trustee (2012 MAT), and Section 3.5 of the 2012 amended and restated Fiscal Oversight and Support Agreement (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the Government Development Bank for Puerto Rico (GDB) as Fiscal Agent to PRASA. However, pursuant to Act 21 of 2016, the Puerto Rico Fiscal Agency and Financial Advisory Authority (PRFAFAA) was established as an independent public corporation and governmental instrumentality that assumed all fiscal agency responsibilities previously assigned to GDB. PRFAFAA also acts as financial advisor and reporting agent of the Commonwealth and its public corporations, including PRASA.

1.2. Consulting Engineer's Report Requirement

As required by Section 7.07 of the MAT, unless the Senior Bonds have been rated investment grade by at least two Rating Agencies for 24 consecutive months, the Consulting Engineer shall prepare a CER to document the current condition and changes, if any, in PRASA's operation and the performance of the water and wastewater systems (the System). Also, as required in Section 3.5 of the 2012 FOA, PRASA must maintain a continuous disclosure policy with its Fiscal Agent and satisfy certain reporting requirements throughout the fiscal year. Among these reporting requirements is the preparation and filing of a report prepared by the Consulting Engineer. As a result of the credit downgrades of PRASA's bonds to non-investment grade level in FY2013, FY2014 and FY2015, and in compliance with the MAT and 2012 FOA, Arcadis prepared this CER for FY2015 (2015 CER or the Report). The submittal of this report was delayed as a result of PRASA's on-going efforts during FY2015 and FY2016 to issue bonds to finance its Capital Improvements Program (CIP) and settling on a concrete Financial Plan under the current fiscal situation.

Unless otherwise indicated, Arcadis's opinion with respect to technical, operational and financial condition and related matters of PRASA's System is presented for FY2015 or as otherwise noted in the Report. Any statements contained in this report involving estimates or matters of opinion, whether or not so specifically designated, are intended as such, and not as representations of fact. Arcadis 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 Arcadis by PRASA is not accurate, the conclusions and recommendations contained in this report may vary and are subject to change. Changed conditions occurring or becoming known

after the issuance of or beyond the period covered by this 2015 CER could affect the material presented to the extent of such changes. Arcadis has no responsibility for updating this report for changes that occur beyond the date of its issuance.

1.3. Conventions

PRASA's fiscal year begins on July 1st and ends June 30th. Throughout this 2015 CER, fiscal year is identified as "FY" followed by the calendar year in which the fiscal year ends, i.e., FY2015 is the fiscal year from July 1, 2014 through June 30, 2015.

1.4. Acronyms

A listing of acronyms or abbreviations of terms used in this report is included in the Table of Contents.

1.5. Statement of Disclosure

This document was prepared solely for the benefit of and use by PRASA for the discrete purposes set forth herein. PRASA did not request Arcadis to provide and Arcadis does not offer to provide nor did or will it provide any services constituting the services of a "municipal advisor" as defined by the Securities Exchange Act of 1934, as amended by the Dodd–Frank Wall Street Reform and Consumer Protection Act (Pub.L. 111-203, H.R. 4173) and regulations promulgated thereunder, or any successor statute or provisions thereto. Accordingly, Arcadis is not a municipal advisor registered with the U.S. Securities and Exchange Commission (SEC).

In the performance of its services on behalf of PRASA, Arcadis did not intend to create, and hereby expressly denies the creation of, any right on the part of any third party to rely upon this document. Except as otherwise provided by statute not subject to waiver, PRASA is not permitted to distribute copies of this document to third parties without the prior written consent of Arcadis and, further, any such distribution of this document is only for informational purposes and third parties have no right to rely hereon. Use of this document should not, and does not, absolve the third party from using due diligence in verifying the document's contents.

Arcadis is required to make disclosures stating the limitations of the work contained within the 2015 CER and its use. In accordance with the Securities Exchange Act of 1934, the following disclosure statements are incorporated into the 2015 CER prepared by Arcadis. This 2015 CER was prepared by Arcadis for PRASA; hereinafter referred to individually as the "Authorized Recipient."

In the performance of its services on behalf of the Authorized Recipient, Arcadis is (a) not recommending any action on behalf of the Authorized Recipient to municipal financial products or the issuance of municipal securities; (b) is not acting as a municipal advisor to the Authorized Recipient, and does not owe a fiduciary duty to the Authorized Recipient pursuant to Section 15B

of the Securities Exchange Act of 1934, as amended by the Dodd-Frank Wall Street Reform and Consumer Protection Act, with respect to the information and material prepared in connection with this scope of work; and (c) acting for its own interests. PRASA shall engage a registered municipal advisor and shall discuss any information and material prepared in connection with this document with any and all internal and external registered municipal advisors and other financial advisors and experts who the Authorized Recipient deems appropriate before acting on this information and material.

PRASA acknowledges that: (a) it shall retain the services of an independent registered municipal advisor, which, during the past two years, was not associated with Arcadis, and that (b) Arcadis is required to comply with the requirements set forth in the federal Exchange Act, Municipal Advisor Rule (17 CFR 200, 240, 249), which requires that the engineering company (i) receive from the municipal entity a representation in writing that it is represented by, and will rely on the advice of, an independent registered municipal advisor; (ii) provide written disclosure to the municipal entity that Arcadis is not serving as a municipal advisor and, with respect to the municipal entity, is not subject to the statutory fiduciary duty applicable to municipal advisors under the federal Exchange Act, and (iii) provide a copy of such disclosure to the municipal entity's independent registered municipal advisor. Arcadis does not provide opinions on or advocates for using a financial product (issuing debt) or the choice of financial products employed. As such, Arcadis submitted its work products to PRASA for review and approval.

Arcadis devoted effort is consistent with (i) that degree of care and skill ordinarily exercised by members of the same profession currently practicing under same or similar circumstances and (ii) the time and budget available for its work in its efforts to endeavor to ensure that the data contained in the 2015 CER is accurate as of the date of its preparation. This document was based on estimates, assumptions and other information developed by Arcadis from its independent research effort, general knowledge of the industry, and information provided by and consultations with the Authorized Recipient and the Authorized Recipient's representatives and consultants. No responsibility was assumed for inaccuracies in reporting by the Authorized Recipient, the Authorized Recipient's agents and representatives, or any third-party data source used in preparing or presenting this study. Arcadis assumes no duty to update the information contained in the 2015 CER unless it is separately retained to do so pursuant to a written agreement signed by Arcadis and PRASA.

This opinion is based upon information provided by, and consultations with, PRASA. Arcadis did not independently verify the accuracy of the information provided by PRASA and others in creating this opinion; however, Arcadis's opinion is based upon the supposition that such sources are reliable and the information obtained therefrom is appropriate for the analysis undertaken and the conclusions reached. To the extent, the information provided to Arcadis by PRASA and others is not accurate, or not inclusive of all details, the conclusions and recommendations contained in the opinion may vary, and are subject to change. Arcadis assumed and assumes no responsibility for inaccuracies in reporting by PRASA or any third-party data source used in preparing such opinion.

Arcadis's findings represent its professional judgment. Neither Arcadis nor its parent corporation, or their respective subsidiaries and affiliates, makes any warranty, expressed or implied, with respect to any information or methods disclosed in the document. Excluding PRASA, whose rights are governed by its contract with Arcadis, no recipient of the document shall have any claim against Arcadis, its parent corporation, and its and their subsidiaries and affiliates, for any liability for direct, indirect, consequential, or special loss or damage arising out of its receipt and use of this document whether arising in contract, warranty (express or implied), tort or otherwise, and irrespective of fault, negligence and strict liability.

No recipient of this document other than the Authorized Recipient may abstract, excerpt, or summarize this document without the prior written consent of Arcadis. Any changes made to this document, or any use of this document not specifically identified within Arcadis's contract with PRASA, or otherwise expressly approved in writing by Arcadis, shall be at the sole risk of the party making such changes or adopting such use.

Arcadis relied on assumptions, forecasts, data and statistics provided by PRASA, its other consultants, and published industry references. Arcadis reviewed the PRASA-prepared forecast over a future five-year period of time and "forward-looking statements." These statements relate to Arcadis's expectations, beliefs, intentions, or strategies regarding the future. These statements may be identified by the use of words like "anticipate", "believe", "estimate", "expect", "intend", "may", "plan", "project", "will", "should", "seek", and similar expressions. The forward-looking statements reflect Arcadis's views and assumptions with respect to future events as of the date of this document and are subject to future economic conditions and other risks and uncertainties. Actual and future results and trends could differ materially from those set forth in such statements due to various factors, including, without limitation, those that will be discussed in this 2015 CER. These factors are beyond Arcadis's ability to control or predict. Accordingly, Arcadis makes no warranty or representation that any of the projected values or results contained in this document will actually be achieved.

This 2015 CER summarizes the work completed up to the date of issuance. Changed conditions occurring or becoming known after such date could affect the material presented and the conclusions reached herein to the extent of such changes. Arcadis has no responsibility for updating this report for changes that occur after the date of the report.

This document is qualified in its entirety by, and should be considered in light of, these limitations, conditions and considerations.

2. Organizational Updates and Changes

2.1. Introduction

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 (Act 92-2004).

Figure 2-1: PRASA Regions

PRASA is managed by an Executive Management Team that provides the day to day management oversight and coordination for all institutional activities. It 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 as of June 30, 2015.

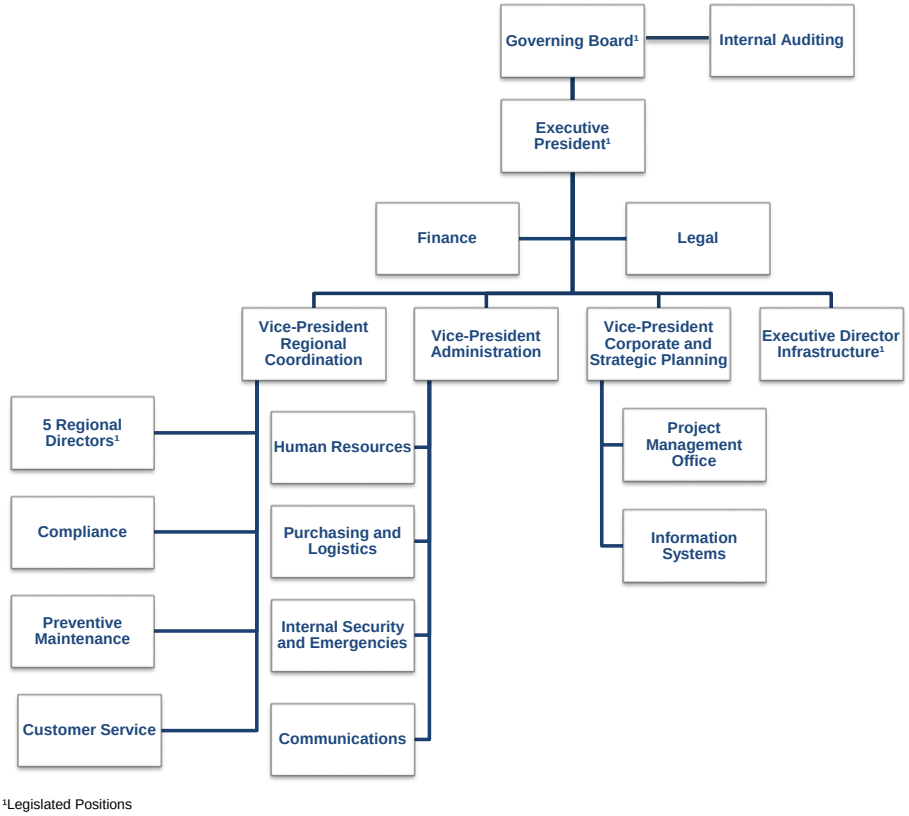

Figure 2-2: PRASA Legislated and Executive Management Structure as of June 30, 2015

PRASA continues to work to achieve the objectives set forth by its Executive Management Team. In FY2014, PRASA's Executive Management Team continued with the Strategic Plan developed in FY2013 with the defined mission of providing quality water and wastewater services at the lowest possible cost, consistent with industry standards. A detailed description of PRASA's Strategic Plan, including key performance indicators (KPIs), is included in Section 4.4.

2.2. Updates and Changes in PRASA's Organization and Management

2.2.1. Governing Board

On May 6, 2013, through the enactment of Act No. 15, PRASA's Board was re-structured as shown in Table 2-1. Although during FY2015 it continued to be a nine-member Board as previously enacted under the Commonwealth's Act 92-2004, the Board was comprised of the following: the Secretary of the Puerto Rico Department of Transportation and Public Works and the Puerto Rico Planning Board Director; one engineer licensed to practice the engineering profession in Puerto Rico; one lawyer with at least seven years of experience authorized to practice law in Puerto Rico; one member with a wide knowledge and experience in corporate finances; two ex-officio members,

the Executive Director of the Mayors Association and the Executive Director of the Mayors Federation; and two customer (consumer) representatives.

Table 2-1:
PRASA Nine-Member Governing Board as of September 30, 2015

Name	Board Position	Position Description	Term Ends
1. Mr. Kenneth Rivera Robles, CPA	President	Independent Director/ Finance	July 2, 2017
2. Mrs. Maricarmen Ramos de Szendrey, Esq.	Vice President	Independent Director / Legal	July 2, 2017
3. Mr. Manuel Suárez Miranda, P.E.	Director	Independent Director / Engineering	July 2, 2017
4. Mr. Luis García Pelatti	Director	Governmental Director/ President of the PRPB	Ex Officio
5. Mr. Miguel Torres Díaz, P.E.	Director	Governmental Director/ Secretary of the PR-DTPW	Ex Officio
5. Mr. Francisco Amill Rodríguez, Esq.	Director	Governmental Director/ Executive Director of the Association of Mayors	Ex Officio
7. Mr. Reinaldo Paniagua Látimer	Director	Governmental Director/ Executive Director of the Federation of Mayors	Ex Officio
8. Mr. Héctor Sánchez Cardona, P.E.	Director	Consumer Representative	June 19, 2020
9. Mr. Félix Aponte Ortíz, PhD	Director	Consumer Representative	June 19, 2020

Except for the two consumer representatives, and the Executive Directors of the Association of Mayors and the Federation of Mayors, all other members of the Board are named by the acting Governor of Puerto Rico, with the advice and consent of the Senate of the Commonwealth of Puerto Rico. The two customer representatives are elected through a public selection process under jurisdiction of and directed by DACO. Finally, apart from the elected customer representatives who will hold their positions for six years, the designated or election terms of the other Board members will be four years or until their successors take office.

The Board is responsible for making or approving all major decisions taken by PRASA, including overall institutional policies, PRASA'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.

2.2.2. Executive Management Team

Since the enactment of Act 92-2004, 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 adequately executed, and have not affected the stability of the organization or the continuity of the operations.

The only notable change in PRASA's organization as of September 30, 2015, was the resignation of Ms. Ivonne Falcón Feliciano as the Vice-President of Administration. Also, Mr. Alberto Feliciano Nieves was appointed as Executive Director of Human Resources and Labor Relations on April 2015. A summary of PRASA's key Executive Management Team as of September 30, 2015, including previous positions held and years of experience, is presented in Table 2-2.

Table 2-2:
PRASA's Executive Management Team

Name	Current Role	Term Ends	Prior Role	Experience Total / PRASA
1. Eng. Alberto M. Lázaro Castro	Executive President[1]	January 2019	Executive Director for Infrastructure	19 years / 11 years
2. Eng. Francisco Martínez Castello	Vice-President of Regional Coordination	December 2017	Executive Director for East Region	26 years / 12 years
3. Vacant	Vice-President of Administration	N/A		
4. Eng. Lynnette Ramírez Rivera	Executive Director for Infrastructure[1]	January 2019	Deputy Exec. Director for Infrastructure	14 years / 8 years
5. Mr. Efraín Acosta Reboyras	Executive Director of Finance	N/A	Deputy Exec. Director of Finance PRIDCO	38 years / 12 years
6. Eng. Roberto Martínez Toledo	Executive Director Metro Region[1]	December 2019	Deputy Exec. Director for Metro Region	29 years / 23 years
7. Eng. Doriel Pagán Crespo	Executive Director North Region[1]	December 2017	Deputy Exec. Director North Region	25 years / 23 years
8. Eng. Héctor Gierbolini Pérez	Executive Director South Region[1]	February 2019	Preventive Maintenance Manager South Region	21 years / 21 years
9. Eng. Roberto Guzmán Velázquez	Executive Director East Region[1]	December 2017	Deputy Exec. Director East Region	27 years / 27 years
10. Eng. Joel Lugo Rosa	Executive Director West Region[1]	February 2018	Deputy Exec. Director West Region	17 years / 17 years

[1]Legislated positions.

The following material changes were reported by PRASA during the first half of FY2016 regarding its organization and changes in leadership and management: Mauricio Olaya's resignation as Vice-President of Corporate and Strategic Planning; the position is currently vacant. Roxana Santaella was appointed as new Purchasing and Logistics Executive Director to replace Sonia Barreto; Dalmarie Mirabal Garay appointment as Customer Service Executive Director to replace Mr. Gustavo Marín. Also, as it relates to PRASA's nine-member Governing Board, Mrs. Gretchen Marie Hau, Esq. replaced Mr. Francisco Amill Rodríguez, Esq. as Director after being appointed as Executive Director of the Association of Mayors.

2.2.3. Staffing Profile

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 inspectors, and surveyors.
- 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.

At the end of FY2015, PRASA had a total staff of 4,989, with 1,238,139 water customer accounts and 763,133 wastewater customer accounts, resulting in a ratio of about 401 customer accounts per employee (more than the 392 at end of FY2014). Current industry for combined utilities operations averages range from 363 to 620, with a median of approximately 476 customer accounts per employee[5]. PRASA's customer account per employee ratio falls within the range for the industry, however on the lower side of the median, which can be attributed to PRASA's System and the utility's size and complexity, given the large number of facilities and wide geographic distribution of these across the island.

Towards the end FY2013 and throughout FY2014, PRASA hired an external consultant to conduct a study to identify opportunities to optimize the organization. The key goals of the study were to identify areas and departments where there are staffing needs and where there are staffing surpluses in order to balance the organization and, as such, determine PRASA's optimum staffing levels. As a result of this exercise, PRASA's Executive Management Team determined that to operate and maintain the System, and effectively manage the utility, a staff of about 4,693 employees is

[5] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, American Water Works Association (2015). Note that a customer with water and wastewater service is referred as Combined Utility for the purpose of this benchmark. Benchmarks reported for "Combined utilities" category.

required. PRASA has indicated that this baseline staffing level will be achieved through a combination of the staffing control policies that have been employed, the regular annual employee attrition, and focused hiring practices to balance understaffed areas while striving to meet the effective number of employees. The analysis for the implementation of redistribution or reduction of personnel was completed.

Table 2-3 shows the staff levels by staff category over the last five fiscal years. Since FY2010, PRASA has implemented staff reduction initiatives, 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. Thus, PRASA reported a 1.98% net reduction of staff from FY2014 to FY2015. This net reduction includes an increase of 70 UIA-AAA employees, 7 management employees, 2 HIEPAAA employees; and a reduction of 171 temporary classified employees and 9 appointed employees. As of September 30, 2015, PRASA's staff totaled 4,944.

Table 2-3:
Staff Levels

End of FY	Appointed Employees	Management Employees	HIEPAAA Employees	UIA-AAA Employees	Temporary Employees	Total Employees
2011	159	938	167	3,490	165	4,919
2012	164	917	172	2,933	890	5,076
2013	159	1,001	158	2,747	823	4,888
2014	170	1,004	153	2,565	1,198	5,090
2015	161	1,011	155	2,635	1,027	4,989
5-year CAGR	**0.25%**	**1.51%**	**-1.48%**	**-5.47%**	**44.15%**	**0.28%**

Source: PRASA Human Resources Department

2.2.3.1. Labor Relations

In FY2012, PRASA and its larger union, the UIA-AAA, signed a new collective bargaining agreement (CBA), effective from January 2012 through December 2015. It included certain retroactive and future economic agreements that have an impact on PRASA's payroll and benefits expense projections which started in FY2013. Also, PRASA and the HIEPAAA signed a new CBA effective from May 2012 through June 2016. It also contains certain economic agreements (i.e., salary increases) that have an impact on PRASA's Payroll and Benefits expenses. Because of Act 66, described in the following section, PRASA's Executive Management and the unions negotiated some terms (i.e., salary increases and savings/retirement plan bonuses) of the CBA, due to the fiscal emergency declared by the Commonwealth of Puerto Rico. PRASA's management continues to maintain a positive working relationship and open communication channels with the unions.

2.2.3.2. Act 66 of 2014 – Negotiations and Final Results

The Commonwealth of Puerto Rico, through the enactment of Act 66 of June 17, 2014 – Fiscal and Operational Sustainability Act for the Commonwealth of Puerto Rico (Act 66-2014), declared a fiscal emergency and required that its instrumentalities (i.e., utilities, government agencies, and

public corporations such as PRASA) implement certain measures to reduce its expenses. Act 66-2014 has primacy over any other law and will remain in place for three years or until certain economic and financial conditions are met. Act 66-2014 requires, among others, the following measures:

- 10% reduction in contracted services expense when compared to FY2014
- 20% reduction in appointed employees' costs when compared to FY2012
- Freeze or reduction of some payroll benefits or compensation

As required under the Uniform Alternate Participative Process established in Act 66-2014, PRASA and its unions engaged in negotiations of the economic clauses of their respective CBAs which culminated with the execution of amendments which are expected to produce significant operating cost reductions. Both UIA-AAA and HIEPAAA unionized personnel agreed with PRASA that the CBAs will continue as stipulated with the exception of some terms which include: the saving plans, salary increases, holiday and sick days' benefits, among others. A summary of the negotiated economic agreements between PRASA and its two main labor unions under Act 66-2014 are presented in Table 2-4. Additionally, the parties agreed to certain non-economic agreements which include, among others: implementation of performance metrics to evaluate performance and productivity, the incorporation of computerized handheld meter readers and use of GPS data for disciplinary actions, and flexibility of work shifts and functions in certain areas, as well as agreeing to certain modifications to disciplinary actions and the conversion of temporary employees (expected to be approximately 300) to regular positions, but with the benefits established by law rather than under the CBAs. These agreements shall remain in effect through June 30, 2017, when the reductions mandated by the Act 66-2014 cease to be in effect. However, its effectiveness may end earlier if certain parameters are met, including that (1) Puerto Rico's preceding fiscal year ends without a budget deficit; (2) Puerto Rico's economic growth rate forecast for the following fiscal year is 1.5% or higher; and (3) a nationally recognized rating agency upgrades the credit rating of Puerto Rico's general obligations to investment grade level. Conversely, if the fiscal emergency does not improve, the Commonwealth's Legislative Assembly could extend the effectiveness of Act 66-2014 beyond 2017, maintaining its cost savings and restrictions.

Table 2-4:
Negotiated Economic Agreements between PRASA and Labor Unions under Act 66

HIEPAAA	UIA-AAA
$1,000 reduction in the Christmas bonus and 50% reduction ($120) reduction in the Summer bonus.	The contribution to the savings plan was eliminated.
Elimination of four holidays, in accordance with Act 111 of July 2014.	All payments for service years (FY2013 payments) were reduced by 50%.
Salary increase agreed in the CBA was postponed to October 2014.	Reduction of five vacation days and three sick days' benefits.
Liquidation of vacation days (in excess of 60 days) was eliminated.	The salary increase agreed in the CBA was modified; a salary increase of $50 per month will be awarded to all unionized personnel, from October 1, 2014.
Liquidation of sick days (in excess of 45 days) was eliminated.	Liquidation of vacation days (in excess of 30 days) was eliminated.
Meal allowance reimbursement conditions were modified.	Liquidation of sick days (in excess of 45 days) was eliminated.
Life insurance benefits were suspended	The use of subcontractors for repairs and meter replacements were eliminated; responsibilities assigned to unionized personnel. Subject to the compliance with the performance metrics.

Cost savings projected to be achieved from the CBAs together with health benefits and the additional cost savings measures implemented by PRASA, including reductions to benefits of management employees and reductions in contracted services were initially expected to provide approximately $37 million in savings for FY2015. The actual savings during FY2015 were approximately $31M, $18 million in accrued expenses and $13 million in reductions in cash payments related to vacations, sick and retirement bonuses, which were accrued but not paid pursuant to the provisions of Act 66-2014. The difference of $6 million from projected to actual is primarily the result of a delay in the implementation of flexibility of works through the universal-brigades that were expected to generate savings in overtime and maintenance expenses and which implementation is currently being negotiated with the UIA. Savings in future years will vary, depending on the projected increases that were to take place, but will not as a result of the freeze in payroll and benefits. Savings include overtime and the need of using private contractors. Overtime savings are to be achieved by appointing these universal-brigades in shifts to cover weekends or second shifts during regular working hours. These savings will help offset the revenue reduction from certain government accounts, since billings will be based on the rate structure that was in place prior to July 15, 2013 instead of the existing rate structure resulting from Act 66-2014.

2.2.3.3. Act 211 of 2015 – Additional Personnel Reductions

As a result of the ongoing fiscal and economic crisis, the Puerto Rico Government Enacted Act 211 on December 8, 2015 (Act 211-2015), which created a "Voluntary Pre-Retirement Program". Act

211-2015 intends to create a program, "*whereby eligible employees of the Commonwealth of Puerto Rico may voluntarily separate from service by receiving incentives until they meet the requirements for retirement; provide for the requirement of credited years of service needed to qualify for this Program; establish the timeframe for employees to exercise their option to avail themselves of the Voluntary Pre-Retirement Program; provide the special incentives that shall be granted to employees who avail themselves of the Program; provide the requirements needed to implement the Program; and for other related purposes* ". The program seeks to offer incentives to employees who have been working for the Commonwealth of Puerto Rico and whom enrolled in the Retirement System before April 1st, 1990, without having received any reimbursement of their contributions and have at least 20 years of service credited under the benefit structure of Act 447, *supra*. Under this program, eligible employees may voluntarily retire early and still receive compensation equal to 60% of their average salary, payout of unused vacation and sick leaves (as per Act 66-2014), and keep their health insurance coverage for a term of up two years. Also, they can continue to contribute to their retirement plan. These incentives are applicable until they meet the requirements for full retirement.

Consequently, the program attempts to reduce the workforce progressively and voluntarily, thus allowing for the economy to undergo a transition process. This may reduce expenses such as payroll and benefits but requires that the Office of Management and Budget (OMB) evaluate and certify that employees eligible for the program and under consideration represent savings for PRASA. Besides the reduction of expenses, Act 211-2015 stipulates that positions that become vacant upon implementation of the retirement program be eliminated, and that agencies take administrative or operational measures to restructure in the absence of these positions. However, OMB may authorize to re-staff the position, if certified to be critical, and in accordance with the plan submitted by the agency. As it pertains to PRASA, most of the eligible employees currently occupy positions that are managerial or supervisory, which may create organizational challenges. As of the date of issuance of this report, PRASA continues to evaluate the potential impacts and benefits of Act 211-2015 prior to authorizing any pre-retirement actions.

2.2.3.4. Training

PRASA continues to offer varied training programs to its employees to improve work management and productivity. Training topics range from technical-oriented seminars to conflict resolution and team building sessions. In FY2015, PRASA offered over 148,838 training hours to its employees; this represents an average of approximately 29.8 hours per active employee. Overall, about 96% of the employees participated in training activities offered by PRASA. As part of PRASA's strategic initiatives, they continue to invest in personnel training to increase work ownership and productivity levels. Also, PRASA is reducing training Contracts and preparing its own employees to handle those duties. They successfully implemented an Operator Training Center (OTC) in the North Region, which began during FY2015 and is expected to be rolled out to other regions in the future. Furthermore, the OTC is including Technical Managers and Supervisors in its training, next graduation on January-2016. Additional information regarding PRASA's Strategic Plan is included

in Section 4. Table 2-5 presents a summary of the number of operators by the type of license they hold.

Table 2-5:
Operator Licensing

	In Training	Type I	Type II	Type III	Type IV	Total
Water	54	25	50	116	276	**521**
Wastewater	11	2	25	21	104	**163**
Total	**65**	**27**	**75**	**137**	**380**	**684**

2.3. Other Material Organizational / Staff Maters

Resulting from an FBI investigation of corruption against a political contributor and others, two PRASA employees, including its ex-Vice-President for Administrative Matters and the ex-director of Purchasing and Logistics up until FY2015, were suspended after being charged in federal court. They were later dismissed following PRASA's employment policies. While no other charges have been presented, both the investigation and ensuing federal case have affected PRASA's public image. PRASA cooperated fully with officials to overcome this situation and move forward.

PRASA's organization will likely undergo further changes in leadership and management because of the November 2016 election as, traditionally, the elected party appoints their representatives in trusted governmental positions and entities. Therefore, there is a potential for a transitional period if the impending changes in leadership within PRASA materialize.

Furthermore, on May 25, 2016, the United States (U.S.) Congress passed the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA), designed to help give Puerto Rico the tools to address its economic crisis and restructure its debt. The bill addresses Puerto Rico's debt by establishing an oversight board, a process for restructuring debt, and expedited procedures for approving critical infrastructure projects. The Financial Oversight and Management Board to be established under this Act shall oversee the development of budgets and fiscal plans for Puerto Rico's instrumentalities and Government. It may issue subpoenas, certify voluntary agreements between creditors and debtors, seek judicial enforcement of its authority, impose penalties, and enforce territorial laws prohibiting public sector employees from participating in strikes or lockouts. The board's responsibilities include:

- Approving the governor's fiscal plan
- Approving annual budgets
- Enforcing budgets and ordering any necessary spending reductions
- Reviewing laws, contracts, rules, and regulations for compliance with the fiscal plan

2.4. Conclusions

The current organization is sufficient for the operation, management and maintenance of the System. PRASA has been able to continue with the policy and program implementation, and O&M. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. Although PRASA continues to have some staffing needs at individual facilities or departments and despite notable improvements over recent fiscal years, PRASA's overall staff levels continue to be high when compared to the Executive Management Team's baseline staffing. Notwithstanding, as per AWWA 2015 Benchmarking Performance indicators PRASA's customer account per employee ratio falls within the range for the industry, however on the lower side of the median, which can be attributed to PRASA's System and the utility's size and complexity.

PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer service, System performance, and budget controls as stipulated in the Strategic Plan 2014-2018 which, as of the date of this report, is under revision and dependent of the resolution of the current fiscal situation. The enactment of Act 66-2014 should help PRASA modify some of its O&M processes through, for example, the implementation and use of metrics system to evaluate performance and productivity, and modifications to certain employee classifications; however, expected O&M savings will be offset by lower revenues to be generated from certain government accounts. Also, the enactment of Act 211-2015 may help PRASA reduce expenses but could affect PRASA's succession planning and knowledge transfer at all operational levels. As previously stated PRASA is evaluating impacts and benefits of this law.

3. Condition of System

3.1. 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 3.47 million residents[6] plus approximately 5 million visitors annually. 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. Since 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. Thus, 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 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 have historically contributed to higher O&M costs compared to other utilities serving similar populations.

Based on the data obtained from PRASA's FY2015 Accountability Report, as of June 30, 2015, PRASA owns and operates eight dams, 118 water treatment plants (WTPs), 52 wastewater treatment plants (WWTPs), 269 wells, 954 water pump stations (WPSs), 1,486 water storage tanks, 824 wastewater pump stations (WWPSs), and more than 20,000 miles of water and wastewater pipelines island-wide. However, as of September 30, 2015, with the completion of La Máquina WTP elimination in August 2015, and the completion of the Alturas de Orocovis WWTP elimination (Consent Decree Certification Civil Action No. 06-6624), in August 2015 the total number of WTP and WWTP operated is currently 117 and 51, respectively.

In FY2015, Arcadis assessed the condition of PRASA's System through an inspection program of a sample of facilities that included a selection of the major elements of the System. The purpose of these inspections, completed between August and November of 2015 and January of 2016, 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. Arcadis is conducting these facility inspections approximately every two years.

[6] Source: U.S. Census Bureau as of July 1, 2015

As part of this effort, Arcadis evaluated the compliance results for all PRASA WTPs and WWTPs for the period of January 1, 2014 through June 30, 2015.

As recommended on the Asset Condition Report the rest of the WTP and WWTP facilities not visited in 2015, as well as a different sample of auxiliary facilities will be inspected during 2016-2017. The next cycle of facility inspections will resume in FY2018.

This section presents a summary of Arcadis's inspection results, findings and recommendations regarding PRASA's System.

3.2. Facility Inspections

A summary of the facilities inspected during 2015-2016 is presented in Table 3-1. In total, 231 facility inspections were performed out of a total of 3,709 facilities that comprise the System. Inspected facilities include: Regulated Dams, WTPs, WWTPs, WPSs, WWPSs, wells and water storage tanks. All regulated dams (100%) were inspected, due to the value of importance of these individual assets. Also, approximately 39% and 55% of the WTP and WWTPs respectively. The WTP and WWTP facilities inspected were selected based on three criteria: those that served a considerable number of customers (higher risk impact/more critical), those with low compliance performance, and those that had a lower rating in previous inspections. Finally, a small portion (about 4% in total) of the wells, water and wastewater pump stations and water storage tanks were inspected considering the lower risk impact these assets have on the System. 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. Nevertheless, based on data provided by PRASA, a discussion of the buried infrastructure has been included in a later section of this report.

3.2.1. Inspections Methodology

Inspections were performed throughout PRASA's five Operational Regions: East, Metro, North, South, and West. Table 3-1 shows the number of facilities inspected within each Region. It should be noted that the total number of inspections performed in the Metro Region is lower than those performed in the other Regions because it has fewer, but larger WTPs and WWTPs and less wells. Nevertheless, it was inspected in a manner consistent with the other Regions.

Table 3-1:
Summary of Inspections by Region

Asset Category	East	Metro	North	South	West	Total
Regulated Dams	3	2	1	1	1	8
Water Treatment Plants	14	4	9	8	11	46
Wastewater Treatment Plants	6	3	7	6	6	28
Wells	3	2	4	5	4	18

Asset Category	East	Metro	North	South	West	Total
Water Pump Stations	8	8	8	9	9	42
Water Storage Tanks	9	14	12	12	14	61
Wastewater Pump Stations	4	8	6	6	4	28
Total	**47**	**41**	**47**	**47**	**49**	**231**

Each facility was inspected using an inspection form developed by Arcadis, that included scoring criteria and criteria weighting customized for each specific asset category. Site visits were conducted in each facility. The purpose of the site visits was to determine the current state of repair and operation of the asset as influenced by age, historical maintenance and operating environment.

The evaluation criteria were chosen from the following list:

- Regulatory Compliance – degree to which the performance of the asset is in compliance with its permit limits and regulatory requirements.
- Operations / Process Control – degree to which asset condition and features allow it to be operated and controlled to meet its performance objectives.
- Equipment / Maintenance – assessment of the adequacy of the maintenance practices and the condition of the facility.
- 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 score between 0 and 3. An overall facility rating was then determined based on the calculation of a weighted average of the ratings for each criterion. For WTP and WWTP, a weighted average was used per equipment listing in the inspection form to account for the importance of critical equipment, then the average of each equipment rating was considered for the overall facility rating. The general interpretation of the numerical ratings is described below:

Rating	Range
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

An overview of the results of the inspections for each asset category is discussed in the following section.

3.2.2. Inspection Results

Based on the most recent facility inspections performed between August and November of 2015 and on January 2016, an overall condition rating for each asset category visited was determined. The condition of each of the facilities varied from new to those requiring certain capital upgrades and/or operational/process control improvements. The inspection rankings and results per facility type are summarized in this section.

3.2.2.1. Regulated Dams

All PRASA's regulated dams, a total of eight, were inspected in January 2016. Regulated dam structures are under the jurisdiction of the Dam Safety Unit of the Puerto Rico Electric Power Authority (PREPA). PREPA administers the Dam Safety Program in association with the Department of Natural and Environmental Resources (DNER), Puerto Rico Planning Board (PRPB), PRASA, and public sector appointees by the Governor. PREPA's Dam Safety Unit performed inspections from 2009-2013 of seven PRASA regulated dams creating summary reports addressing the dam structure, appurtenant works, operations and safety for each facility. Arcadis utilized the previous 2014 Dam inspections, PREPA's inspection reports and PRASA's latest (Dec-2015) Inspection and Follow-up Reports as a baseline from which to perform independent visual inspections and evaluations of the dam structures.

Table 3-2 presents the comparison of the average rating of the facilities by each category evaluated. The overall average rating of each evaluation criteria for facilities inspected in each year are also presented. Overall, all eight dams received an adequate rating.

Table 3-2:
Dams – Comparison of Average Inspection Results for 2008-2016

Criteria	2008[1]	2009[2]	2010	2012	2014	2016	Change 2016 vs. 2014
Equipment/Maintenance	2.3	2.2	2.3	2.3	1.8	1.9	0.1
Regulatory Compliance	2.2	2.2	2.2	2.3	2.3	2.3	0.0
Operations/Process Control	2.2	2.1	2.1	2.2	2.1	2.1	0.0
Staffing/Training	2.1	2.1	2.3	2.3	2.4	2.4	0.0
Overall	**2.3**	**2.1**	**2.3**	**2.3**	**2.1**	**2.1**	**0.0**

[1] Based on seven facilities (excludes Río Blanco Dam).
[2] Río Blanco Dam, under construction at the time, was included in inspections.

Two dams (Cidra and Isabela) received a poor rating in the Equipment/Maintenance category. The Cidra dam also had a poor rating in the Regulatory Compliance and Operation/Process Controls categories. In general, one dam (Cidra) received an overall rating of poor while the rest received an overall rating of either adequate or good. Las Curías Dam which had an overall rating of poor in the 2014 inspections improved to an adequate overall rating. PRASA's dams do not appear to have comprehensive surveillance and monitoring plans (SMPs). SMPs summarize all the types of inspections, frequencies, involved personnel, types of instrumentation, measurement frequency, data collection methods, data processing and reporting for each dam. SMPs should be tailored to

the critical potential failure modes for the dam. Based on the SMP, a surveillance and monitoring report should be prepared annually. This annual report summarizes data found from the surveillance and monitoring program. The annual report publishes plots of instrumentation data and overall condition of the dam based on the surveillance and monitoring program. Both the SMP and the annual report should be available for inspectors to review.

3.2.2.2. Water Treatment Plants

Forty-six (46) WTPs were inspected in 2015. Each visit consisted of a site walkthrough and an interview with the operator, plant supervisor or designated personnel, and revision of available plant reports. Therefore, the information obtained was at least in part based on the understanding of the person that was being interviewed. Table 3-3 presents the comparison of the average rating results of the facilities inspected by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2015 inspections is also provided. On average, the WTPs were rated as adequate with a score of 2.1. About 89% of the plants were classified as adequate, while the rest 11% of the plants were classified as good. No WTPs were rated as unacceptable or poor in overall rating. This is indicative of the fact that approximately 77% of the WTPs are able to produce water that meets standards for disinfectant residual, turbidity, and disinfection byproducts (DBPs) at least most of the time.

Table 3-3:
WTPs – Comparison of Average Inspection Results for 2008-2015

Criteria	2008	2009	2010	2012	2014	2015	Change 2015 vs. 2014
Regulatory Compliance	2.2	2.3	2.1	2.5	2.3	2.0	-0.3
Operations/Process Control	2.2	2.5	2.6	2.7	2.2	2.2	0.0
Equipment/Maintenance	2.1	2.3	2.3	2.3	2.4	2.1	-0.3
Staffing/Training	2.2	2.6	2.4	2.9	2.7	2.1	-0.6
Overall	**2.2**	**2.4**	**2.3**	**2.6**	**2.3**	**2.1**	**-0.3**

In general, the WTPs are in adequate condition. However, nine (20%) of the WTPs inspected were considered poor in terms of compliance, due to non-recurring exceedances of the Safe Water Drinking Water Act (SDWA) in total coliforms, total organic carbon (TOC), total tri-halomethane (TTHM), and haloacetic acids (HAA). These exceedances were found to be mostly driven by the transition of facilities into Stage 2 D/DBPR. Also, almost all the facilities have recurring noncompliance events for parameters included in their National Pollutant Discharge Elimination System's (NPDES) permits. These facilities are currently being addressed or scheduled to be addressed either in measures identified in the 2006 Drinking Water Settlement Agreement (also referred to as the Puerto Rico Department of Health (PRDOH) Agreement), in PRASA's CIP, or by remedial actions taken by the Regions. In comparison with the 2014 inspection results, all criteria decreased significantly, except for operations/process control criterion, which remained the

same. The recent decrease in compliance can be attributed in part to projects not being executed or being postponed as the CIP slowed-down its investment in projects since 2014 until the program was ultimately placed on hold in December 2015, due to PRASA's financial situation. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. However, the current fiscal situation and the restraints of Law 66 have adversely affected PRASA's efforts with respect to staff development and the provision of adequate staff in certain facilities. Furthermore, the fiscal situation has also affected the existing condition of the WTPs. This is evident, as noted in Table 3-3, in the facilities overall condition as well as in the equipment/maintenance criterion, which both decreased by 0.3 in their inspection results score from the 2014 inspections.

The facilities with the lowest overall score of the 46 WTPs inspected are summarized in Table 3-4. As shown below, all fourteen facilities received a score in the lower end of the adequate scoring range (below 2). One of these facilities, Ceiba Sur WTP, will be eliminated. PRASA should address the shortcomings identified during inspections to bring these facilities into continuous and consistent compliance.

Table 3-4:
2015 WTP Lowest Rated Facilities and Observations

WTP	2015 Score	Observations	CIP Identified
Enrique Ortega – La Plata (Metro)	1.6	During the evaluated period the facility compliance was rated as poor. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms and TTHM & HAA within the system; also, minor exceedances in Turbidity. For the NPDES compliance, it had significant Flow and Residual Cl violations and minor DO exceedances. The operations and process control of the WTP was rated in the lower end range of adequate. No Jar tests performed, no potable water flow meter and Equipment and O & M manuals not available during visit. No calibration plan for chemical feed pumps. In general, the equipment and maintenance of the WTP was rated as adequate. The sedimentation basins and filters had water leaks, causing considerable water loss. This was corrected. Spyder system for the sedimentation basins and the flocculation mixers are out of service. The holding tank at the STS system was overflowing since 2 of the 5 pumps are out of service. One Belt filter press out and another needs maintenance. There are some vacant positions, one supervisor, at least another license operator and one STS operator. Also, two of the five operators are not licensed.	Yes

WTP	2015 Score	Observations	CIP Identified
San Sebastián (West Region)	1.6	During the evaluated period the facility compliance was rated as poor. The WTP had various severe exceedances in the SDWA Compliance in the following parameters, Total Coliforms and within the system in TOC, THM and HAA. In addition, for the NPDES Permit, the WTP had some minor exceedances on turbidity, Residual CL and BOD, and significant exceedances with Flow. The operations and process control of the San Sebastian WTP was in the lower end range of adequate. Jar tests performed three times a day, once during every shift. Emergency generator cannot operate dewatering system (belt filter press). In general, the equipment and maintenance of the WTP was in the lower end of adequate condition. Currently, the WTP has one helicone for pre-sedimentation, but the equipment has not been in service for a long period; the supervisor indicates that the helicone is a problem for the operation of the WTP. The belt filter press was out of service due to a transmission problem. Facility needs more licensed operators for its operating hours.	Yes
Ceiba Sur (East Region)	1.7	During the evaluated period the facility compliance was rated as adequate. The WTP experienced significant exceedances in SDWA compliance with TOC and HAA within the system and minor violations in Total Coliforms. For the NPDES compliance, it had significant flow violations and minor exceedances with turbidity. The operations and process control of the WTP was rated as barely adequate. However, the plant in general is not in good condition but is scheduled to be eliminated as part of the Valenciano WTP Phase 1 project. Most of the equipment was in poor condition or not in operation. Actiflo unit was not operational. Needs more operators to cover absent/vacation time, reduce overtime.	Yes
Guayama Urbano (South Region)	1.7	During the evaluated period the facility compliance was rated as poor. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms, TOC and TTHM and HAA within the system. For the NPDES compliance, it had significant flow violations and minor exceedances with turbidity and BOD. The operations and process control of the WTP was rated in the lower end range of adequate. Jar test performed daily. At the moment of the visit the equipment manuals were not found. The WTP does not have additional security. In general, the equipment and maintenance of the WTP was rated as adequate. The following equipment were out of service: one intake pump, one multimedia filter, the automatic sludge removal system and one distribution pump. Improvements are needed along the WTP process units to ensure the safety of the Operators. Facility needs more licensed operators for its operating hours.	No

WTP	2015 Score	Observations	CIP Identified
Corozal Urbano (North Region)	1.7	During the evaluated period the facility compliance was rated as adequate. The WTP experienced significant exceedances in SDWA compliance with TTHM within the system and minor violations in TOC and HAA in the system. For the NPDES compliance, it had significant flow violations and minor exceedances with turbidity, copper and zinc. The operations and process control of the WTP was rated as poor. No Jar tests performed, no flow meter and no calibration plan for chemical pumps. No additional security at WTP and roads, fence and overall appearance need improvement. Because the distribution tank is under construction, a temporary tank was constructed besides the existing sludge holding tank. For contact time (CT) compliance it is required to use the combined volume of the existing clearwell, with the sludge tank and the temporary tank. In general, the equipment and maintenance of the WTP was in the lower end range of adequate. The filter media has not been changed since 2004 and one of the two backwash pumps is out of service. The sludge treatment system is currently out of service. The existing Robert Filter's treatment units have never been operated. Need more operators to properly cover facility's operating hours. The operators have not received the confined space and hazwoper trainings.	Yes
Ponce Nueva (South Region)	1.7	During the evaluated period the facility was rated as adequate. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms and TOC and minor violations of HAA in the system. For the NPDES compliance, it had significant exceedances in flow and minor exceedances with turbidity, Residual Cl and copper. The Process control and operation of the WTP was rated as poor. Emergency Generator Unit (EGU) out of service and temporary EGU does not have capacity to operate entire plant. Additional security needed. The operators perform the necessary sampling, following SOPs, for adjustments to process. Jar tests performed daily. In general, the equipment and maintenance of the WTP was in adequate condition. However, Superpulsators need to be repaired, automatic backwash valves, emergency power generator and electrical systems out of service. The training is adequate for the operation of the WTP. Facility needs one additional operator to cover all shifts, vacations, absent time.	Yes

WTP	2015 Score	Observations	CIP Identified
Canóvanas Nueva (Metro Region)	1.8	During the evaluated period the facility compliance was rated as poor. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms and TTHM & HAA within the system. For the NPDES compliance, it had significant exceedances with Turbidity, Copper, Lead and BOD and minor violations in Zinc. The operations and process control of the WTP was rated as adequate. However, Jar tests only performed when drastic changes in turbidity occurs, no potable water flow meter, O & M manual not available during visit. EGU does not have enough capacity for distribution pumps. In general, the equipment and maintenance of the WTP was rated as adequate. However, Vac-Trac system for the sedimentation basins is out of service. Superpulsator is operating as a sedimentation basin. Windows of the chlorine application room should be close. There is a need for an "At Large" licensed operator.	Yes
Guaynabo Los Filtros (Metro Region)	1.8	During the evaluated period the facility compliance was rated as poor. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms and TTHM & HAA within the system; also, minor exceedances in TOC and turbidity. For the NPDES compliance, it had minor violations in Residual Cl. The operations and process control of the WTP was rated as adequate. Jar tests performed weekly. No potable water flow meter, equipment and O & M manuals not available during visit. Needs improvement of access roads and illumination. In general, the equipment and maintenance of the WTP is adequate. However, the WTP has some units out of service: filters control system, (1) filter, (1) mixer at flocculation tank, spyder system at sedimentation basins, (1) turbidimeter and structural deterioration of sedimentation basin No.4 is noticeable. Hazwoper training needs to be updated. Facility needs more licensed operators for its operating hours.	Yes
Aguadilla (West Region)	1.8	During the evaluated period the facility compliance was rated as poor. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms, TOC and TTHM within the system and minor violations of turbidity and HAA in the system. For the NPDES compliance, it had minor exceedances with Residual Cl. The operation and process control of the WTP is good, the operator make the necessary adjustments to the process, depending on the results of the laboratory samples. Jar tests performed three times a day, once during every shift. Emergency generators have capacity for entire plant. In general, the equipment and maintenance of the WTP was in the lower end range of adequate condition. Both superpulsator units of the WTP were out of service. The Sludge Treatment System (STS) has been out of service for a long time, and the sludge is being discharged by the discharge 001 point. Need more operator staff to cover absent/vacation time.	No / (Process Control Issue)

WTP	2015 Score	Observations	CIP Identified
Juncos Urbano (East Region)	1.8	During the evaluated period the facility compliance was rated as adequate. The WTP experienced significant exceedances in SDWA compliance with HAA within the system and minor violations in Total Coliforms and TOC. For the NPDES compliance, it had minor exceedances with turbidity and BOD. The operations and process control of the WTP was rated as poor. Documentation of manuals, etc. was not very good, several documents were missing or not organized. Not performing Jar Test and frequently does not comply with CT. No flow meter and security cameras were working. In general, the equipment and maintenance of the WTP was in the lower end range of adequate. However, (1) flocculation polymer pump and a filter backwash pump are out of service, as well as one of the distribution pumps.	No / (Process Control Issue)
Hatillo-Camuy (North Region)	1.8	During the evaluated period the facility compliance was rated as adequate. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms and TOC. For the NPDES compliance, it had significant exceedances with Flow, Turbidity, Copper, Lead, Zinc. The operations and process control of the WTP was rated as adequate. The operators perform the necessary sampling, following SOPs, for adjustments to process. However, no Jar tests performed, no potable water flow meter, emergency response plan (ERP) and equipment manual not updated. Also, no calibration plan for chemical feed pumps. Membrane system had previously experienced performance problems, caused by the poor cleaning of the system. In general, the equipment and maintenance of the WTP was in the lower range of adequate. One pump for chlorine application is out of service. One of the two pumps that transfer water from the filters to the membrane system is out of service, the second pump has the variable frequency drive cooling system out of service too. In the Superpulsator, the actuator of valve No.4 is also out of service. One of the two pumps for the distribution to Punta Brava service area, is out of service. No STS. Need at least one more operator to properly rotate during its operating hours.	Yes
Aceitunas (South Region)	1.9	During the evaluated period the facility compliance was rated as adequate. The WTP experienced significant exceedances in SDWA compliance with THM within the system and minor violations in Total Coliforms and TOC. For the NPDES compliance, it had minor exceedances with turbidity and BOD. The operations and process control of the WTP was rated as poor. The operators perform the necessary sampling, following SOPs, for adjustments to process. However, the laboratory room does not have the required equipment to perform the process tests. Jar test not performed. The Auto transfer switch is out of service, an external crew operate the EGU when a power failure occurs. In general, the equipment and maintenance of the WTP was rated as adequate. At the moment of the visit the aeration tank was overflowing; it has diffusers that were not visible due to tank's overflowing. The WTP green areas need grounds keeping, some equipment is corroded and need to be painted. The staffing and training are adequate for the operation of the WTP and its operating hours.	No

WTP	2015 Score	Observations	CIP Identified
Humacao (East Region)	1.9	During the evaluated period the facility compliance was rated as good. The WTP experienced significant exceedances in SDWA compliance with Total Coliforms. For the NPDES compliance, it had minor exceedances with Residual Cl. The operations and process control of the WTP was rated as poor. No jar test being performed. O & M and equipment manuals not available or being used. Missing lab equipment, no flow meter and no adequate containment on diesel tank. Poor lighting, security, men's bathroom and general appearance. Also, they have a standby flocculation unit (old unit) for maintenance purposes. Equipment was found to be generally in barely adequate condition, one filter which was out of service due to a broken underdrain; two mechanical mixers; the three spider systems for sludge removal; one filter flow meter; the distribution pumps to Humacao (currently not used); and the discharge 001 flow meter and residual chlorine analyzer which are out of service. No STS. Housekeeping in this plant was poor and not clean. There were great amounts of polymer drones without secondary containment. Per both, operator and supervisor, staffing was not adequate for the plant operation; more licensed operators are necessary.	Yes
Río Blanco (East Region)	1.9	During the evaluated period the facility compliance was rated as adequate. The WTP experienced minor exceedances in SDWA compliance with Total Coliforms and TOC. For the NPDES compliance, it had significant flow violations and minor exceedances with copper and BOD. The exceedances at the Discharge Point 001 were due to the lack of a sludge treatment system (STS). The Discharge Monitoring Report (DMR) explains that copper is present in the surface water from the river. The operations and process control of the WTP was rated as poor. Jar tests performed daily. Not using the equipment manuals, automatic transfer switch does not work and diesel valve not properly locked. In terms of housekeeping, equipment debris was observed at different locations in the plant. Also, sludge level is very high at the sedimentation basins. The lack of an STS affects the discharge quality. Equipment was found to be generally in the lower end of adequate condition. The sludge removal mechanism which was out of service due to high sludge level. Other system that although functional was out of service was the helicone system. Also, several mixers in the flocculation basins are out of service. The STS is out of service. Facility is understaffed of licensed operators for its operating hours.	Yes

As mentioned, compliance results show that facilities are, in general, performing slightly worse with respect to compliance with limits of effluent discharge parameters. For example, Aguadilla WTP has improved its NPDES parameters, but added exceedances in HAA during 2015 in SDWA parameters. Also, Canóvanas Nueva WTP and Enrique Ortega WTP continue since the 2014 CER with certain challenges to meet TTHM, Total Coliforms, and HAA effluent parameters and the Guaynabo Los Filtros, was added to the list recording exceedances in those same parameters. Finally, it should be noted that in 2015, besides Guaynabo Los Filtros other facilities were added to the lowest score list such as San Sebastian, Corozal Urbano and the Guayama WTP which

reported exceedances mainly in TTHM, TOC, and HAA effluent parameters. PRASA will attempt to address some of the compliance issues encountered at several of the treatment facilities by performing operational adjustments but this might not resolve the situation and would require attention by means of R&R or CIP. However, these are dependent on the fiscal situation and availability of funding.

Future regulations 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 (see Sections 5.5 and 5.6 for additional discussion on renegotiations with Regulatory Agencies, future regulations and other regulatory requirements). Notwithstanding the impact of future regulations, capital improvements are needed to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, allow continued economic development and help bring the System into compliance with all regulatory requirements.

3.2.2.3. Wastewater Treatment Plants

Twenty-eight (28) WWTPs were inspected in 2015. Each visit consisted of a site walkthrough and an interview with the operator, plant supervisor or designated personnel. Thus, as with the WTPs, information was at least in part based on the understanding of the individual whom was being interviewed. Table 3-5 presents the comparison of the average rating results of the facilities inspected by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2015 is also presented. Overall, WWTP facilities were rated as adequate with a score of 1.9.

Table 3-5:
WWTPs – Comparison of Average Inspection Results for 2008-2015

Criteria	2008	2009	2010	2012	2014	2015	Change 2015 vs. 2014
Regulatory Compliance	1.3[1]	1.5[1]	1.5[2]	1.4	1.5	1.8	0.3
Operations/Process Control	2.4	2.4	2.3	2.4	2.3	2.0	-0.3
Equipment/Maintenance	2.2	2.2	2.4	2.2	2.3	2.0	-0.3
Staffing/Training	1.8	2.0	1.8	2.3	3.0	2.0	-1.0
Overall	**1.9**	**2.0**	**2.0**	**2.0**	**2.0**	**1.9**	**-0.1**

[1] 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. Also, both have been closed.
[2] One WWTP (Playa Santa) that discharges to underground injection was not evaluated under this criterion because it does not have an approved NPDES Permit.

The WWTPs generally range from poor to good condition with regulatory compliance as the category of primary concern. Compliance with NPDES effluent limits has been the greatest challenge for a number of WWTPs. Of the 28 facilities inspected, six (21%) received unacceptable

rating and three (11%) received poor rating in terms of compliance as a result of multiple reported exceedances of their interim and/or final NPDES limits. Some of the facilities that rated poor or unacceptable from a compliance perspective are being addressed either in measures included in PRASA's CIP as identified in the recently negotiated 2015 USEPA Consent Decree, and/or as identified by PRASA's Regions (including process control adjustments). However, most of the WWTPs which have been rehabilitated, expanded or retrofitted, are still incurring in compliance exceedances with NPDES discharge parameters. Process control continues to be a challenge in some of the facilities, even though the plant operators indicated that standard operating procedures and control strategies are followed. In summary of overall rating, of the 28 facilities inspected, nine (32%) received a poor rating, sixteen (57%) received an adequate rating and three (11%) received a good rating. It is evident, given this inspection's results that the condition of the WWTP has deteriorated since the previous inspection. There are nine facilities rated as poor compared to only two in the 2014 inspections. The decline in WWTP condition and ratings is an effect of recurring observations from previous inspections that have yet to be addressed and the slowing down of the capital improvement and R&R programs due to the fiscal situation and budget limitations.

In comparison with the 2014 inspections results, the regulatory compliance criteria increased, while the equipment/maintenance, operations/process control and staffing/training criteria scores significantly decreased. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. However, the current fiscal situation has adversely affected PRASA's efforts with respect to staff development and the provision of adequate staff in certain facilities. Furthermore, the fiscal situation has also affected the existing condition of the WWTPs. This is evident, as noted in Table 3-5, in the facilities overall condition results decrease of 0.1 from the 2014 inspections and most noticeable in the number of facilities rated as poor, which increased to nine facilities (32%) in the 2015 inspections from two facilities (7%) in the 2014 inspections. The decline in WWTP condition and ratings is an effect of recurring observations from previous inspections that have yet to be addressed and the slowing down of the capital improvement and R&R programs due to the fiscal situation and budget limitations. Some of the facilities require major improvements thus their inclusion in the CIP but some can be addressed through PRASA's R&R program and may not require major capital improvements.

PRASA should address the shortcomings identified during inspections to bring these facilities into continuous and consistent compliance. These improvements may be related to new process equipment, process automation and or process control optimization. The facilities with the lowest overall score (below 2.0) of the 28 WWTPs inspected are summarized in Table 3-6.

Table 3-6:
2015 WWTP Lowest Rated Facilities and Observations

WWTP	2015 Score	Observations	CIP Identified
Guayanilla (South Region)	1.0	During the evaluation period the facility compliance was unacceptable. Significant exceedances of BOD, Nitrates and phosphorous (P). Need to evaluate if plant is outdated or if improvements can be made to comply with regulations. Operations and Process control resulted in a barely adequate rating. The WWTP is old and not much adjustment can be performed for process optimization. Application of GC-950 at aeration basins of both Plant A and B for P removal, however violations still occur. Several of the equipment is old and outdated, but performing adequately. One degritter out of service. Several Sludge drying beds lack roof and polymer and dechlorination application systems are visibly corroded. Need another operator to cover vacations/absent time.	Yes
Camuy (North Region)	1.3	During the evaluation period the facility compliance was unacceptable. Significant exceedances with Total Nitrogen, also BOD and TSS. As indicated by the supervisor, the plant never complied with this parameter since the last plant modification. Need further analysis, whether nutrient removal system should be added. The operations/process control implemented was adequate but below rating of 2.0. One of the comminutors and one of the degritter units were out of service. Three (3) blowers of the trickling filters are out of service and one of the intermediate clarifiers is out as well. The fence is missing in three of the four corners of the WWTP. The plant staff and training was adequate for the operation of this facility and its operating hours.	No
Cayey (East Region)	1.3	During the evaluation period the facility compliance was unacceptable. Significant noncompliance with Phosphorous (P) and fecal Coliforms. Continuous issues with ultraviolet (UV) system. The Operators perform the necessary SOPs & sampling to adjust the process. Overall, operations/process control was rated as adequate but below the 2.0 rating. Modifications to original design required to meet P removal. Use of polymer to precipitate Phosphorus has been eliminated by increasing mixed liquor suspended solids concentration at biological nutrient removal (BNR). Adjustments for handling P have not provided the desired results, probably needs reassessing. Most equipment was in adequate to good conditions. However, several units are out of service: One of the degritters units, one mixer at BNR, one floating mixer and a blower and mixer at holding tank. Training and staffing is sufficient for WTP and its operation hours.	No/ Improvements to be addressed by Operational Region)

WWTP	2015 Score	Observations	CIP Identified
Guánica (South Region)	1.4	During the evaluation period the facility compliance was unacceptable. Significant exceedances of Total Nitrogen (Nitrates & ammonia - NO2+NO3+NH3). Need to evaluate process of nutrient removal in order to comply with regulations and determine the optimal operation of the BNR. Also, repair grit removal system. The operators perform the necessary sampling, following SOPs, for adjustments to process. However, need to improve the handling of total nitrogen (nitrates and ammonia). BNR was place in operation in June-2015. There is old equipment that needs replacing and the grit removal system is out of service. General grounds need better maintenance. Currently, Operations/preventive maintenance has schedule repairs to the existing degritters and repairs to the influent flow meter. The staffing lacks maintenance crew and one manager and one supervisor attend 3 WWTPs.	No / (Improvements to be addressed by Operational Region)
Lajas (West Region)	1.4	During the evaluation period the facility compliance was unacceptable. Significant exceedances in Phosphorus (P), ammonia (NH3) and in fecal coliforms and BOD. The P and NH3 exceedances were due to deficiencies in the aeration system. Repairs and improvements are already implemented. The four blowers were repaired, and membranes were installed in each of the SBRs. Fecal coliform exceedances were due to problems with the UV system. The problems that may have caused the exceedances were attended. Operations/process control was rated as poor. Equipment/maintenance was rated as adequate. Plant operates around half of the design capacity. On hold improvements: Roof installation to dried sludge container and automation of polymer injection. Needs housekeeping staff, perhaps another operator.	No / (Improvements to be addressed by Operational Region)
Santa Isabel (South Region)	1.4	During the evaluation period the facility compliance was unacceptable. Significant exceedances of fecal Coliforms and TSS, and a residual chlorine event. SBR needs improvements which may be the major contributor of the exceedances. In addition, during the evaluation period there where several unapproved industries discharges that affected the WWTP process and compliance. Those were discovered and stopped, plus the sludge wasting was increased. The operators perform the necessary sampling, following SOPs, for adjustments to process. Overall, most of the equipment is in adequate condition, the plant is rated as adequate. One BFP is out of service, reported for maintenance. SBR needs improvements as indicated in the pending projects section, awaiting funding to perform the works. The staffing and training are good for this facility and its operating hours.	Yes

WWTP	2015 Score	Observations	CIP Identified
Yabucoa (West Region)	1.4	During the evaluation period the compliance was rated as adequate. Significant exceedances in Flow and Fecal Coliforms and minor violations with ammonia and nitrates. Fecal coliforms violations may be due to the excess flow above the package plant treatment capacity. Total permit limits are based on both package plant and old plant in service, having the old plant out of service limits the plants treatment capacity. Other violations related to Nitrogen are due to treatment type limitations. Operations and process control was rated as poor. Most equipment is in adequate to poor condition. Some critical equipment, such as the influent comminutors (which serve as screening equipment) and degritters are not in service. The old plant should be placed into operation in order to properly process the total flow received. Training is adequate and staffing needs at least one "At large" operator to cover vacation/absent time, reduce overtime.	Yes
Vega Alta (North Region)	1.4	During the evaluation period the facility compliance was rated as poor. There were major exceedances with Total nitrogen and fecal coliforms, as well as events with residual chlorine, DO, TSS and Total Coliforms. A possible reason for not complying with the coliforms could be due to the overload of solids since (1) package plant is out of service, it might be increasing the sludge blanket in the clarifier of the working package plant, which then cannot contain the solids and these are carried over the weir to the effluent. Also, the facility might need a nutrient removal system for nitrification and denitrification. Overall operations/process control was rated as poor. No jar tests performed, the emergency generator does not have capacity to operate the temporary sludge centrifuge and the manuals are not updated. The existing contact stabilization package plant is still under rehabilitation, which includes structural repairs and clarifier upgrade. Needs to be placed in operation to handle peak flows. The sludge drying beds are not being used for dewatering since they are using a rented centrifuge for nearly a year. It is expected that when completing the rehabilitation project, to proceed with the sludge drying beds operation. The grit removal system is out of operation; these units need to be repaired or replaced. One influent pump out of service. Need at least 1 "At Large" operator to cover vacation/absent time, reduce overtime.	Yes

WWTP	2015 Score	Observations	CIP Identified
Arecibo (North Region)	1.6	During the evaluated period, the facility compliance was rated as poor. It had major exceedances with F. Coliforms and T. Coliforms. Although there were improvements to the chlorine application system during the last year, the problem kept occurring. Further analysis and action is recommended. The process control performed in the facility in general was barely adequate. Plant operates around half the design capacity. It was noted that a significant amount of foam accumulated in the discharge point 001, this could be caused by an excess of polymer injection in the facility. The degritter system is out of service because of problems with the motor transmission, this could contribute to the excess solids in the effluent. One influent pump and ventilation are out of service. One of the scum rotary screens for the primary clarifiers is out of service. In addition, the belt filter press and the dewatering building are in bad shape. The supervisor mentioned that there are two unfilled positions for the maintenance of the facility. Incur in overtime and need housekeeping personnel.	Yes
Ponce (South Region)	1.6	During the evaluation period the facility compliance was rated as poor. It had significant problems with fecal Coliforms and residual chlorine. The plant completed the pre-chlorination project at the splitter box and polymer application for assistance to coagulation, but still reflected problems complying with fecal coliforms thus further analysis and action is recommended. The plant has adequate process control procedures and adjustments but in the lower end of the range. The WWTP is working at a little over half the capacity. Currently using potable water for NPW system, but future project to use the treated water after chlorination in the works. Overall, most of the equipment is in adequate condition. Digester 1 & 2 have been out of service for a long time and still are undergoing repairs. Need to complete project. Need more operators to alternate all shifts, cover vacations/absent time, and reduce overtime.	Yes
Aguadilla (West Region)	1.6	During the evaluation period the facility compliance was rated as adequate. Only some exceedances in F. Coliforms and an event with TSS. This could have been triggered by the fact that the WWTP was without dewatering system for a period while securing the rental of a temporary centrifuge. The operations/process control was rated as unacceptable. There is no system to control scum out of the primary clarifiers, the fine screen system was eliminated, currently performing manual extraction. Plant is operating at less than half the design capacity. EGU is out of service. Using a rented portable EGU, which does not have the capacity to operate entire plant. Most of the major equipment has some type of issue. Overall rating was borderline adequate. Mechanical bar screens out of service; Entire STS system out of service (using rented centrifuge); septage aerators are out of service; (1) sludge pump and thickener motor damaged; EGU not completed; Sludge pump building in bad condition. Tractors for groundskeeping are out of service, receiving assistance from Corrections program. In need of a permanent lab technician (Water analysis) since students offer only temporary services.	No

WWTP	2015 Score	Observations	CIP Identified
San Sebastián (West Region)	1.8	During the evaluation period the facility compliance was rated in the lower end range of adequate. Several exceedances with fecal Coliforms occurred. As informed by Supervisor, there were no operational problems during the evaluation period. Factors that could have provoked these violations are: infiltrations, treating more flow than process capacity and chlorine injection strategy currently used. Chlorine is not flow proportioned, instead chlorine is only adjusted during rain events, depending on the chlorine concentration at the contact chambers. The operators perform the necessary sampling, following SOPs, for adjustments to process. Probably need to improve chlorine injection strategy or install a flow proportioned system in order to regularly comply with regulations. Also, Plant is processing more flow than design capacity. Blowers for the Biofilters are not being used. Septage does not undergo any process, directly to sludge drying bed. Overall, most of the equipment is in adequate condition but below the 2.0 rating. The staffing needs more operators to cover vacations and reduce overtime. (3) Shifts only 4 operators. The training of personnel could be improved.	Yes
Caguas (East Region)	1.9	During the evaluation period the facility compliance was rated in the lower end range of adequate. Several violations to Fecal Coliforms and some minor violations to BOD, Phosphorous and an event with ammonia. Phosphorus should be addressed by adjusting BNR operation and/or adding a chemical phosphorus removal product. Fecal coliforms may be an issue due to UV lamps out of service. Plant has adequate (below 2.0 rating) operation and process control measures, however, additional efforts need to be implemented to control phosphorus and fecal coliforms. Plant operating at half the design capacity. Equipment condition is adequate but below the 2.0 rating. The WWTP has some new equipment out of service, which should be addressed by improving maintenance efforts. Some of the units out of service: (2) mechanical screens; (2) influent pumps; (1) blower, (2) nitrate pumps and several mixers at BNR; (2) RAS pumps; (1) filter; and several lamps of UV. Training could be improved.	No
Aibonito (East Region)	1.9	During the evaluation period the facility compliance was rated as good. Few exceedances on Nitrates and an event on ammonia. Nitrogen violations may be due to nearby food industry discharges. Plant is not designed to handle such discharges. Operational and process control measures were rated as poor. Strategies not communicated effectively. ERP not updated and no calibration of polymer feed pumps, but operators have an effective method to measure and adjust for proper application. The emergency generator provides power to the entire plant. Overall, equipment/maintenance was in adequate condition but close to the poor rating. Significant deduction in score due to sand filters, which are not operating. Plant has proper training for size and type of facility. Lacks proper staffing, incurs in overtime.	Yes

WWTP	2015 Score	Observations	CIP Identified
Vega Baja (North Region)	1.9	During the evaluation period the facility compliance was rated in the lower end range of adequate. The parameters with exceedances include Residual Cl, NH3 and F. Coliforms. The parameter of F. Coliforms was exceeded 5 times in the period. A possible reason for not complying with these parameters could be that the WWTP experienced problems with the chlorine application and the UV system in the past, and currently one of the disc filters is not operating. The process control procedure is being performed adequately. The operators sample for several parameters to conduct adequate operation of the WWTP. The plant is currently controlling the phosphorus removal which was a parameter violated during previous inspections by applying Ferric Chloride prior to the A/A train clarifiers. The plant is still experiencing problems with the disinfection, it could be evaluated to use the UV system and the chlorine application in series and not alternating. Safety issues were found including the stairs of the nutrient removal tank, and some equipment in the stairs of the clarifiers, among others. Most of the equipment was in adequate operating condition except for the biological rotators, which has some units out of service and one disc filter out of service as well. The training is adequate for the process and operation hours of the WWTP. Additional staff is necessary for the housekeeping and maintenance of the WWTP areas.	No

3.2.2.4. Wells

PRASA has reported that it owns and operates 269 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). A total of eighteen wells were inspected in 2015. Each visit consisted of a site walkthrough and an interview with the designated personnel and the results of the assessment of those wells are described below. The inspection results for previous years were compared to the inspection results from the 2015 inspection to analyze condition changes. Table 3-7 illustrates the comparison of the average rating for 2008 through 2015 of all facilities using the overall rating since the equipment evaluation was merged with the operations/process control criterion. This merged criterion was performed using the same deductions and weighted score than previous asset condition assessment reports thus the impact on the overall score was not altered. Of the eighteen wells inspected in 2015, adequate ratings were given to thirteen facilities (72%); whereas three received poor ratings and the remaining two facilities received a rating of good. Overall, wells were rated as adequate with a score of 1.9.

Table 3-7:
Wells – Comparison of Average Inspection Results for 2008-2015

Criteria	2008	2009	2010	2012	2014	2015	Change 2015 vs. 2014
Overall	2.0	1.9	2.1	2.2	2.2	1.9	-0.3

As shown in Table 3-7, all categories evaluated yielded results in the adequate range. However, this year the average results decreased by 0.3 due mostly by Arroyo Urbano Well, Texaco well and Campanillas 8 Well, which were in poor condition. Also, due to the current fiscal situation, improvements had to be reduced or placed on hold thus exacerbating the deterioration of some facilities. In general, the deficiencies noted were due in part to deterioration in equipment conditions. Although all the wells were generally observed to be in adequate condition, there were several factors that resulted in some wells being rated lower. The wells rated adequate and poor category generally had several of the following conditions listed below:

- Lack of remote monitoring
- Inadequately labeled control panel
- Lack of emergency generator unit
- Inadequate or missing Pressure regulator valve
- Minor Corrosion and leaks
- Missing bolts
- Lack of safety device equipment or Emergency Kit
- Overall appearance not satisfactory, such as overgrown vegetation, flooding, floating debris, and painting
- Inadequate security or fence
- Facility drawings not available
- Staffing not adequate

The sample of wells that were inspected was generally in adequate condition; these wells 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. However, future regulatory requirements may require either the implementation of significant capital improvements to include and achieve additional treatment capabilities at well facilities, or the closure of certain wells. Currently, PRASA is conducting a comprehensive study at all active groundwater wells island-wide to assess source water protection and identify potential groundwater under the direct influence (GWUDI) of surface water. The project grouped wells into five different priorities and schedules. As of December 2015, PRASA has completed three of the five priority evaluations and has begun performing Microscopic Particulate Analysis to further evaluate the potential of a well of being GWUDI. This effort is being performed as a result of complying with USEPA's Surface Water Treatment Rule (SWTR) and state regulations required by the PRDOH. The SWTR requires source protection, filtration and disinfection when surface water or GWUDI is used as a source for drinking water. Results of the GWUDI evaluations currently being conducted by PRASA should prove beneficial to identify additional needs in these facilities. This initiative continues its progress.

3.2.2.5. Water Pump Stations

PRASA has reported that it owns and operates 954 WPSs. 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) – usually not inspected, except for 1 this year. PRASA's WPSs vary in pumping capability from less than 100 gpm to over 9,000 gpm. A total of 41 above ground WPSs (4.3% of total WPSs) were inspected on 2015. Each visit consisted of a site walkthrough and an interview with the designated personnel. The results of the assessments of those stations are described below. The facilities were evaluated using facility specific criteria and regional specific criteria, in order to have a better understanding about the facility's conditions, and obtain an overview of the maintenance and staffing practices of the region/operational area. One criteria considers operations, process control and equipment aspects which are related (limited to) a specific facility. The other criteria considers maintenance aspects, which are carried out either on a regional or operational area basis and, also, the staffing and training aspects. Staffing and training was included to evaluate the adequacy of PRASA's assigned monitoring and operations personnel.

The operations/process control/equipment criterion was assigned a weighting factor of 75%, while the maintenance/staffing criterion was assigned a weighting factor of 25%.

The inspection results for previous years were compared to the inspection results from 2015 inspection to analyze performance changes since the previous inspections. Table 3-8 illustrates the comparison of the average rating of all facilities by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2015 is also presented. The average WPSs overall rating for 2015 resulted in the adequate range with an overall rating of 2.2.

Table 3-8:
WPSs – Comparison of Average Inspection Results for 2008-2015

Criteria	2008	2009	2010	2012	2014	2015	Change 2015 vs. 2014
Overall	2.2	2.2	2.3	2.4	2.2	2.2	0.0

As shown in Table 3-8, the overall rating was unchanged compared to the 2014 results. Although the majority of the WPSs were generally observed to be in adequate or good condition, there were a number of factors that resulted in some WPSs being rated lower. The WPSs with lower ratings generally had several of the following conditions:

- Equipment not in full service
- Lack of pressure gauges on pump suction and discharge
- Lack of pressure relief system
- Visible leaks and corrosion

- Lack of posting emergency numbers in the facility
- Inadequate lighting
- Lack of flow meter
- Lack of remote monitoring
- Inadequately labeled control panel
- Deteriorated supports
- Lack of lifting crane and/or hoist
- Lack of emergency generator unit
- Facility drawings not available
- Staffing not adequate

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 are related to lack of features to optimize operation and maintenance practices, and condition of 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 do not require major capital improvements.

3.2.2.6. Wastewater Pump Stations

PRASA has reported that it owns and operates 824 WWPs that varies in pumping capability from less than 100 gpm to over 10,000 gpm depending on the population density and its proximity to the WWTP. A total of 28 WWPSs (3.4% of total WWPSs) were inspected in 2015. Each visit consisted of a site walkthrough and an interview with the designated personnel. In general, the inspected facilities predominantly use wet pit type submersible pumps, although several dry pit type stations were also inspected. The result of the assessments of those stations is described below. The facilities were evaluated using facility specific criteria and regional specific criteria, in order to have a better understanding about the facility's conditions, and obtain an overview of the maintenance and staffing practices of the region/operational area. One criteria considers operations, process control and equipment aspects which are related (limited to) a specific facility. The other criteria considers maintenance aspects, which are carried out either on a regional or operational area basis and, also, the staffing and training aspects. Staffing and training was included to evaluate the adequacy of PRASA's assigned monitoring and operations personnel.

The operations/process control/equipment criterion was assigned a weighting factor of 75%, while the maintenance/staffing criterion was assigned a weighting factor of 25%.

The inspection results for previous years were compared to the inspection results from 2015 to analyze the performance. Table 3-9 presents the comparison of the average rating of all facilities

by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2015 is also presented. The average WWPSs rating for 2015 resulted in the adequate range with an overall rating of 2.4.

Table 3-9:
WWPSs – Comparison of Average Inspection Results for 2008-2015

Criteria	2008	2009	2010	2012	2014	2015	Change 2015 vs. 2014
Overall	1.7	2.0	2.0	2.1	2.3	2.4	0.1

The overall condition of WWPSs slightly improved since the 2014 inspections.

The WWPSs with lower ratings generally had several of the conditions listed below:

- One or more major pieces of equipment are out of service
- Lack of emergency generator unit or available but not working
- Lack of telemetry (level, power, etc.)
- No process pump protection (e.g., bar screen or comminutor)
- Records of bypasses or overflows at the pump station
- Lack of exterior alarm
- Lack of lifting crane and/or hoist
- Overall appearance is not satisfactory, such as overgrown vegetation
- Interior/exterior lighting is not adequate
- Bar screen requires cleaning
- Exhaust fan not working, not timed paced or not present
- Floating debris in the wet pit
- Facility drawings not available
- Staffing was not adequate

In general, the WWPSs are in adequate condition. The overall improvement observed in the WWPSs could be a result of PRASA's efforts under its Integrated Maintenance Program (IMP). Although facilities in overall were found to be adequate, issues such as equipment out of service, security concerns, and general maintenance were still observed. Also, some facilities still lack adequate alarm systems and/or telemetry systems, and staffing. Having remote monitoring will help PRASA prevent overflows in the System.

3.2.2.7. Water Storage Tanks

PRASA has reported that it owns and operates 1,486 water storage tanks that vary in storage capacity (size) from 100 to 10,000,000 gallons. A total of 61 water storage tanks (4% of total tanks) were inspected in 2015. Each visit consisted of a site walkthrough and an interview with the designated personnel. The results of the assessments of those stations are described below. The facilities were evaluated using facility specific criteria and regional specific criteria, in order to have a better understanding about the facility's conditions, and obtain an overview of the maintenance and staffing practices of the region/operational area. One criteria considers operations, process control and equipment aspects which are related (limited to) a specific facility. The other criteria considers maintenance aspects, which are carried out either on a regional or operational area basis and, also, the staffing and training aspects. Staffing and training was included to evaluate the adequacy of PRASA's assigned monitoring and operations personnel.

The operations/process control/equipment criterion was assigned a weighting factor of 75%, while the maintenance/staffing criterion was assigned a weighting factor of 25%.

The inspection results for previous years were compared to the inspection results from 2015 inspection to analyze performance changes since the previous inspections. Table 3-10 illustrates the comparison of the average rating of all facilities by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2015 is also presented.

Table 3-10:
Tanks – Comparison of Average Inspection Results for 2008-2015

Criteria	2008	2009	2010	2012	2014	2015	Change 2015 vs. 2014
Overall	1.9	1.6	1.6	1.9	2.4	2.3	-0.1

On average, overall ratings slightly decrease from 2014 inspections. More facilities were visited which increase the chance of lowering the scores. Furthermore, two were close to poor rating, those were Barinas I (1.5) and Barinas II (1.7). Notwithstanding most of the tanks were generally observed to be in adequate or good condition, there were several factors that resulted in some tanks being rated lower. The tanks that rated poor generally had several of the following conditions:

- Lack of locks on tank access hatches
- Lack of routine internal inspections of tank or daily visits
- Lack of adequate security lighting
- Lack of remote monitoring
- Lack of local level indicator
- Lack of adequately screened vents
- Presence of Leaks

- Visible concrete cracks and deterioration
- Visible roof surface defects
- Area around tank not readily accessible (typically due to overgrowth of vegetation)
- Unacceptable overall appearance, such as overgrown vegetation and debris

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 missing equipment and overall maintenance condition of the tanks, which are not critical to the basic function of the tanks. However, there were a few deficiencies that should be addressed to ensure the tanks provide a safe, reliable source of stored potable water and to minimize treated water losses (i.e., local alarms and remote tank monitoring of tank levels). These deficiencies do not require significant capital upgrades, but rather a modification to operation and maintenance practices (e.g. removal of overgrown vegetation and periodic tank internal inspections) or can be addressed through PRASA's R&R program (e.g. repairs to tank hatches, vents, level alarms, and security fences). In addition, remote monitoring is recommended as an optimization measure and as a preventative measure against water losses in the distribution system; however, PRASA already begun with this initiative, providing remote monitoring to those tanks which are the most significant in the distribution system.

3.3. Buried Infrastructure

The following sections provide some discussion regarding indirect indicators of the condition of buried infrastructure and the steps PRASA is taking to improve them. Historically, PRASA had not kept a reliable database of its buried infrastructure. Nevertheless, since FY2005 PRASA has invested in and continues to develop and update its Geographical Information System (GIS) database to allow for a better control, record and management of its buried assets. Also, PRASA continues with its buried infrastructure R&R program, mainly managed and implemented by the Regions. Pipe R&R, which targets pipe break and leak-prone areas, are identified by PRASA's Operational Areas and prioritized per severity of the problem. Meter replacements are programmed and managed through PRASA's NRW Reduction Program.

3.3.1. Water Meters

PRASA owns over 1.4 million water meters ranging from 1/2 to 12 inches in diameter. PRASA has continued its meter replacement initiative under the Revenue Optimization Program. As reported by PRASA, about 680,000 small meters (1-inch in diameter or less) have been replaced between FY2010-FY2015. A total of 51,734 small meters were replaced during FY2015. Furthermore, during this same period PRASA replaced over 5,000 large meters (greater than 1-inch in diameter). A total of 763 large meters were replaced during FY2015. PRASA's meter replacement program has had significant positive results in PRASA's metering accuracy as well as in its billings. PRASA plans to continue renovating this infrastructure as meters continue to age and wear out. To that effect, in FY2015, PRASA projected that over 491,000 small meters and

2,900 large meters will be replaced between FY2016 and FY2020. However, given the fiscal situation and overall suspension of PRASA's CIP, the meter replacement initiative under the Revenue Optimization Program has been suspended since June 30, 2015. PRASA indicates that although the initiative is currently on hold, minor replacements have been performed, either due to maintenance, theft or special client requests. Nonetheless, no investments have been made to the Program. This suspension has created a backlog of pending orders of approximately 300,000 meter replacements and thus, a shift in the FY2016 to FY2020 projections.

3.3.2. Water Distribution System

Based on PRASA's Accountability Report of FY2015, PRASA owns over 14,753 miles of water pipelines, which include both transmission and distribution pipes with sizes ranging from two inches to 72 inches in diameter. As in previous years Arcadis 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, considering the volume of NRW reported by PRASA which amounts to 55.1% of total water production as of FY2015.

3.3.2.1. Non-Revenue Water

NRW is water that has been produced but is not billed to customers. However, not all NRW is due to water losses. As shown in the water balance summary presented in Figure 3-1, NRW has three main components: unbilled authorized consumption, commercial (apparent) losses and physical (real) losses. Combined, commercial and physical losses make up the System's water losses. Unbilled authorized consumption is in turn composed of unbilled metered and unbilled unmetered consumption which includes water used by PRASA for operational and internal purposes and water used for firefighting. Examples include: potable water service provided to PRASA's facilities, water used for washing and cleaning PRASA's tanks and sanitary pipelines, tanker trucks for communities with deficient water service, firefighter's usage, etc.

<table>
<tr><td rowspan="8">System Input Volume (Dispatched Water)</td><td rowspan="3">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="7">Non-Revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="5">Water Losses</td><td rowspan="3">Commercial Losses

(Apparent Losses)</td><td>Unauthorized Consumption (theft)</td></tr>
<tr><td>Customer Metering Inaccuracies</td></tr>
<tr><td>Data Handling (Billing) Errors</td></tr>
<tr><td rowspan="3">Physical Losses

(Real Losses)</td><td>Main Line Leakage</td></tr>
<tr><td>Storage Tank Overflows</td></tr>
<tr><td>Service Connection Leakage</td></tr>
</table>

Source: American Water Works Association and International Water Association

Figure 3-1: Water Balance Summary

Table 3-11 provides a summary of key water distribution system metrics for FY2015, including current levels of water production, water losses, and NRW, as reported by PRASA.

Table 3-11:
Water Losses and Non-Revenue Water

Fiscal Year	Total Water Production (MGD)[1]	Water Losses		Non-Revenue Water	
		(MGD)	(%)	(MGD)	(%)
FY2012	647	381	58.9%	399	61.7%
FY2013	617	354	57.4%	363	58.9%
FY2014	598	343	57.3%	351	58.7%
FY2015	557	299	53.7%	307	55.1%
Difference FY2014-2015	-41	-44	-3.6%	-44	-3.6%
Cumulative Difference FY2012-2015	-90	-82	-5.2%	-92	-6.6%

[1]Includes a metering-error adjustment identified by PRASA in its water balance audits, latest in 2015: about 6 MGD adjustment for FY2015, 14 MGD adjustment for FY2014 and 18 MGD adjustment for FY2013; FY2012 data was also adjusted by FY2013's amount.

PRASA's average NRW percentage from FY2002 through FY2011 has been about 61%, with a record high recorded in FY2011 of 64.5%. However, since FY2012, PRASA's NRW levels have been consistently declining. In FY2015, of the total 557 MGD produced, approximately 307 MGD

was NRW (55.1 %). Of this amount of NRW, 299 MGD (97.4 %) was due to water losses (both apparent and real) and 8 MGD (2.6%) was due to unbilled authorized consumption. Of the total amount of water losses in FY2015, approximately 64 MGD (21.4%) was due to apparent (commercial) losses, while approximately 235 MGD (78.6%) was due to real (physical) losses. As shown in Table 3-11, the percentage amount of water losses and NRW in FY2015 both reduced by about 3.6%, compared to FY2014 results; and by about 5.2% and 6.4%, respectively when compared to FY2012. As shown, FY2015 has been the fiscal year with the most percentage reduction in NRW. As also shown in Table 3-10, from FY2012 to FY2015, PRASA reports to have reduced the amount (volume) of water produced (72 MGD reduction), amount of water losses (71 MGD reduction), and NRW (80 MGD reduction). PRASA attributes these reductions to the following main contributing factors: greater understanding and improvement of management practices regarding NRW and water losses, water system optimization measures, and corrections made in water production and data collection practices.

Based on the 2014 AWWA[7] benchmarking report, water losses (apparent plus physical losses) for utilities with combined (water and wastewater) operations range from 5.7% to 26.7% (median of 12.4%). Also in 2014, AWWA validated water audits for 26 utilities that use the same water audit methodology employed by PRASA[8]. Results show that NRW (expressed as a percentage of total water supplied) ranged from 5.8% up to 44%. Although methodologies for calculating NRW may differ between utilities, jurisdictions, and countries, which make it difficult to assess the reasonability of the comparisons; PRASA's level of NRW is still higher than the values previously presented.

Nonetheless, PRASA's NRW levels are comparable to those of developing and some emerging countries. For example, the Asian Development Bank mentions a study performed by the South East Asian Water Utilities Network analyzing NRW levels of 47 water utilities across Indonesia, Malaysia, Thailand, the Philippines, and Vietnam, which concluded that the levels of NRW average 30% of the water produced, with wide variations among individual utilities ranging from 4% to 65%[9]. For comparison purposes, the following are some additional NRW estimates published by The International Benchmarking Networks for Water and Sanitation Utilities (the number in parenthesis refers to the year results were reported in)[10]:

- Johannesburg, South Africa – 41% (2009)
- Guayaquil, Ecuador – 63% (2009)
- Quito, Ecuador – 31% (2010)
- Bogotá, Colombia – 51% (2010)
- Río de Janeiro, Brazil – 52% (2011)
- Sao Paulo, Brazil – 32% (2011)
- Montevideo, Uruguay – 49% (2011)
- Lima, Peru – 37% (2008)

[7] Sources: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, published by the AWWA (2014)
[8] http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx
[9] Source: Nonrevenue Water: A Governance Challenge, published by the ADB (2006)
[10] Source: https://www.ib-net.org/

Also, since FY2012, PRASA began measuring the Infrastructure Leakage Index (ILI) which is an indicator that is used to measure the level of physical losses in the water distribution system. More specifically, the ILI is defined as the current annual real losses divided by the unavoidable annual real losses. The unavoidable annual real losses represent the lowest technically achievable annual real losses for a well-maintained, well-managed system and is the likely lower bound on water losses. As a performance indicator, the ILI represents a measure of the combined performance of three infrastructure management methods for real losses: the speed and quality of repairs, active leakage control, and assets management. Factors that affect the ILI include the pipe age and material, customer density, and system pressure. The ILI was introduced in 2000[11] and is also defined and calculated in AWWA's M36 Water Audits and Loss Controls manual. The ILI has been adopted around the world, although it is mostly used in Europe. An ILI between 1 and 3 is considered excellent. U.S. utilities currently measuring the ILI for their systems reported values ranging from 0.7 to 11.2. Globally, systems in developed countries report lower values of 5; while in developing countries values range from 10 up to about 50. In FY2012, PRASA reported an ILI of about 18. However, since then, PRASA's ILI has reduced by about 40%: reported values for FY2013, FY2014 and FY2015 were about 13, 11 and 10, respectively. PRASA has indicated that these reductions have been achieved through the implementation of the following measures:

- Improvements in data management and quality (better production measurement).
- Reduction in events and duration of water storage tank overflows.
- Reduction in the time to repair leaks.
- Leak detection with specialized equipment.
- Pressure management in the distribution system.

PRASA recognizes that reducing its NRW and water losses volume and, in turn, its water production, will have positive effects on not only its operations, but also on its financial results (lower O&M expenses and higher revenues, for example), and on its sustainability practices. Therefore, PRASA has established a fully dedicated NRW monitoring and management team responsible for implementing projects that will reduce the NRW, specially the System's water losses. PRASA's *NRW Plan Draft Report* (May 2015) presents the current water losses condition, organizational structure of the NRW Program monitoring and management team, initiatives to reduce the water losses, goals, metrics, cost estimates and benefits obtained from recovering water. It is PRASA's goal to achieve a reduction of physical losses of up to 157 MGD (35% of total production) by FY2020. Combining the reduction of both commercial and physical losses, PRASA expects to reduce the NRW to 218 MGD by FY2020 (48.7% of total production). Figure 3-2 below shows PRASA's goals and expectations for the reduction of water losses.

[11] Source: Alegre, H. Hirner, W., Bapista, J., and Parena, R. (2000). "Performance indicators for water supply services" IWA Manual of Best Practices

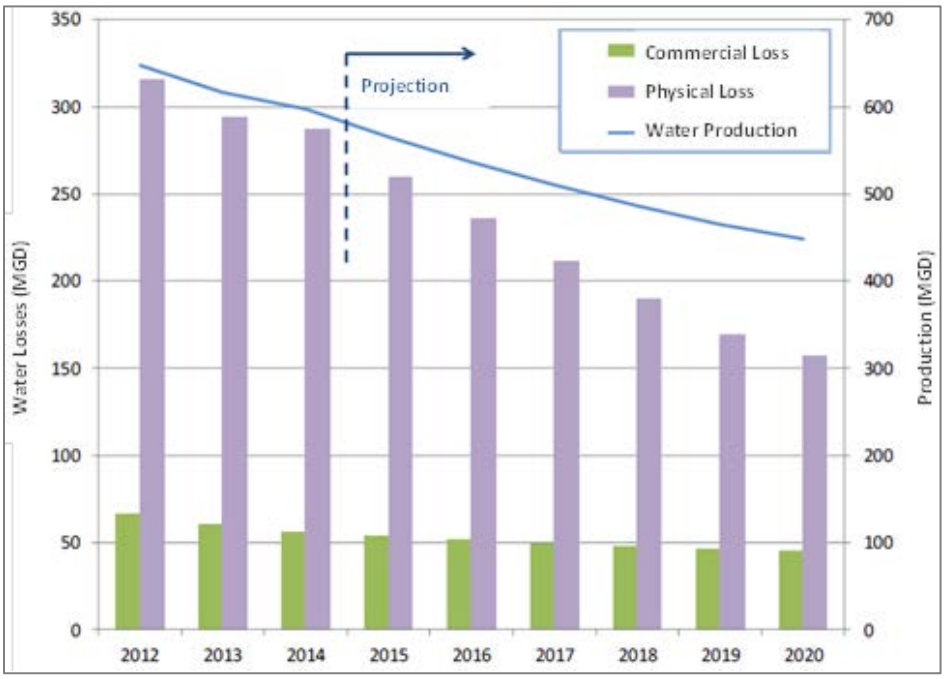

Figure 3-2: PRASA's Water Loss Control Program Goals

As previously mentioned, PRASA has already experienced a decline in the reported NRW and water losses as compared to previous years. Some of the actions and projects to be implemented by PRASA to achieve the additional reductions in NRW and water losses are: reducing the time to repair leaks, reducing the number of events and duration of water storage tank overflows by increasing the amount of tanks connected to telemetry, replacing damaged small and large meters, installing remote meter reading for large and small meter customers, continuing the leak detection program, installing meters at PRASA facilities, identifying unauthorized consumption, and reducing the overall water production by approximately 25%.

Figure 3-3 shows the actions identified by PRASA in the *2015 NRW Draft Report* to be taken to achieve their NRW reduction goals by 2020.

Goals 2020			Actions	Goal	% Recovered Volume
Total Water Production 448 MGD			**Reduction in water production**	**5% Annually**	**20%**
			Measure production	**83%**	
	Authorized Consumption 246 MGD (54.9%)	**Authorized Billed Consumption** 229 MGD (51.1%)	**Stabilize billed consumption**	**27 Mm³/month**	**-**
		Authorized Unbilled Consumption 17 MGD (3.8%)	**Measure consumption in PRASA's facilities**	**630 additional facilities**	**6%**
	Total Water Losses 201 MGD (44.9%)	**Commercial or Apparent Losses** 45 MGD (10%)	**Replace large diameter meters**	**5,900 replacements**	**1.4%**
			Automatic meter reading in large meters	**100%**	
			Replace small diameter meters	**60,000/yr**	**4%**
			Automatic meter reading in small meters	**75,000 meters**	**-**
			Reduce the unauthorized unbilled consumption (theft)	**Recover 20 Mm³**	**1.1%**
		Physical or Real Losses 157 MGD (35%)	**Increase leak detection and repair unreported leaks**	**17,000 mi in small diameter pipes**	**19%**
				46 mi in large diameter pipes	
			Reduction in the time to repair leaks	**2 days**	**38%**
			Reduction in events and duration of water storage tank overflows	**1,058,000 minutes**	**11%**
			Increase the amount of tanks with telemetry	**510 additional tanks**	

Numbers may not add up due to rounding
Source: 2015 Non Revenue Water Plan Draft Report, PRASA

Figure 3-3: 2020 NRW Reduction Actions and Goals

In addition to the measures previously mentioned, PRASA continues to implement a series of initiatives such as residential and commercial meters replacement, optimization and remote monitoring of the distribution systems, installation of flow meters integrated to PRASA's SCADA to adequately measure daily production, etc., in order to address the primary contributors of these water losses. These initiatives are discussed in detail in Section 4 of this report.

3.3.2.2. Leak Monitoring and Control

As shown in Table 3-12, in FY2015 PRASA indicates that a total of 63,503 leaks were reported. Table 3-11 also shows the average annual leaks occurrence per 100 miles of water piping. The total annual reported leaks have increased approximately 17% over the past fiscal year. This increase could be due to an increase in the actual number of leak occurrences, to an increase in the number of people reporting leaks (as a result of PRASA's communication initiatives and increased social media presence), or a combination of the two. Another factor that could be contributing to the higher number of reported leaks during FY2015 is the findings of the island-wide leak detection

survey. Also, another potential factor is the severe drought that affected the island, which forced PRASA to take actions to mitigate the impact of the drought in the customers. These actions included more than normal operation of the distribution systems, including valves and pump stations, so that even when proper protocol was followed, the actions tended to produce an adverse effect in the number of reported leaks. However, Arcadis has not made an independent evaluation to identify the root causes of this increase. Nevertheless, PRASA's reported rate of leak occurrence continues to be extremely high compared to other utilities in the U.S. and Canada (average annual leaks and breaks per 100 miles are between {4 and 35} and between {4 and 25} respectively[12]). Although this high rate is not surprising, given the existing infrastructure's age, size, complexity, and significant changes in elevations of the System, it still influences PRASA's NRW.

Table 3-12:
Reported Leaks from FY2011 to FY2015

Fiscal Year	Total Annual Reported Leaks	Annual Leaks per 100 miles Using 14,753 miles of Water Pipeline
2011	52,817	376[1]
2012	42,868	306[1]
2013	47,032	335[1]
2014	54,154	386[1]
2015	63,503	430

Source: PRASA Systems, Applications, and Products in Data Processing (SAP) (Commercial) Database
[1]Water pipeline total length used for previous fiscal years (FY2011-FY2014) was 14,031 miles.

The average weekly reported and repaired leaks per fiscal year, as well as the percentage of repaired leaks with respect to the number of leaks reported in each fiscal year are shown in Figure 3-4. For FY2015, PRASA reports an average of approximately 1,198 leaks per week. Comparing the weekly reported leaks in each fiscal year, it can be observed that the reported leaks decreased from FY2011 to FY2012. However, the past three fiscal years, the weekly reported leaks have increased approximately 5%, 15% and 17% respectively. PRASA also has steadily increased the percent of repaired leaks including about 16% in FY2015 compared to FY2014 results. As shown in Figure 3-4, PRASA has continued to improve its leak repair metrics, achieving an all-time high of about 1,162 leaks repaired per week, on average, during FY2015.

[12] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, published by the AWWA (2015).

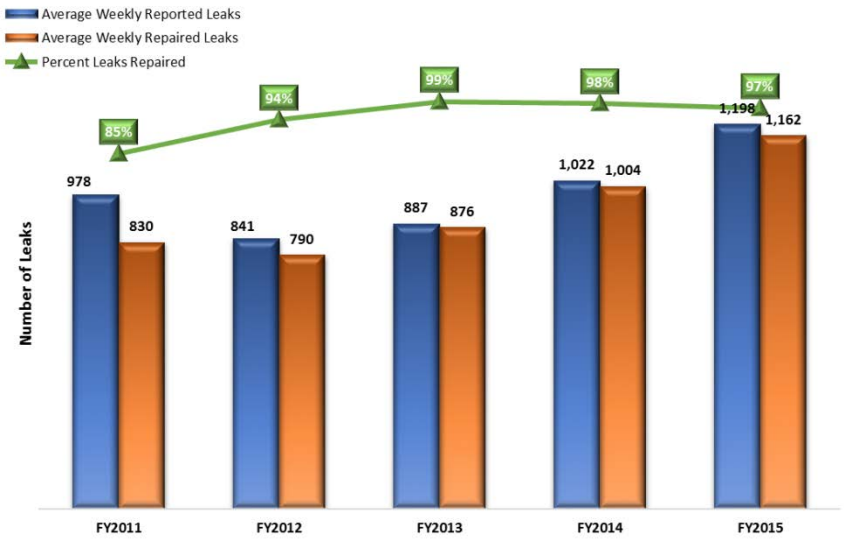

Figure 3-4: Island-Wide Weekly Average Leaks Reported and Repaired

Table 3-13 provides a summary of the average repaired leaks per working day and average backlog. Based on the weekly average pending leaks and weekly average pending leaks with duration greater than seven days, it can be observed that in FY2015 PRASA averaged a backlog of approximately 1.9 days of pending leaks and a backlog of approximately 0.3 days of pending leaks with duration greater than seven days. The average backlog days for pending leaks increased in FY2013 compared to FY2012 results, given the significant increase in the average weekly pending leaks from year to year. However, in FY2014 the average backlog days for pending leaks reduced by about 64% when compared to FY2013 results and on FY2015 continued its improvement by reducing another 17% compared to FY2014. This resulted in a significant improvement in the average backlog days for pending leaks greater than seven days, with a reduction of about 25% compared to FY2014 results. This is even with the reported drought period, which required the availability of repair crews to attend system operations first thus reducing time dedicated for the repair activities. PRASA's effectiveness in repairing pending leaks in a timely manner has continued to improve year after year since FY2011.

Table 3-13:
Annual Average Backlog of Pending Leaks

Fiscal Year	Average Weekly Pending Leaks	Average Weekly Pending Leaks >7 Days	Average Repaired Leaks per Working Day[1]	Average Backlog Days for Pending Leaks	Average Backlog Days for Pending Leaks >7 Days
2011	1,031	427	166	6.2	2.6
2012	611	226	158	3.9	1.4
2013	1,147	88	179	6.4	0.5
2014	460	72	205	2.3	0.4
2015	434	62	232	1.9	0.3

[1] Assumes five working days per week. Source: PRASA SAP (Commercial) Database.

During the first three months of FY2016, PRASA indicates that a total of 17,624 leaks were reported. For this period, the weekly pending leaks and repaired leaks per working day averaged about 438 and 67, respectively. The average weekly pending leaks and the average repaired leaks per working day reports represents about a 15% decrease and 14% increase, respectively, both compared to the results obtained during the same period for FY2015. PRASA reported a backlog of 1.6 days of pending leaks with a duration greater than seven days during this period.

PRASA reports that it completed the process of implementing Mobile Data Terminals (MDT) in its repair crew vehicles. This technology will allow PRASA to assign paper-less work plans to its repair crews, and will facilitate the geo-referencing of leaks to allow PRASA to analyze leak frequency and identify root causes. Finally, it will provide better repair metrics measurement, as it will record hour by hour as opposed to day by day as currently tracked by PRASA. PRASA expects to achieve faster repair response times and improve the repair lead and backlog times tracking. Furthermore, PRASA plans, in the near future, to provide the MDTs to private contractors hired to assist on leak repairs, during periods of backlog accumulation or labor conflicts.

Regarding water storage tank overflows issues, PRASA has been implementing continuous monitoring of water storage tanks across its operational regions as a measure to help control and minimize overflow (water losses) occurrences. Finally, as a measure to help optimize the System's operation and reduce potential leaks through valves, PRASA has included its pressure regulator/sustaining valves in the IMP and has indicated that it is providing training to its employees to carry out the necessary maintenance activities. Notwithstanding, the current fiscal situation may adversely affect the leak repair and attention rates.

Additional discussion regarding other PRASA NRW initiatives is included in Section 4 of this report.

3.3.3. Wastewater Collection System

Based on PRASA's Accountability Report of FY2015, PRASA owns approximately 5,994 miles of wastewater pipelines. 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 (replacement) to reduce inflow and infiltration and overflow occurrences.

3.3.3.1. Overflow Monitoring and Control

As shown in Table 3-14, PRASA indicates that in FY2015, 28,569 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 3-14 also shows the average annual overflows occurrence per 100 miles of sewer. In FY2015, an average of 477 overflows per 100 miles of sewer was reported. There was an increase of total annual reported overflows of about 1.7% from FY2012 to FY2013 which could be due to an increase in the actual number of overflows occurrences, an increase in the number of people reporting overflows (as a result of PRASA's communication initiatives and increased social media presence), or a combination of the two. Again, Arcadis has not made an independent evaluation to identify the root causes of this increase. In FY2014 there was a reduction in the total annual reported overflows of about 1.5% compared to FY2013 and again in FY2015 an increase of 6% was observed compared to FY2014 reported overflows. Conversely, PRASA's reported rate of overflow occurrence continues to be extremely high compared to other utilities in the U.S. and Canada (average annual overflows per 100 miles are between 1 and 7 overflows[13]). However, this high rate is not surprising given the size and complexity of the System. Other contributing factors to this high rate of overflows include aging infrastructure and inadequate customer use (i.e., illegal connections and discharges).

Table 3-14:
Reported Overflows from FY2011 to FY2015

Fiscal Year	Reported Overflows	Annual Overflows per 100 miles Using 5,994 miles of Wastewater Pipeline
2011	28,185	529[1]
2012	26,903	505[1]
2013	27,358	514[1]
2014	26,937	506[1]
2015	28,569	477

Source: PRASA SAP (Commercial) Database
[1]Wastewater pipeline total length used for previous fiscal year (FY2011-FY2014) was 5,325 miles.

PRASA's average weekly reported and repaired overflows per fiscal year are shown in Figure 3-5. For FY2015, PRASA reports an average of approximately 539 overflows per week. Comparing the weekly reported overflows per each fiscal year, it can be observed that the reported overflows decreased in FY2012. However, in FY2013 there was a slight increase over the FY2012 results due to the increase in the number of reported overflows through the fiscal year. In FY2014, the average weekly reported overflows experienced a reduction of approximately 2% compared to FY2013 results and again in FY2015 an increase of 6% was observed compared to FY2014 results. Also, shown in Figure 3-5 is the percentage of repaired overflows with respect to the number of overflows

[13] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, published by the AWWA (2015).

reported in each fiscal year. PRASA's rate of repair of overflows has significantly improved since FY2011.

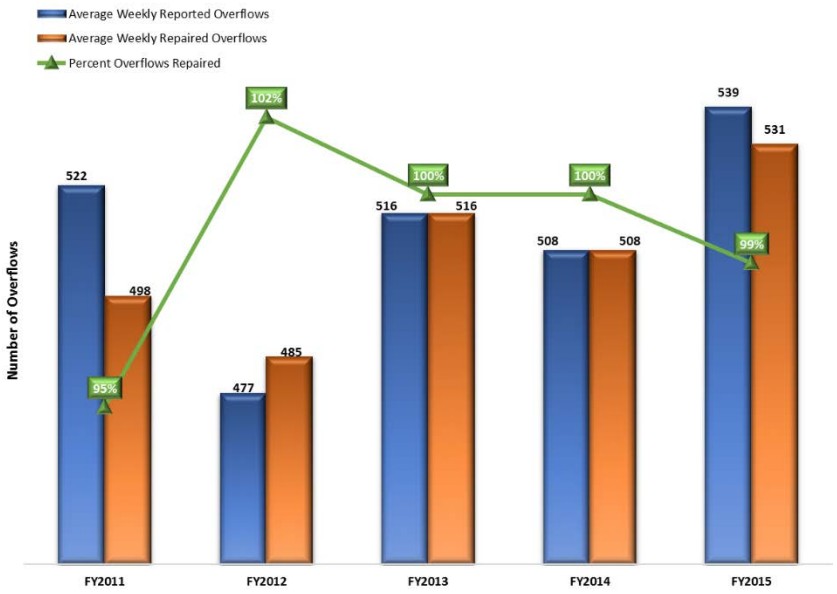

Figure 3-5: Island-Wide Weekly Average Overflows Reported and Repaired

Table 3-15 provides a summary of the average repaired overflows per working day and average backlog. As shown, the average weekly pending overflows decreased from FY2011 to FY2012. In FY2013 the average weekly pending overflows resulted in a small increase compared to FY2012 results. However, in FY2014 PRASA reported only 169 average weekly pending overflows, which is a significant improvement compared to previous fiscal years. In FY2015, PRASA continue its decrease with 108 reported average weekly pending overflows. In FY2015, PRASA also improved its average backlog achieving approximately 1.0 days of pending overflows and a backlog of 0.09 days of pending overflows with duration greater than seven days. These results represent a reduction of about 38% and 47%, respectively, compared to FY2014 results. PRASA's effectiveness in repairing pending overflows in a timely manner has continued to improve year after year since FY2011, particularly those with duration greater than seven days.

Table 3-15:
Annual Average Backlog of Pending Overflows

Fiscal Year	Average Weekly Pending Overflows	Average Weekly Pending Overflows >7 Days	Average Repaired Overflows per Working Day[1]	Average Backlog Days for Pending Overflows	Average Backlog Days for Pending Overflows >7 Days
2011	350	98	100	3.5	1.0
2012	224	52	97	2.3	0.5
2013	295	19	105	2.8	0.2
2014	169	18	104	1.6	0.17

Fiscal Year	Average Weekly Pending Overflows	Average Weekly Pending Overflows >7 Days	Average Repaired Overflows per Working Day[1]	Average Backlog Days for Pending Overflows	Average Backlog Days for Pending Overflows >7 Days
2015	108	10	106	1.0	0.09

[1] Assumes five working days per week. Source: PRASA SAP (Commercial) Database.

During the first three months of FY2016, PRASA indicates that a total of 7,311 overflows were reported. For this period, the weekly pending overflows and repaired overflows per working day averaged about 84 and 27, respectively. The average weekly pending overflows represent a reduction of about 39% and the average repaired overflows per working day represent an increase of about 2%, both compared to the results obtained during the same period for FY2014. PRASA reported a backlog of 0.43 days of pending overflows with a duration greater than seven days.

As with leaks, PRASA expects to improve its sewer overflows response time and metrics tracking using the MDT technology currently being implemented across its operational regions. As mentioned, this technology will allow PRASA to assign paper-less work plans to its repair crews, and will facilitate the geo-referencing of sewer overflows to allow PRASA to analyze overflow frequency and identify root causes. Also, same as with leaks, PRASA intends to expand MDTs use to private contractors hired to attend overflows cases. However, it is important to indicate that the current fiscal situation can adversely affect the sewer overflow repair and attention rates.

3.4. Conclusions

In general, the condition of the facilities visited varied from those recently upgraded/rehabilitated to those requiring capital upgrades. Table 3-16 presents a summary of the 2015-2016 inspection results. The data indicates that 93% of the facilities inspected are in the adequate to good range. When compared to 2014 inspection results, there was a noticeable increase in facilities (11 facilities) in the poor rating which increased from 3% to 7% thus decreasing the high percentage of adequate to good range in 2014 by four percent (from 97% to 93%). This, even though 72 more facilities were inspected.

Table 3-16:
2015 vs 2014 Asset Condition Inspection Results Summary

Asset Category	Unacceptable		Poor		Adequate		Good		Total	
	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014
Regulated Dams	0	0	1	1	5	5	2	2	8	8
Water Treatment Plants	0	0	0	0	41	35	5	12	46	47
Wastewater Treatment Plants	0	0	9	2	16	21	3	5	28	28
Wells	0	0	3	0	13	6	2	2	18	8

Asset Category	Unacceptable		Poor		Adequate		Good		Total	
	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014
Water Pump Stations	0	0	2	1	33	16	7	4	42	21
Water Storage Tanks	0	0	0	1	37	15	24	14	61	30
Wastewater Pump Stations	0	0	1	0	12	10	15	7	28	17
Total	**0**	**0**	**16**	**5**	**157**	**108**	**58**	**46**	**231**	**159**
Percent of Total	**0%**	**0%**	**7%**	**3%**	**68%**	**68%**	**25%**	**29%**	**-**	**-**

Comparing the 2015-2016 assessment results by asset category with those of the 2014 condition assessment, some changes were found for Wells, WTPs, WPS and WWTPs. As shown in Table 3-16, only one dam, Cidra, was degraded to poor, same as the previous inspection. Cidra, is utilized by PRASA as a raw water source and represents a high hazard in the event of an uncontrolled release of impounded water or in the ability to provide constant quality drinking water. Las Curías, which was rated as poor in the last inspection, improved to adequate. Finally, addressing the priority items indicated in PREPA's inspection reports and the additional observations made by Arcadis included in the asset conditioning report, would give the dams a higher level of safety, and would help maintain the physical conditions of the structures so that they can continue serving the water supply system as expected.

A small number of WTPs declined from good to adequate, performing slightly worse with respect to compliance with limits of effluent discharge parameters. This was mostly driven by a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 D/DBPR. PRASA acknowledges that it has some challenges ahead to bring these facilities (systems) into compliance with the new regulation as future regulations 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. However, PRASA has begun conducting evaluations, water quality modeling, developing action plans and implementing remedial actions to minimize these non-compliance events but efforts have been hindered due to the fiscal situation. Furthermore, facility ratings decreased in all criteria compared to the 2014 inspections, except operations/process control which remain the same. This decline in ratings is an effect of the slowing down of the capital improvement and R&R programs due to the fiscal situation and budget limitations. Given the results in compliance and existing condition of the facilities, it is evident that capital improvements are needed to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, allow continued economic development and help bring the System into compliance with all regulatory agencies. In addition, PRASA should continue to standardize processes and provide more tools and training to operators regarding process controls and actions, to facilitate and improve plant operations and performance.

An operator school was implemented in the North Region and it is PRASA's goal to continue its implementation in the other Regions. Finally, PRASA should address the shortcomings identified during inspections to bring these facilities into continuous and consistent compliance.

Regarding the WWTPs, some of the facilities that obtained a low rating/score have at least one project identified in PRASA's CIP, or PRASA has indicated that is working on identifying operational measures to improve the facilities. Some of the facilities which have been rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters. There were nine facilities rated as poor compared to only two in the 2014 inspections. Furthermore, the equipment/maintenance ratings decreased 0.3 from the 2014 inspections and the staffing reflected the need of staff in some facilities by its 1.0 decrease in ratings. The decline in WWTP condition and ratings is an effect of recurring observations from previous inspections that have yet to be addressed and the slowing down of the capital improvement and R&R programs due to the fiscal situation and budget limitations. Furthermore, process control continues to be a challenge in some of the facilities, even though standard operating procedures and control strategies are said to be followed. Bringing these facilities into consistent and sustained compliance with discharge parameters, address the shortcomings identified during inspections and additional operational improvements including new process equipment, process automation and process control optimization are some of the measures that PRASA must undertake to continue to improve and maintain the condition of these facilities.

Regarding the ancillary assets, inspections were about doubled, two operational areas within each region were visited thus a larger sample was obtained. There was an equivalent or slight improvement in overall scores for WWPS and WPS and a slight decrease for Water Tanks. A significant lower rating in wells overall scores compared to the 2014 results. Most of the deficiencies noted can be addressed through PRASA's R&R program and may not require major capital improvements. Note, however, that implementation of PRASA's R&R program also depends on PRASA's ability to identify and obtain financing. In addition, future regulatory requirements may require either the implementation of significant capital improvements to include and achieve additional treatment capabilities at well facilities, or the closure of certain wells. Furthermore, considering the recent drought in 2015 and activation of wells as an action by PRASA to mitigate the effects of the drought and the probability of additional activation of wells in the future, it is imperative that the facilities are addressed by the R&R program or by the CIP if need be. Note that financing of PRASA's R&R program has also been negatively affected given PRASA's fiscal situation.

PRASA continues to work on and improve its leak detection and monitoring practices, and continues to aggressively address leak occurrences. Currently, PRASA is monitoring remotely most of the tank's levels in their distribution system to avoid tank overflows and improve the water distribution balance. Also, PRASA has established a resource fully dedicated to NRW monitoring and is working on the creation of a NRW management team. PRASA is now conducting periodic water audits which are used to implement the necessary controls and develop action items to

address NRW. This has helped drive the reduction in water production, water losses, and in NRW reported by PRASA from FY2014 to FY2015.

Although the number of sanitary overflows is also high compared to the U.S., for example; PRASA has continued to improve its response time and attention/repair effectiveness to minimize the duration of these overflow events and their environmental impact. However, it is important to indicate that the current fiscal situation can adversely affect the sewer overflow repair and attention rates. PRASA is implementing sanitary sewer evaluations and repair plans to reduce levels of infiltration and inflow (I/I) that must be treated in their WWTPs. The progress of this initiative has been affected as well by the fiscal situation.

Arcadis has provided recommendations for CIP projects and/or minor improvement needs (refer to facility inspection forms for facility-specific observations and recommendations). Considering the size and complexity of the System, it is reasonable to state that the System will continue to require significant capital investments and continuous maintenance and repairs. Also, it is likely that, as the System continues to age and as new compliance regulations are implemented, additional O&M budget may be necessary to address maintenance and repairs and compliance matters. PRASA's proposed CIP adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies, and considers modifications currently under re-negotiation between PRASA and Regulatory Agencies. As previously mentioned, while PRASA has begun to identify the potential impact of new regulations, 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. PRASA's existing CIP includes a limited contingency to address future regulations and any other regulatory requirements. However, as the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. These CIP needs, as negotiated or as currently being negotiated with Regulatory Agencies, will be prioritized and implementation schedules will depend on PRASA's financial capacity. It is important to note that since the fiscal situation has significantly prolonged and adversely impacted the implementation of the CIP, initiatives and R&R program, the condition of the facilities could continue to deteriorate.

4. O&M Practices and Strategic Plan

4.1. Introduction

Arcadis 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 obtained through the 2015 asset condition assessment effort described in detail in Section 3. Overall, Arcadis found PRASA's O&M practices to be adequate and noted that during FY2015, through the roll-out, deployment and stewardship of PRASA's Strategic Plan, changes and improvements in PRASA's O&M practices made positive impacts on the System.

Most of the WTPs and WWTPs were found to be adequately operated and maintained. However, as presented in Section 3, there were several WTP and WWTP facilities that reported exceedances in compliance treatment parameters during the evaluation period and/or lacked the appropriate operational tools (i.e., O&M manuals, process controls, and laboratory equipment) at the moment inspections were conducted; yet, these were the exception and not the norm. Also, despite needing some additional general upkeep and grounds maintenance ancillary facilities, for the most part, are also being adequately operated and maintained. Nevertheless, several of these facilities were found to have at least one operational and/or maintenance shortcoming. Arcadis has observed that, throughout time, PRASA's O&M efforts and practices have improved. However, there is still room for further improvement with respect to prioritization, scheduling, and execution of corrective and routine maintenance activities, particularly for ancillary facilities and buried infrastructure as noted during the 2015 asset condition inspections.

As mentioned, PRASA has adopted the mission of providing quality water and wastewater services at the lowest possible cost. To reach that goal, PRASA's Executive Management Team has developed and implemented a Strategic Plan with five key strategic initiatives: 1) Fiscal Health, 2) Operational Excellence, 3) Infrastructure and Sustainability, 4) Organizational Transformation, and 5) Technological Innovation. The Strategic Plan also includes KPIs established by PRASA's Executive Management Team, and metrics established and measured by the departments and Regions, to track and improve operational performance.

A summary of the O&M budgets, O&M highlights provided by PRASA's support departments and Regional personnel, and a detailed summary of PRASA's Strategic Plan, programs and Operational Initiatives are included in this section.

4.2. O&M Costs

Over the past five fiscal years, PRASA's O&M expenses have fluctuated from $644M in FY2011 to $635M (includes non-cash adjustments) in FY2015. PRASA continues its effort to become more efficient by exercising greater management controls to reduce its O&M costs and by implementing various operational programs and initiatives, now contained within its five-year Strategic Plan.

PRASA's FY2015 O&M expenses were approximately $635M, of which $558M were directly related to the O&M of the System. The other $77M were 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. PRASA estimates that approximately 75% of its System O&M budget ($419M) is allocated to the water system and the remaining 25% ($140M) to the wastewater system. Estimated costs per million gallons (MG) and per customer account for combined utilities operations are summarized in the Table 4-1 and Table 4-2 below.

Table 4-1:
PRASA FY2015 O&M Water System Budget Benchmarks

Performance Indicator	PRASA	2012 Survey Benchmark Median[1]	2013 Survey Benchmark Median[2]
Cost per Account[3]	$338.41	$408.00	$361.00
Cost per MG Processed[4]	$2,060.94	$2,565.00	$2,240.00
Cost per 100 miles of pipe	$2,840,100.32	$2,233,874.00	$2,123,944.00

[1] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)
[2] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, AWWA (2015)
[3] Based on number of water accounts at the end of FY2015 of 1,238,139.
[4] Based on FY2015 total production and distribution of approximately 557 MGD of potable water

Table 4-2:
PRASA FY2015 O&M Wastewater System Budget Benchmarks

Performance Indicator	PRASA	2012 Survey Benchmark Median[1]	2013 Survey Benchmark Median[2]
Cost per Account[3]	$183.55	$373.00	$344.00
Cost per MG Processed[4]	$1,646.19	$3,122.00	$2,233.00
Cost per 100 miles of pipe	$2,335,669.00	$2,143,610.00	$2,386,572.00

[1] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)
[2] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2013 Annual Survey Data and Analyses Report, AWWA (2015)
[3] Based on number of wastewater accounts at the end of FY2015 of 762,748
[4] Based on FY2015 total treatment of approximately 233 MGD of wastewater

4.3. Support Departments and Regional O&M Highlights

Arcadis conducted meetings with key PRASA department directors and other personnel to obtain a current status of the different departments. A summary of the information provided by PRASA is detailed in the following sub-sections.

4.3.1. Department Updates

- *Customer Service* – During FY2014, PRASA's Customer Service Department began the initiative of reducing the existing 24 commercial offices and three satellite offices to 11 commercial offices plus one virtual office. This initiative is aligned with the Government's initiative on regionalization and government efficiency, and is expected to be completed by January 2016. The new reorganization will facilitate and improve customer service activities and customers' experience in PRASA's commercial offices. Furthermore, the new organization will include two commercial offices per Region, except for the Metro Region which will have three commercial offices, and will also include web service stations to provide guidance on the procedures related to services activities. In addition, personnel will relocate from the closed offices to vacant positions within PRASA including placement in the call center.

  As part of PRASA's Strategic Plan, the Customer Service Department continues to focus on measuring and implementing aggressive metrics to further improve invoicing, collection and billing adjustment practices, customer service complaints, service interruptions, and customers with deficient services; and improving meter readings, collections, and customer time of attention in commercial offices. PRASA continues to monitor and improve its collections, particularly those of large clients, which include all government, commercial and industrial clients. Regarding the Customer Service Department initiatives, the Business Intelligence was completed on December 2014 and the Regional Supervising Center was completed as well during FY2015. Also, the web service and a mobile application were launched and have been on-line since June 2015. However, the implementation of the new web services stations administer by each municipality are planned to be completed during FY2016. As of the date of this report about twenty-one municipalities have implemented these services. Through all of these initiatives, PRASA's customers will be able to perform service related activities (inquiries, leak/overflow reports, service requests, etc.) online instead of having to do these in person in a commercial office. Also, PRASA's Customer Service Department is currently working on an effort to reduce NRW and improve billings and collections in low income communities. They implemented a program in collaboration with the community leaders and local residents that includes reading meters, addressing community concerns, and helping improve collections (Approximately 51,800 public housing registered users). Moreover, for FY2016, as of September-2015, PRASA has achieved 29,870 disconnections of services surpassing the 52 days of delinquency. Finally, PRASA is revising the Commercial Regulations ("*Reglamento sobre el Uso de los Servicios de Acueducto y Alcantarillado Sanitario de Puerto Rico*"), after public hearings that took place on September 8-9, 2016 and the revised document including recommendations obtained during the hearings will be presented to PRASA's Board for approval. The changes to the Regulation mostly include articles that impact payments, invoicing, among others.

- *Purchasing and Logistics* – PRASA's Purchasing and Logistics Department continues to operate mainly from the central administration building, although certain purchasing and

logistics personnel are permanently assigned to the Regions. Regarding purchasing practices, as stated by PRASA's Purchasing and Logistics Department director, the SAP Portal program continues its operation with occasional tweaks and improvements. Through this program, all purchasing requests are managed online, including the public bidding processes, which was recently integrated, excluding projects under $3,000 and non-emergency projects. Also, the Storage Materials Catalog, which includes pictures of the material and SAP process explanation, was completed for all Regions during the 2015 summer. Future improvements to SAP Portal include: the Certification of Services (invoices), completed on December 2015; the list of storage materials (Lotus Notes), completed on January 2016; and the notification of award for the bidders, expected during FY2016. In addition, they created a codification for chemicals that helps account for type and quantity of chemicals per WTP. The final implementation of this effort will occur after the completion of the request for qualifications (RFQs), which has been evaluated and is currently in the process of notification. In summary, the SAP Portal has not only helped reduce the time it takes to process a purchase order request (target: 25 days); it has also made the process more competitive allowing for a greater participation of new service/equipment providers. Furthermore, the department informed that they complied with their KPI metric, reaching the reduction of the evaluation time to 25 days (from input into Lotus Notes until request of purchase is outgoing) on the SAP Portal. Moreover, this KPI metric has been recently adjusted to 40 days. Regarding logistics practices, PRASA decided to relocate their main distribution center in Mayagüez to the Metro Region, in the municipality of Toa Baja. This effort was completed by December 2015, when it started its operation. This move is expected to benefit PRASA given a logistic supervisor will be on-site and it should facilitate the frequency of deliveries from suppliers, since most are located within the Metropolitan area. Another proposed improvement to the new distribution center is the inclusion of "bar code" for equipment and materials; however, this effort is currently on hold pending assignment of the necessary budget. Also, the new distribution center and PRASA's warehouses island-wide will be interconnected and communicate with each other; an initiative implemented with the prior distribution center that has helped PRASA achieve greater inventory controls. Moreover, as part of their effort of maintaining control of PRASA's purchased materials, an inventory of all PRASA's equipment in the distribution center was performed and continues through all facilities to attain logistics controls between regional/plants storage including usage evaluation, to achieve a reduction of inventory.

PRASA continues to evaluate further improvements to its purchasing and logistics processes to reduce costs and increase operational productivity. Additionally, purchasing and logistics continues focusing on improving its chemicals purchasing and management processes, and usage controls. This effort is being conducted in direct collaboration with the Operations and Compliance departments; however, as with other PRASA initiatives, this effort has been delayed due to the current fiscal situation. During May 2015, the department also developed a storage yard (located at the Puerto Nuevo WWTP premises) and includes in its inventory large diameter material/equipment to facilitate and expedite repairs. In addition, on July 2015

PRASA established a transshipment area in Puerto Nuevo WWTP, which is used for materials to be decommissioned. Furthermore, future initiatives include inventory control by means of bar coding and a warehouse for laboratories. Finally, the fleet management responsibilities have been reassigned to the PRASA Integrated Preventive Maintenance Department.

- *Systems and Information Technology* – PRASA Systems and Information Technology (IT) Department continues developing the information technology management areas and the implementation of the Global Technological Innovation for PRASA's Renovation Program (INTEGRA, by its Spanish acronym). As of September 2015, some of the initiatives and/or programs that the Department is working had been completed successfully; others have been postponed or eliminated due to the current fiscal situation. Initiatives that they are currently working or have completed include: new virtual offices, integration to social media, application launch to perform several tasks (i.e. payments, complaints, report leaks and overflows) completed on July 2015, implementation of Mobile Data Terminals (MDT) at all regions and their operational areas completed on April 2015, among others. PRASA's Management indicates that project scopes, priorities, and returns on investment are the key factors being assessed in the evolution of the INTEGRA program. Also, during FY2015, the department made key technology infrastructure (hardware) upgrades that provide PRASA a more reliable IT infrastructure. On October 2015, the department is scheduled to complete the development of a technological platform to assist and digitalize human resources (HR) documentation and related transactions. The HR portal will allow employees to complete administrative forms, request licenses (vacation, sick, and unpaid leaves), trainings, among others and for supervisors' authorizations; as well, as improve PRASA's HR database and records. This will allow PRASA Management to achieve faster results in managing HR matters of employees, and in measuring the HR Department's performance. The department continues supporting the development of technological advancements in PRASA and is now also working on a project that will connect and report (to key personnel) PRASA's island-wide SCADA facility data.

- *Communications* – PRASA's communication practices are now more transparent for its clients and other key stakeholders. The Communications Department, in coordination with the Systems and IT Department, continues updating and improving PRASA's web site, which includes quarterly accountability reports, an investor relations section (which includes applicable and relevant PRASA data), and greater customer account capabilities, among others. PRASA's Communications Department has also increased PRASA's media presence (printed, online, and radio/televised). They continue maintaining clip logbooks of key events (i.e., 2015 water drought, 2014 water drought, 2013 rate increase process); in addition to a year in review logbook as a measure to retain institutional knowledge for future PRASA Executive Management Teams. Finally, as part of their educational efforts, PRASA indicated that on April 2015 they had their first Open Plants Educational Community event. The purpose of this event was to advocate to the community, especially students, about the water and wastewater

treatment process and to further engage the community and their responsibility as costumers in helping to maintain the water and wastewater systems in good working conditions.

- *Compliance* – PRASA's Compliance Department continues to effectively monitor regulatory compliance in PRASA facilities, and continues to maintain open channels of communication with Regulatory Agencies. PRASA continues to engage consultants to support in the compliance with regulatory mandates, and in the development and implementation of corrective measures. The department continues focused on the implementation of remedial measures and commitments to improve the separate and combined sanitary sewer system operating efficiency in order to minimize sewer overflow impacts. As part of their efforts to comply with the requirements stipulated by the Regulatory Agencies regarding the optimization of preventive maintenance protocols and corrosion prevention, new opportunities to improve the preventive and corrective maintenance program are required to ensure the proper O&M of all critical facilities. As indicated by the Compliance Department, PRASA began with the implementation of the O&M program for Puerto Nuevo WWTP which includes mapping pipelines, cleaning and flushing program, assessment of system's condition, among others. Additional information regarding PRASA's IMP is included in Section 4.5. Also, as part of the Department initiatives, they are currently working with the Process Control Program for Treatment facilities, completed for WWTP and for WTP (including STS) expected to be completed by FY2016. The Compliance Department also reported that they began with the implementation of an oil and grease compliance program focused on educating, monitoring, and inspecting applicable commercial customers and are expected to finish and submit to the EPA by September 2016. Regarding the pre-treatment program (applicable for industrial clients) PRASA indicated that the projected pre-treatment regulatory revision draft, to address the changes in the discharge limits for phosphorus and nitrogen effluent parameters, was completed and submitted and was expected to go for public hearings on December 2015. However, this process has been delayed and is currently still pending further action. Furthermore, the department continues as the responsible party for PRASA's health and safety program, which includes talks, meetings, task risk assessment to improve O&M practices and employee safety. In collaboration with the Purchasing and Logistics Department, they are preparing a qualification document for the providers of chemicals products which was expected to be completed by November 2015. However, this process has been delayed. At the time of the preparation of this report, the Compliance Department also was currently working with the GWUDI project, previously discussed in section 3.2.2.4 and with the Combined Sewer Overflow (CSO) project to comply with the Consent Decree, specifically at Puerto Nuevo. Combined Sewer Overflow Outfall or "CSO Outfall" shall mean, for the purpose of the Consent Decree only, any outfall currently identified and authorized, or identified and authorized in the future, as a combined sewer overflow or CSO in any of PRASA's Wastewater Treatment Plant's NPDES Permits. Finally, the Compliance Department, in collaboration with PRASA's Infrastructure Department, completed negotiations with USEPA regarding the

consent decree but is still in ongoing negotiations with PRDOH regarding PRASA's agreements. Additional information on the renegotiation process is provided in Section 5.

- *Legal* – The Legal Department deals with: 1) claims, which include courts and extra-judicial and; 2) Litigation, which includes damages, contract noncompliance (class action lawsuits, service & contractors Contracts), bid injunctions, bankruptcy and administrative (bills, water theft, injunctions). The department consists of the director, three auxiliary directors (Litigation, Opinions/Counsel, Contracts) and a pool of ten lawyers. Also, for damages litigation they use external counsel from four law firms with pre-negotiated fixed rates and for contract non-compliance received assistance from three pre-approved external firms in an as needed basis. All labor related issues are managed by the HR Department. The department is also involved in the negotiations with the Regulatory Agencies to modify certain requirements of the consent decrees, and agreements to re-align compliance priorities and in turn, help alleviate PRASA's financial burden. These modifications are expected to result in the postponement or advancement of the implementation of certain projects currently included in the CIP, and/or the modifications of their scopes. Furthermore, the legal department is counseling with regards to the FBI investigation discussed in section 2.3.

- *Infrastructure* – PRASA's Infrastructure Department continues to manage and implement PRASA's CIP with the support of the Program Management Consultants (PMCs). CIP includes over 738 projects that range from mandatory compliance-related projects, to general infrastructure (structure) improvements, renovation and replacement, as approved by PRASA's Governing Board under Board Resolution No. 2909 on March 2015. However, the majority of CIP projects has been delayed, postponed or terminated because of the current fiscal situation. The Infrastructure Department is also responsible for the management of PRASA's Comprehensive Energy Management and the Plant Automation programs (further discussed in more detail within this section, in subsections 4.5.3 and 4.6 respectively). A detailed description of PRASA's CIP is provided in Section 5, along with a description of the efforts being implemented by the Infrastructure Department, in coordination with the Compliance and Legal departments for the re-negotiation of existing consent decrees and agreements. In addition, the Infrastructure Department was running an initiative to reactivate the production of hydroelectric power, starting with the Carraízo hydroelectric facility. However, despite completing the design and bid process for the project, it was placed on hold during FY2015 given that bids received were much higher than estimated. Therefore, considering this and the ongoing fiscal situation, the project has been postponed until further notice.

4.3.2. Regional Updates

Arcadis also conducted meetings with the five Operational Regional Directors and other personnel who provided current status of their operational activities. A summary of the information provided by PRASA is detailed below.

All Regions reported their current focus on the Operational Optimization Program, with energy consumption reduction, operations optimization, plants automation, WTP's production reduction, system simplification to reduce O&M costs, reduction of pressures, redundancy and flexibility in systems, NRW identification and reduction (primarily through leak detection and attention), identification and reduction in sewer overflows, treatment facility compliance, among others.

From May to October 2015 Puerto Rico experienced an extreme drought period, which intensified between May and September 2015, greatly affecting the municipalities served from the Loíza (Carraízo), La Plata, Toa Vaca and Cidra reservoirs. Even though much of the drought impact was focused on the Metro Region, it affected other Regions as well. The Metro Region implemented a plan to extract raw water from certain wells in order to reduce the extraction of the reservoirs. Also, the East and North Regions performed underground well activation to increase the water supply and counter against the drought. Moreover, to reduce the potable water consumption, PRASA emphasized the use of non-potable water for purposes that do not necessarily require water to comply with regulatory quality standards. PRASA's next steps include developing and establishing standard operating procedures (SOP) for maintaining and selling non-potable water extracted from underground wells. Additionally, the Regions reported that they have identified lessons learned experienced during the recent drought, and that several improvements to the existing infrastructure have been implemented to minimize or avoid potential water interruptions in the future. Normal services were restored on October 25, 2015.

During FY2015, PRASA's Regions reduced the subcontracted support that helped simplify the implementation, development and evolution of its CIP and instead started moving towards the implementation of a prioritization list intended mainly to avoid or minimize service disruptions by focusing efforts on addressing those priority projects with their own operational and universal crews.

In addition, investment in remote monitoring of facilities is being performed by all Regions to facilitate the future operation of the plants that are currently undergoing automation improvements. Some Regions are more advanced than others and operate 24 hours in three shifts while others only operate during regular daylight work hours. The Regions and all 21 operational areas are utilizing the Mobile Data Terminals (MDT) tablets to process and execute work orders, this practice helps to quantify the productivity metric. Furthermore, PRASA plans, in the near future, to provide the MDTs to private contractors hired to assist on leak repairs, during periods of backlog accumulation or labor conflicts, and for other activities such as, sewer line flushing, vacuum trucks and pavement repairs. The Regions reported that they continue to confront challenges regarding the fleet's mechanical conditions and availability.

The North Region continues to invest in personnel training to increase work ownership and productivity levels. They implemented the OTC, which began during FY2014 and is currently including supervisors and managers in its certified operators' exams. The goal is to implement it in the other Regions as well.

Finally, the Regions informed that they are performing quality checks to their metrics to support PRASA's KPIs, however all mentioned that the drought and the fiscal situation has hindered the compliance of several of the required indicators.

4.4. Strategic Plan FY2014-FY2018

As reported in the previous CER, PRASA has adopted the mission of providing quality water and wastewater services at the lowest possible cost. To reach that goal, PRASA's Executive Management Team developed and implemented a Strategic Plan in FY2013, which covers the five fiscal years from 2014 through 2018. The Strategic Plan includes five strategic initiatives and key programs, as shown in Figure 4-1. According to PRASA, these initiatives should address the different critical elements that affect its vision and mission.

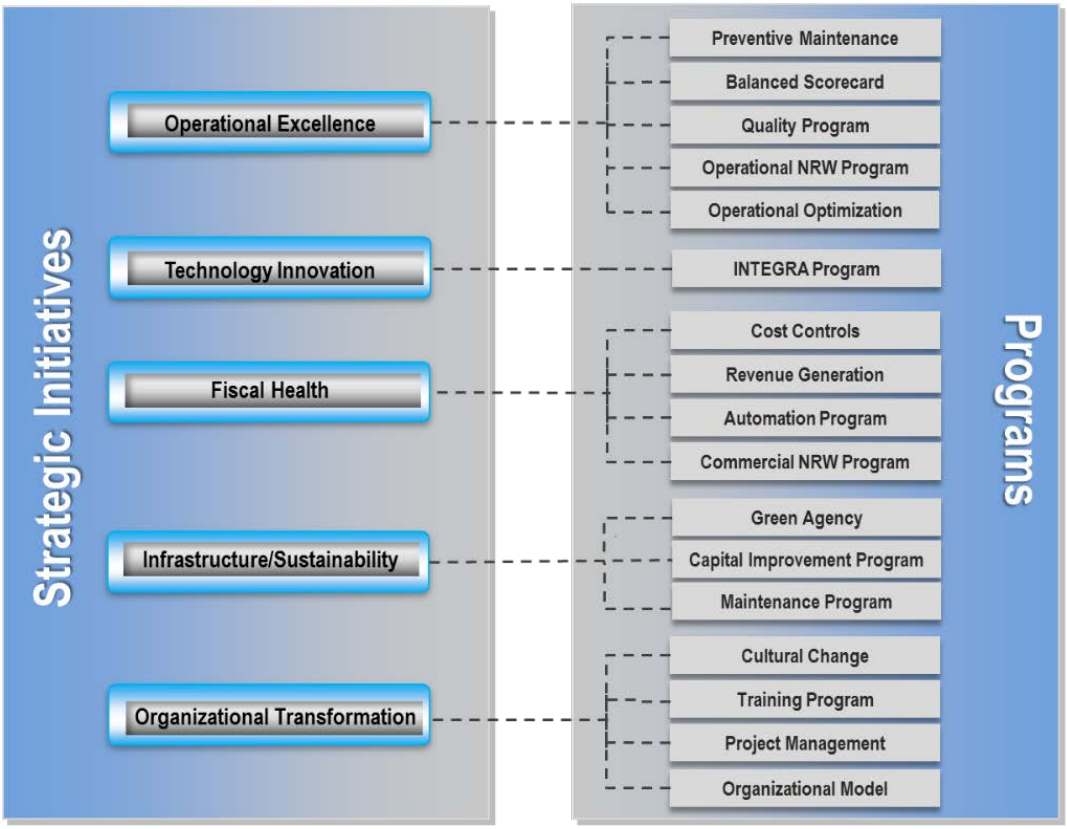

Figure 4-1: FY2014-FY2018 Strategic Plan Initiatives and Programs

PRASA's Executive Management Team is currently in the process of revising and refining certain aspects of its Strategic Plan considering the lessons learned during FY2014 and FY2015 with realignment of strategic initiatives such as Fiscal Health (to include a plan to self-finance PRASA's CIP in the future) and Organizational Transformation. A draft has been developed. KPI goals were adjusted (made stricter) for FY2015; and the methodology for calculating certain KPIs was revised

to better align them with Management's goals. PRASA has stated that one of its key goals is to reduce its dependence on bond issuances for the financing of its CIP within the next 10 years.

A brief description of each strategic initiative and related programs is provided below.

- *Operational Excellence*: The principal objective of this initiative is to develop a model for providing reliable, sensible, and economic services while assuring the full compliance of customers' expectations. The associated objectives and goals of this initiative are summarized in Table 4-3.

Table 4-3:
Operational Excellence Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Improve Regulatory Compliance	Quality Program	Increase the regulatory compliance	Non-compliance fines
			Potable water service compliance
			Wastewater service compliance
Operational Effectiveness	Operational Optimization/Balanced Scorecard	Improve bill precision	Billing adjustments
		Reduce quantity of customer service complaints	Customer service complaints
		Reduce quantity of clients with defective service	Service interruptions
			Deficient service clients
		Improve client satisfaction	Time of service in a commercial office
		Improve the fleet's mechanical conditions and repair rate	Available vehicles (%)
		Improve the service level of the supplier	Time of issuance service or purchase order
		Improve the average logistic time level	Time of delivery of the supplier
Improve the IMP	IMP Program	Improve the time of repair in water production and distribution equipment	Average time of repair of equipment
		Increase the preventive maintenance level while the corrective maintenance is reduced	Preventive maintenance vs. corrective relationship
Non-revenue Water Reduction	NRW Operational Program	Improve service quality	Leak's repair time
		Non-revenue water reduction	Non-revenue water (MGD & percentage)
		Increase production efficiency	Water production (MGD)

- *Technology Innovation*: This initiative includes all projects related to software applications or infrastructure solutions aligned with the operational and functional support. The principal objective of this initiative is to centralize all technological projects to maximize the use of

resources. The associated objectives and goals of this strategic initiative are summarized in Table 4-4.

Table 4-4:
Technology Innovation Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Achieve Technology Optimization	INTEGRA Program	Complete projects as scheduled	Complete projects on schedule

- *Fiscal Health*: This initiative includes all projects aimed to increase revenues or reduce costs while maintaining a balance between long-term debt, asset values, O&M expenses, and operational revenues. The principal objective of this initiative includes the improvement of PRASA's financial capacity, capture revenue losses from existing customers, increase the budget's management effectiveness, reduce operational costs, and link service rates to factors such as economic tendencies of consumption, short-term financial management, and long-term financial health management. This initiative is PRASA's highest priority on its Strategic Plan. The associated objectives and goals of this initiative are summarized in Table 4-5.

Table 4-5:
Fiscal Health Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Cost Controls	Automation Program/Control Costs	Improve the efficiency level of the employee	Employees by connection (1,000)
		Compliance with operational expenses	Overtime (over payroll)
Increase Revenues	NRW Commercial Program/Revenue Generation Program	Increase revenue	Budget usage
		Increase revenue level while debt level is reduced	Debt service coverage
		Increase collection level	Collections percentage

- *Infrastructure and Sustainability*: This initiative includes all projects aimed to generate an efficient use of hydrological and energy resources inside PRASA and the compliance with the CIP. The principal objective is to maximize infrastructure, investments and operational resources to protect, restore, and improve the natural environment. The associated objectives and goals for this strategic initiative are summarized in Table 4-6.

Table 4-6:
Infrastructure and Sustainability Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Energy Consumption Reduction	Green Agency Program	Reduce the energy consumption	Electric Consumption
Comply with Capital Improvement Projections	CIP	Complete projects as scheduled	Performance Rate of Project Costs

Strategic Objectives	Program	Goals	Performance Indicator
			Performance Rate Progress of CIP Projects

- *Organizational Transformation*: This initiative includes all projects aimed to develop a proficient, adaptable, and motivated workforce under a collaborative environment. The principal objective of this initiative is the support to the improvement of PRASA's efficiency to be profitable, dependable and sustainable on all facets of the operations and support processes. The associated objectives and goals of this initiative are summarized in the following Table 4-7.

Table 4-7:
Organizational Transformation Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Achieve an organization committed with the established objectives	Cultural Change Program/Training Program/ Project Management/Organizational Model	Increase the Employees' Satisfaction	Employee Training
			Work Effectiveness
			Non-working days

PRASA's Executive Management Team also adopted an operation optimization balanced scorecard with the purpose of improving PRASA's operational effectiveness. The indicators (previously discussed) measured in this balanced scorecard are: billing adjustments, customer service complaints, service interruptions, clients with deficient services, time of service in a commercial office, fleet availability, time of issuance/completion of service/purchase order, and effectiveness and timeliness of suppliers.

PRASA began tracking these performance indicators towards the end of FY2013 and set aggressive metrics to be met in each year included in the Strategic Plan. Finally, PRASA continues the development of a Program Management Office (PMO) to centralize all management, planning, and execution of its Strategic Plan and related initiatives and programs, data control, and KPI monitoring. However, progress on the development of the PMO has been slow.

4.4.1. Key Performance Indicators

Tables 4-8 and 4-9 present a summary of PRASA's KPI goals and results. The results are stated for FY2014 as of June 2014 (Table 4-8), and for FY2015 as of June 2015 and for the first quarter of FY2016 (Table 4-9). In FY2015, PRASA achieved a compliance score of 54% of its KPIs on an island-wide basis. Based on the FY2015 results, the following are some of the KPIs for which PRASA did not meet its defined goals: overtime, billings vs. collections, complaints in customer service (per 1000 active accounts), unplanned work effectiveness, billing adjustments, and average time for equipment repairs, among others. These are key areas that PRASA should continue to work on in FY2016. Although PRASA continues to challenge itself in enhancing its operational optimization efforts to achieve its strategic goals, it is important to mention that FY2015 KPI results

were impacted by the extreme drought and the fiscal situation affecting the island. Also, PRASA continues to add new performance indicators and to establish aggressive metrics in some of the KPIs, as shown in the tables below.

Table 4-8:
FY2014 PRASA Operations Key Performance Indicators

Key Performance Indicators	FY2014 Goals	Results as of June 2014
Employees per Connection	3.25 or less Employees/ 1,000 connections	3.15
Overtime	Reduce to 7%	10%
Budget Compliance (excludes electricity costs)	Increase to 100%	95%
Collections vs. Billings	Increase to 92%	91%
Compliance - Water System	Increase to 97%	98%
Compliance - Wastewater System	Increase to 95%	97%
Billing Adjustments	Increase to 97.5%	96.4%
Complaints in Customer Service (per 1000 active accounts)	Reduce to 10.36	17.56
Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers)	Reduce to 9%	7%
Customer Attention Time (Commercial Office)	Maintain below 25 min.	26.27 min
Vehicle Availability	Increase to 90%	91%
Average Processing Time of Purchase Orders	Less than 25 days	20 days
Preventive vs. Corrective Maintenance Ratio	Increase to 66%: 34%	71:29
Average Time for Equipment Repairs	Less than 20 days	24 days
Reported Overflows1-	-	-
Reported Leaks1	-	-
Repair time for leaks	Reduce to 60.0 hrs.	58.90 hrs.
Average Water Production (MGD)	Reduce to 608 MGD	598 MGD
Energy Consumption (Annual)	Reduce to 749.7MKwH	720 MKwH
Project Progress (CIP)2	-	-
Cost Performance (CIP)	Greater or equal to 0.9	1.03
Training (cumulative hours per employee)	More than 24 hrs.	32.42
Unplanned Work Effectiveness (Absenteeism)	Reduce to 4.58 days	19.69 days
Planned Work Effectiveness	Reduce to 5%	14%

Table 4-9:
FY2015 & First Three Months of FY2016
PRASA Operations Key Performance Indicators

Key Performance Indicators	FY2015 Goals	Results as of June 2015	FY2016 Goals	Results of first three months of FY2016
Employees per Connection	3.03 or less Employees/ 1,000 connections	2.85	3.28 or less Employees/ 1,000 connections	3.46
Overtime	Reduce to 8%	11%	Reduce to 8%	12%
Budget Compliance (excludes electricity costs)	Below 100%	92%	Below 100%	95%
Collections vs. Billings	Increase to 93.75% or Above	91.79%	Increase to 96% or Above	92%
Compliance - Water System	Increase to 98% or Above	99.4%	Increase to 99% or Above	99.4%
Compliance - Wastewater System	Increase to 97% or Above	97.2%	Increase to 97% or Above	97.8%
Billing Adjustments	Increase to 97.5% or Above	96.8%	Increase to 97.5% or Above	97.9%
Complaints in Customer Service (per 1000 active accounts)	Reduce to 16.68	19.9	Reduce to 16.68	19.5
Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers)[1]	Reduce to 6.5%	5.3%	Reduce to 5%	-
Customer Attention Time (Commercial Office)	Maintain below 25 min.	26.39 min	Maintain below 30 min.	20.00 min
Vehicle Availability	Increase to 90% or Above	87%	Increase to 92% or Above	87%
Average Processing Time of Purchase Orders	Less than 15 days	14 days	Less than 25 days	19 days
Preventive vs. Corrective Maintenance Ratio	Increase to 80%: 20%	78:22	Increase to 80%: 20%	78:22
Average Time for Equipment Repairs	Less than 20 days	30 days	Less than 25 days	23 days
Reported Overflows	Reduce to 2,512 monthly	2,378	Reduce to 2,221 monthly	2,437 per month
Reported Leaks[2]	Reduce to 4,509 monthly	5,225	Reduce to 3,296 monthly	4,736 per month
Repair time for leaks	Reduce to 60.0 hrs.	62.03 hrs.	Reduce to 58.0 hrs.	63.43 hrs.
Repair time for overflows	(New KPI for FY2016)		Reduce to 36.0 hrs.	33.04 hrs.
Average Water Production (MGD)[3]	Reduce to 565 MGD	557 MGD	Reduce to 558 MGD	477 MGD
Energy Consumption (Annual)	Reduce to 710.28MKwH	684.42 MKwH	Reduce to 660.34MKwH	149.71[6] MKwH
Project Progress (CIP)	Greater or equal to 0.9	1.0	Greater or equal to 0.9[3]	-
Cost Performance (CIP)[4]	Greater or equal to 0.9	1.0	Greater or equal to 0.9	-
Training (cumulative hours per employee)	More than 24 hrs. per year	26.88	More than 25 hrs. per year	3.78 first 3 months
Unplanned Work Effectiveness (Absenteeism)	Reduce to 1.5 days	2.82 days	Reduce to 2 days	2.23 days

Key Performance Indicators	FY2015 Goals	Results as of June 2015	FY2016 Goals	Results of first three months of FY2016
Planned Work Effectiveness	Reduce to 10%	5%	Reduce to 10%	4%
Percent of NRW[5]	Reduce to 56.9%	57.8%	-	-

[1] The Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers) does not include the months of May and June 2015 to exclude the service interruptions due to the 2015 drought event rationing plan. Also, this indicator was not evaluated for the first three months of FY2016 due to the rationing plan in effect during these months.
[2] The FY2016 Reported Leaks KPI metrics was modified to include only the in-line reported leaks (O12).
[3] The Average Water Production (MGD) KPI was not used by PRASA for the evaluation of the overall KPI score because of the 2015 drought event rationing plan and constant modification of the metric goal during the evaluated period.
[4] According to PRASA, the Project and Cost Performance KPIs for FY2016 are being measured only by Region, as such, no overall goal and result is presented for the first three months of FY2016.
[5] The Percent of NRW KPI is only measured annually and island-wide.
[6] Cumulative for the first three months of 2016.

4.5. On-Going Programs and Initiatives

The following programs and initiatives, some of which began development and implementation prior to FY2015, have been included under PRASA's Strategic Plan. A brief description and current status of each of these initiatives is provided below.

4.5.1. Integrated Maintenance Program (IMP)

The 2006 and 2010 Consent Decrees with USEPA and the 2006 PRDOH Agreement required that PRASA implement and continue to develop a comprehensive Integrated Preventive Maintenance Program, which evolved to the IMP during FY2013 to include both corrective and planned (i.e. preventive, predictive and proactive) maintenance activities, to ensure the proper O&M of its treatment plants and other critical facilities, including WWPSs. Through this program, PRASA established a plan to enable programmed and continuous maintenance to treatment 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 continues to finance part of the program through its CIP (costs associated with the necessary R&R prior to the integration of the facilities into the preventive maintenance program) and the rest (the actual maintenance costs) through its O&M budget.

As previously mentioned, the 2015 USEPA Consent Decree included the requirement for PRASA to continue with the approved IMP, to be further discussed in Section 5.5. Minimum requirements for the IMP include the following key components:

- Recordkeeping
- Maintenance Planning and Scheduling
- Storeroom and Inventory System
- Maintenance Personnel Training and Organization

- Cost and Budget for Maintenance Operations

In addition to the minimum requirements established in previous Consent Decrees, the 2015 Consent Decree has a new requirement for PRASA to develop and submit to EPA no later than March 1, 2017 a Corrosion Control Program to add to the implementation of the IMP.

The benefits highlighted by PRASA regarding the preventive maintenance program include the following:

- 100% compliance with the requirements of the Regulatory Agencies.
- Reduction in hiring external O&M service crews for electromechanical works.
- Increase the efficiency of the planning group.
- Increase operational reliability of equipment to reduce service interruptions and address repairs effectively and in a timely manner.
- Improve the use of information technology and quality of its database.

Key achievements include:

- Integration to the IMP of 100% of water and wastewater facilities (including plants, pump stations, wells, dams, intakes, and tanks).
- Integration to the IMP of 100% of control valves in the distribution system.
- Up to 97% of generators were operable (this metric has been maintained since FY2015).
- The average pumps redundancy is maintained between 92 and 96% for all water and wastewater pumps and treatment plants.
- Continue paperless certification (digital copies) of equipment calibrations.
- Restructured FY2014 project to standardize control panels in water pump stations, by performing the design and installation with internal personnel. The project was extended to all operational regions and will have a duration of three years.
- Maintained average time to repair equipment between 22 and 24 days (FY2014 results); current KPI is to maintain average time to repair equipment at or below 25 days.

PRASA had implemented a short-term and a long-term plan for the IMP. Key short-term projects executed during FY2015 include the following:

- Rehabilitation of water treatment plants (100% completed).
- 100% integration of the facilities into the programs.
- Mobile devices implementation for calibrations; completed. Pending implementation for warehouses and facility inspections.

- Plants maintenance optimization:
  - Maintenance optimization plan creation (99% complete).
  - Integration of maintenance optimization plan to SAP PM (40% complete).
  - Implementation of optimization plan (35% complete).
- Integration of maintenance optimization plan to SAP PM (40% complete).
- Implementation of SAP PM in 100% of the WTPs.
- Predictive techniques implementation with the interim service crews (on-going; trainings completed).
- Live tracking IMP metrics was postponed.
- Integrate the wastewater collection system and water distribution systems into the IMP (100% completed).

New IMP projects identified during FY2015 include telemetry systems to view 100% of the system in SCADA, creation of Operation Excellency Centers to replace Regional Operational Centers, root cause analyses for equipment failure and revision and standardization of the IMP processes.

The long-term plan that was established to be completed beyond FY2015, includes the following projects:

- New metrics and more aggressive goals for existing metrics including average time of equipment repair and tracking of corrective versus preventive maintenance.
- SAP PM and SCADA Programs Integration – maintenance orders being automatically created in SAP PM by SCADA.
- Asset management implementation and nomenclature standardizations.
- Special equipment establishment in reliability maintenance managed by the IMP in PRASA's central administration building.
- Continuous improvement projects including equipment standardization and critical materials incoming/receiving inspections.

4.5.2. Non-Revenue Water Reduction Program

In May of 2008, PRASA began to implement its comprehensive NRW Reduction Program to reduce water losses (apparent and real), increase revenue, reduce operational costs, and minimize water infrastructure capital investments. Reducing NRW continues to be a high priority goal for PRASA. PRASA embarked on the development of a strategic NRW management and reduction plan. For this, in late 2011, PRASA retained the services of a NRW consultant. The objective of this strategic NRW management and reduction plan is to provide PRASA with the necessary information to develop a comprehensive and cost-effective, long-term NRW management program.

The report was completed in May of 2012; it identifies a series of short, mid, and long-term activities that would provide PRASA opportunities to not only reduce its current NRW volume, but also to improve its revenues and reduce expenses. The specific initiatives being implemented under this program are described below. As part of the NRW management and reduction plan, PRASA has established a fully dedicated NRW monitoring and management team and is now conducting periodic water audits, which are used to implement the necessary controls and develop action items to address NRW and meet the established goals. However, additional efforts and greater resources shall be dedicated to PRASA's NRW Reduction Program in order to maximize benefits.

4.5.2.1. Revenue Optimization Program

As part of the NRW Reduction Program, PRASA's 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 five fiscal years.

Figure 4-2 depicts this increasing tendency in revenue generated from PRASA's Revenue Optimization Program from FY2011 to FY2015. As shown, PRASA has consistently exceeded its budgeted amount for operational initiatives. In FY2015, PRASA collected approximately $114.7M through its Revenue Optimization Program, which is about 17% higher than the FY2015 approved budget amount of $97.9M. It should be noted that the significant increase from FY2013 results to FY2014 results (an increase of approximately 32%) and from there on, considers the rate increase implemented by PRASA on July of 2013.

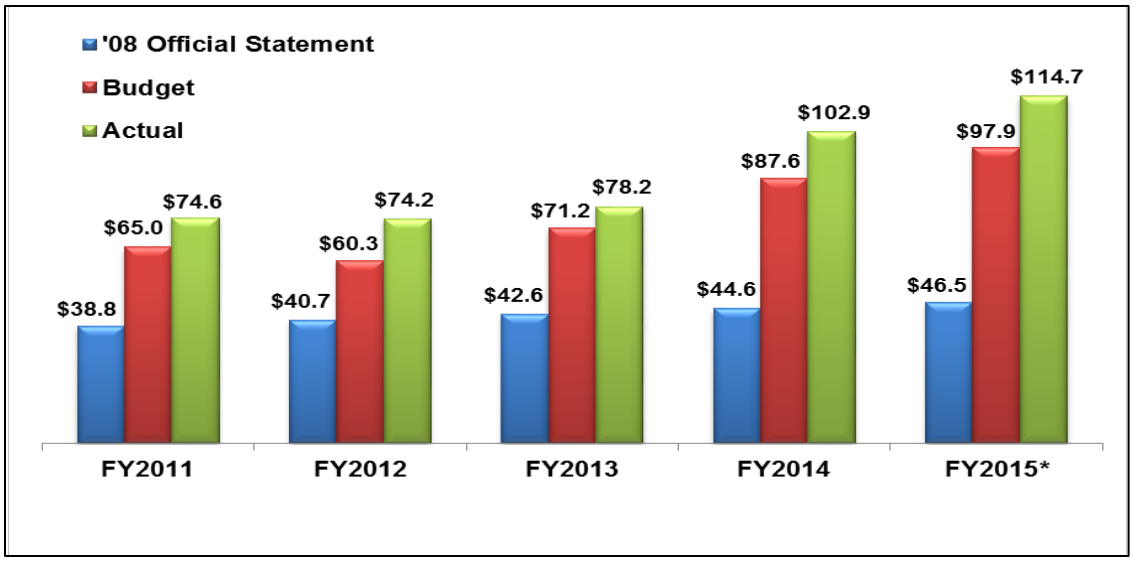

Figure 4-2: Revenue Optimization Program Results FY2011- FY2015 ($, Millions)

Table 4-10 below presents a breakdown of the Revenue Optimization Program initiatives, the FY2015 actual and the FY2016 preliminary results; the FY2017 approved annual budget; and the FY2018 through FY2019 projected opportunities. The expected cost of all the above-mentioned

initiatives is projected at $10M per year plus the cost of financing the required capital investments, which has been included in PRASA's financial projections.

Table 4-10:
Revenue Optimization Program Initiatives FY2015 – FY2019 ($, Thousands)

Initiative	FY2015 Actual	FY2016 Preliminary[1]	FY2017 Annual Budget[3]	FY2018 Projection[4]	FY2019 Projection[4]
Small Meters (net of degradation)	$42,065	$39,429	$46,233	$63,165	$59,612
Large Meters	16,443	14,475	17,869	21,473	23,430
Theft and Inactive (Tx) Accounts	30,709	36,613	44,251	35,349	36,922
Sprinklers	2,460	2,277	1,508	1,114	1,284
Disconnections and Collections Efforts	14,159	11,479	4,500	4,500	3,600
Class Correction	1,966	1,701	1,929	2,397	2,865
Condominiums	583	662	486	1,386	1,386
Miscellaneous	6,299	5,062	2,123	1,281	1,281
Total Additional Revenues[2]	**$114,684**	**$111,698**	**$118,899**	**$130,665**	**$130,380**

[1] Based on Operating Revenues collected through June 30, 2016.
[2] Numbers may not add up due to rounding.
[3] Based on Approved Annual Budget.
[4] Based on the 2015 POS.

A description of each of the NRW operational initiatives, and underlying assumptions regarding their projected revenue impact, is discussed in Section 7.4.1.

4.5.2.2. 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's 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

The first phase of the project, which involved the services of a private contractor, commenced in July of 2012 and was completed in November 2013. The contractor completed the following services:

- 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.
- Development of the Geodatabase using Geographic Information System (GIS) software. Approximately 860,000 locations were geo-referenced by the contractor.
- Standardization of physical addresses in both the Geodatabase and PRASA's SAP customer database of about 30% of accounts.
- Linking the Geodatabase with PRASA's SAP customer database.

In FY2014, PRASA continued the development of the Geodatabase with internal resources and support from its GIS subcontractors. The second phase of the project, which included the location of customers through field investigations as well as a desktop analysis of various databases, was completed in July 2014. Approximately 89% of PRASA's customers (1.2M) were identified and georeferenced as a result of this effort.

The third phase of the project, which commenced in July 2014, included field visits to identify the remaining PRASA customers in the Metro Region and in the municipalities of Caguas and Gurabo that were not previously located (approximately 129,000 customers), as well as the identification of any customer receiving PRASA services without an active or with an inactive account. Field visits have been completed resulting in the following:

- Approximately 15,000 additional customers were geo-referenced.
- Standardization of the remaining physical addresses, including the creation of area, sectors, and urbanization maps. Approximately 1,000 urbanizations, condominiums, and sectors have been identified and delimited.

A total of 1.37M of PRASA's customers have been identified and georeferenced. This represents approximately 97% of PRASA's customers. Although some locations still have not been geo-referenced, field investigations will no longer be performed under the current contractor. PRASA's GIS subcontractor conducted a pilot field study to evaluate the cost-effectiveness of geo-referencing the remaining locations by conducting field visits; results showed that the costs outweighed the benefits to be achieved given that the percent amount of locations geo-referenced was significantly lower than the sites visited (approximately 16% were georeferenced). In other words, most of the meter visits resulted in not being able to be paired up with a PRASA account. As such, going forward PRASA will geo-reference accounts not yet found, leveraging opportunities under its capital and R&R projects (i.e., piping replacement projects and new system construction).

Because the Geodatabase is a tool to be used by PRASA in the identification of its existing and potential customers, at this moment PRASA is not estimating incremental revenues from this initiative. However, with this tool, PRASA will be able to implement additional initiatives and

address customer database and connection anomalies that do represent significant revenue opportunities for PRASA, specifically regarding commercial losses.

4.5.2.3. Development and installation of an AMR/AMI System for Large Meter Customers in the Metro Region

The purpose of the development and installation of this initiative is primarily to:

- Increase efficiency and precision in the process of meter reading and billing consumption
- Reduce NRW
- Improve the service provided to large customers within the Metro Region

For purposes of this project, large meter customers are defined as those customers with water meters 1-1/2 inches or larger.

As previously reported, this project was originally envisioned to consist of the installation and operation of an Automatic Meter Reading and/or Advanced Metering Infrastructure (AMR/AMI) system for approximately 3,305 large meter customers in the Metro Region. However, the scope of work was later expanded by PRASA. Through this project, PRASA has partnered with a contractor (Johnson Controls, Inc.) to enter into a contract agreement for the implementation of revenue enhancement measures, which includes water meter accuracy improvements and the installation of a hybrid AMR/AMI system for large meter customers in the Metro Region. Additionally, PRASA believes that there is an opportunity to identify and impact additional customers in the Metro Region that are currently inadequately identified in PRASA's Customer Database or that have inadequately sized meters installed, particularly, non-residential customers with smaller diameter meters. Therefore, the scope also includes water meter improvements to selected 1-inch and smaller meter customers in the Metro Region. Infrastructure improvements, such as improvements to meter boxes and meter box lids, retrofit of existing meters, installation of new meters, and replacements or modifications to the meter size or type, and the integration of the customers' accounts with PRASA's SAP customer database system, as needed, also form part of the measures identified in the scope of work. The performance component was eliminated from the contract.

The project is being implemented in two phases: Phase 1 – Development Phase and Phase 2 – Implementation Phase. During Phase 1 the contractor conducted a thorough audit of all large meter customers in the Metro Region, as well as identified opportunities for non-residential customers with small diameter meters. The audit (Phase 1) was completed in August of 2014. Audit results presented by Johnson Controls, Inc. show that once the project is completed (i.e., all measures identified in the audit are implemented), the projected additional annual revenues are in the order of $2.2M; although PRASA may receive additional economic benefits as a result of: 1) a decrease in operation and maintenance costs, and 2) future capital cost avoidance. Investment costs were also revised and refined in the audit: total investment costs were revised at about $16.3M. The main difference in the project costs (compared to the original estimate prior to completion of the audit)

is due to the actual findings of meter infrastructure conditions and the additional infrastructure improvements that are required to be able to install the AMR/AMI system (i.e., meter box improvements and lids replacements). PRASA included a limited measurement and verification (M&V) component to enable tracking of project progress but not as to validate warranties. Additional measurement and verification and on-going maintenance costs were revised at about $0.84M per year.

Based on the audit results, and considering the additional non-measurable benefits that the project will provide PRASA, PRASA's Executive Management Team (as approved by PRASA's Governing Board) will proceed with Phase 2 of the project, the Implementation Phase. PRASA already has a draft contract agreement with the contractor, but the signing of the contract and the notice to proceed is currently on hold until PRASA's fiscal situation is resolved. The implementation time (installation period) for this initiative is estimated at 18-24 months.

4.5.2.4. Water Leak Detection

To better understand the magnitude of hidden water leaks (physical losses) in PRASA's water system, in FY2013 PRASA carried out a project to detect leaks in the Arecibo and Caguas water distribution systems. In total, between the two systems a total of 600 miles of pipeline was surveyed. About 288 leaks were detected with an estimated flow of about 4.7 MGD. Through this project, PRASA confirmed that there are a significant number of undetected water leaks in PRASA's water system. Based on these results, PRASA projects that there could be as much as 100 MGD being lost through undetected water leaks throughout the island. Hence, PRASA's Executive Management Team believes that detection and repair of these leaks could significantly reduce the volume of PRASA's NRW.

In January 2014, PRASA expanded the leak detection project throughout the island. PRASA established a goal of surveying about 7,000 miles of water pipelines, island-wide, over an 18-month period as part of the project. The water pipeline inspections goal was completed by June 2015 and a total of 3,800 leaks were detected.

As of December 2015, PRASA has established a new goal of surveying about 3,500 miles of small meter water pipelines throughout the island and a total of about 25.5 miles of large meter water pipelines in selected areas. PRASA's Regions are prioritizing leak repairs in accordance to their severity, giving a higher priority of repair to major leaks which represent a higher reduction in NRW.

4.5.2.5. Other Initiatives

Following its commitment to reduce NRW, PRASA is currently in the planning phase of two more initiatives that shall be further defined and developed during FY2016. One initiative consists of replacing meters with remote meter reading meters at an island-wide scale. The other initiative consists of the implementation of a prepaid meters and payment plans for PRASA's customers, which is being planned to first be offered to public housing customers (approximately 50,000 of

PRASA's clients). This project should help PRASA to both reduce NRW and reduce its debt from non-paying customers. Currently, PRASA is conducting a feasibility study on both initiatives to determine if PRASA should proceed with their implementation.

4.5.3. Comprehensive Energy Management Program

PRASA's energy cost is the second largest cost behind Payroll and Benefits; in FY2015 it accounted for approximately 22% of its total Operating Expenses, 2% less than previously reported for FY2014. During the past three fiscal years, PRASA's energy use has reduced from 745 MkWh during FY2013 to 692 MkWh during FY2015 (consumption data based on bills as of October 2015). In addition to the reduction in energy use, during FY2014, PRASA's electric power costs were significantly reduced because of the preferential electricity all-in-rate approved for PRASA under Act 50 of June 2013 (Act 50), of $0.22 per kilowatt-hour (kWh) for the first 750 million kWh of consumption (any excess to be paid at PREPA's average cost per kWh for the most recent audited fiscal year). This rate is effective from FY2014 through FY2016. Starting on FY2017 and going forward, and unless PREPA is able to provide electricity at a lower cost or that PREPA's DSCs are negatively affected, the all-in-rate would decrease to $0.16 per kWh, again for the first 750 million kWh of consumption[14]. However, effective in FY2017, PREPA revoked the preferential electricity all-in-rate.

A key benefit of the all-in-rate is that, in addition to stabilizing PRASA's electric energy costs, it has also helped PRASA to better forecast its Operational Expenses (in recent years, electric energy costs were very volatile and difficult to forecast and budget for). Refer to Section 7 for further discussion regarding PRASA's forecasted assumptions and projected savings.

PRASA continues its Comprehensive Energy Management Program to manage and reduce its energy consumption and costs. As previously reported, PRASA undertook two separate procurement processes to engage the private sector in investing in energy related projects. These are: 1) Demand Side Projects through Energy Performance Contracts (EPCs); and 2) Supply Side Projects through Power Purchase Agreements (PPAs). Additionally, PRASA continues its internal initiatives and activities being implemented by the operational Regions and PRASA's Infrastructure Department. A description of the different initiatives is provided in the following sub-sections.

4.5.3.1. Demand Side Projects through Energy Performance Contracts

During FY2015, PRASA continued with the implementation of six EPCs. The objective of this initiative, which began during FY2009, is to have Energy Service Companies (also referred to as ESCOs) perform assessments and guarantee savings obtained by installing equipment and

[14] PREPA is currently under a forbearance agreement with its creditors. In September of 2014, a chief restructuring officer was appointed to evaluate PREPA's fiscal situation and develop a comprehensive fiscal turnaround plan. It is expected that under this plan, the second stage of the preferential all-in-rate (and potentially the all-in-rate as a whole) will be eliminated.

implementing activities designed to reduce energy consumption. The most important benefit for PRASA in employing this type of performance contract is the operations benefit from improvements guaranteed by the ESCOs and as such, if the energy savings are not achieved, the ESCO will pay PRASA for the non-achieved savings. 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.

PRASA continues with the EPCs with Honeywell International as the Energy Savings Company (ESCO) for water and wastewater treatment facilities. However, in response to the financial situation PRASA is facing and its effects on due payments, PRASA has decided to put on hold three of the six EPCs that have not started the construction/implementation phases. Table 4-11 provides a status summary of this initiative as of September 31, 2015. With the completion of the implementation phase of the first three EPCs, PRASA expects to save approximately 10.8 million kWh per year, while upon completing the remaining three EPCs, PRASA expects to save approximately 21.7 million kWh per year. In terms of capital costs, unlike the demand side PPAs, the capital investment is financed by PRASA with bond proceeds (due to restrictions of the Governmental Accounting Standards Board). As mentioned, approximately $50M of PRASA's February 2012 bond issue was designated to finance facility improvements related to the EPCs initiative; thus, the debt service cost associated to this project is included in the financial projections discussed in Section 7.

Table 4-11:
PRASA EPCs

Facilities	Status
Caguas WWTP	Implementation completed. Started Measurement and Verification phase.
Barceloneta WWTP & Bayamón WWTP	Construction/Implementation substantially completed in Barceloneta, completed in Bayamón.
Sergio Cuevas WTP (Carraízo RWPS)	Construction/Implementation on hold.
Superaqueduct RWPS	Design completed. Construction/Implementation Notice to Proceed on hold.
Puerto Nuevo WWTP	Design on hold.

4.5.3.2. Supply Side Projects through Power Purchase Agreements

In 2009, PRASA also undertook 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 kWh than what PRASA currently pays to PREPA. From this process, PRASA concluded successful agreements with three companies, of which one has completed the construction phase and is in operation or in process of obtaining final permits for commercial operation. Additionally, after the completion of the Request for Proposal (RFP) process, various unsolicited proposals were received. Of these, PRASA has elected to pursue

two additional PPA projects. Table 4-12 below provides a status summary of the PPAs as of September, 2015.

Table 4-12:
PRASA PPAs

Proponent	Technology	Status
Renewable Power Development[1]	Gasification	Contract signed; Undergoing planning and permitting process for one 10MW facility (5MW committed to PRASA). Contractor is facing challenges in obtaining permits and waste supply contracts
Windmar Renewable Energy (PV Properties)	Solar	Contract signed; 6.1 MW in operation, 0.5 MW construction completed and pending approval by PREPA
Element Power Solar	Solar	3 MW; contract cancelled
Organics Management	Gasification	Contract signed; developer in process of obtaining financing

During the second half of FY2014, PRASA issued a second RFP for additional PPAs. From this process, PRASA completed the evaluation of the proposals and began negotiations with SunEdison for 5 MW of solar photovoltaic projects.

During FY2015, PRASA saved approximately $725,000 from the solar PPAs currently in operation. Additional savings are expected once the other signed PPAs and those under negotiation from the 2014 RFP are in operation.

4.5.3.3. Regional Operational Initiatives

PRASA's Executive Management Team has set a goal to achieve additional energy consumption reductions of at least 5% between FY2014 and FY2017. During FY2014, PRASA's Operational Regions started to evaluate opportunities to implement energy conservation measures in its WTPs and WWTPs, and they are also leveraging hydraulic modeling analyses and optimization efforts to reduce energy consumption in the water distribution and wastewater collection systems (i.e., pump stations facilities). So far, PRASA's Operational Regions have identified energy conservation measures that reduce equipment operation time at the WWTPs with process control measures and at the WPSs by identifying and controlling system pressures and distribution tank overflows. Methods to track savings and establishing metrics have been put in place in FY2015.

4.5.3.4. Other Projects

In addition to the demand and supply side projects, PRASA evaluated the rehabilitation of the Lago Loíza (Carraízo) hydroelectric facility. The facility has been out of service since Hurricane Hugo impacted the island in 1989. PRASA will replace one of the three hydropower units, which has an estimated capacity of 1.1 MW. Energy generated from the rehabilitated facility will be used to supply power to PRASA's facility on-site. The design for this project and the bid process were completed in the first half of FY2015, but bids received were much higher than estimated.

Therefore, considering the high bids and the ongoing fiscal situation, the project has been postponed until further notice.

4.6. 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 system protocols to automatically operate and remotely monitor its WTPs. The project scope includes the procurement and installation of automation control equipment (capital investment is estimated at approximately $400,000 per facility). As previously reported, the automation program underwent significant changes during the second term of FY2013. The program continued to be managed by PRASA's Infrastructure Department during FY2015. The Automation Program delivery strategy was revised as follows:

- Cluster operational model in place – PRASA to implement the organizational change component internally.
- Implement full automation of WTPs processes in the North Region clusters (No. 5, 6, 8, 9, and 10) and in the Metro Region (Cluster No. 22).
- Automatic Shutdown (ASD) at all plants in the West, South, and East Regions.

PRASA expects to complete the full automation of WTPs in Cluster No. #5 (a total of six plants), and Cluster No. 8 (a total of eight plants), and Cluster #9 by FY2017. Delays during construction and modification to some plants have extended the construction period to complete full automation of these clusters. Moreover, the current fiscal situation has adversely impacted the development and execution of the program. The regions will be partially automated following the 8-4-8-4 Automation plan[15]. PRASA intends to complete the remote monitoring of the remaining plants in FY2016. However, this has been delayed due to the current fiscal situation. At the same time, PRASA will negotiate with PRDOH which of these plants will be transitioned to remote operation[16] in the future.

Facilities modifications to accommodate the Plant Control Center (PCC) rooms for each cluster and the automation-capable Remote Operation Centers (ROCs) will be completed by FY2017. Repair and replacement of certain plant equipment extended the previously reported completion date of FY2016. The East Region ROC was completed in FY2012. The North Region ROC and three of the five PCCs are completely functional as of FY2013. The remaining two PCCs will come

[15] The term 8-4-8-4 operations refers to having an operator at the facility for a period of eight hours followed by a remote monitoring and un-manned operation for the next four-hour period. This 12-hr cycle is repeated, reducing the number of operators needed and minimizing overtime significantly.
[16] The term remote operation refers to a WTP that automatically adjusts parameters to meet regulatory compliance without the need of on-site operators. The WTP's performance is remotely monitored 24 hours a day, 7 days a week. Routine visits are required for maintenance and other specific tasks.

online in FY2016. The South and West Region ROCs were completed in FY2014 and the Metro Region ROC will be completed by FY2017.

PRDOH and PRASA agreed on an endorsement procedure prior to the implementation of 8-4-8-4 and remote operation. This means that while plants can have ASD (needed for 8-4-8-4 operations) or full automation capabilities, the WTPs must follow the endorsement procedure prior to implementation of reduced shifts or staff. This causes a gap in the number of plants delivered and the number of plants endorsed. To date, a total of seven endorsements have been received, and the ASD capabilities have been completed on another seven WTPs but PRASA has decided not to pursue the endorsement at this time. Another twelve mostly due to new findings by the PRDOH during inspections, are expected by end of FY2016. After a maturity period and full automation is tested, PRASA can request endorsement for remote operation. Table 4-13 summarizes the projected program development schedule over the life of the project. As shown, under the revised strategy, PRASA has determined that only 112 WTPs (out of 118) will be impacted through this initiative. During FY2014, PRASA added five more plants to the initiative, including three large Metro Region plants (Sergio Cuevas, Enrique Ortega, and Guaynabo). Though PRASA is not intending to remote operate these three plants, they were added to the initiative to provide for remote monitoring.

Table 4-13:
Plant Automation Implementation Schedule

Fiscal Year	Cumulative No. of Plants with Remote Monitoring	Cumulative No. of Plants in Program with ASD Capability	Cumulative No. of Plants in Program with ASD Endorsement	Cumulative No. of Plants in Program with Full Automation Capabilities	Cumulative No. of Plants in Program with Remote Operation Endorsement
<2014	30	15	2	6	0
2014	52	34	5	9	0
2015	72	71	7	9	0
2016	82	76	20	12	0
2017	92	86	35	15	5
2018	102	91	50	20	17
2019	113	91	65	25	24
2020	113	91	75	30	24
2021	113	91	85	30	24

4.7. Creation of PRASA Holdings, LLC

As part of PRASA's plan to collect additional revenues to supplement its revenues and diversify its revenue sources, pursuant to Act No. 228, enacted on November 1, 2011, PRASA has created a new corporate entity, as a holding company for future investments. PRASA Holdings, LLC was registered in the State of Delaware; it is authorized to do business in Puerto Rico. One of the first

opportunities pursued is the exportation of consulting services focused on infrastructure management and revenue optimization for utilities in Latin America (i.e. Honduras and Colombia).

Another opportunity that was being pursued consists in the development and operation of open access fiber optic infrastructure mainly through PRASA's water and wastewater system pipes in the San Juan Metropolitan area neighborhoods of Old San Juan, Condado and Isla Verde. PRASA was in the process of finalizing the *Use Agreement* needed for the implementation of this opportunity. [Also, PRASA has altered the original concept where PRASA was to finance the initiative and perform the works and operation, whereas now a third-party company will put up the initial capital investment and perform the installation, operation and maintenance of the infrastructure thus significantly reducing the projected revenues indicated in the 2014 CER. As part of the negotiation, PRASA will try to incorporate in the contract the cleaning of the pipelines to be used, which should provide an added benefit to PRASA. However, due to the ongoing fiscal situation efforts on this pursuit were suspended.

4.8. Conclusions

Despite certain O&M related observations made during facility inspections in 2015, PRASA's O&M practices are adequate. The implementation of a Strategic Plan, revenue optimization program and the measurement and tracking of key metrics and KPIs has helped PRASA in the execution of its programs and projects, and in improving both operational, financial and management results. However, the planned O&M investments have been impacted due to the ongoing fiscal situation and have fallen behind the System needs. Although PRASA intends to continue to develop and implement operational initiatives with the goal of improving and optimizing its operations, several of these initiatives have been postponed or cancelled due to the ongoing fiscal situation. However, initiatives such as the Plant Automation Program and the reduction of NRW, present key opportunities for PRASA which could result in increased revenues and cost savings. As such, once funding has been identified, PRASA shall prioritize efforts to reactivate these initiatives as soon as possible.

5. Capital Improvement Program and Regulatory Compliance Status

5.1. Introduction

PRASA continues to implement a comprehensive 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 the System 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. 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 required by PRASA's Governing Board, PRASA's Infrastructure Department must annually submit for its approval an updated five-year CIP plan. The CIP presented in this 2015 CER was approved by PRASA's Governing Board under Board Resolution No. 2909. It covers the planning period from FY2016 through FY2020. The FY2015 planned CIP totaled approximately $291M; however, PRASA's preliminary CIP expenditure results amounted to approximately $251M. The lower than projected CIP expenditure was due to PRASA's financial situation and delay in the issuance of the 2015 Senior Bonds, which proceeds were intended to partially finance the CIP.

This section of the report provides:

- an overview of PRASA's CIP, 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 Development and Management

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 extremely aggressive and robust infrastructure program, PRASA obtained the services of five major firms or program management consultants (the PMCs) to plan, design, and manage the CIP projects in each of the five Regions. On July 1, 2009, PRASA reduced the number of PMCs from five to two in order to reduce associated program overhead costs (estimated savings of about $7M). However, PRASA's Infrastructure Department identified the need to re-engage a third PMC and re-distribute responsibilities, as performance metrics started to decline. Therefore, since February 1, 2013 there were three PMCs that provided support to PRASA in the project development process and actively participate in the planning, conceptualization, design and construction phases island-wide.

The PMCs are organized into three main teams: pre-construction, construction, and post-construction. As part of the pre-construction activities, the PMCs manage key tasks that drive CIP project budgets, such as defining project scopes, negotiating consultant contracts for studies and design services, reviewing project constructability, preparing project construction cost estimates, preparing bid packages, and managing bid processes (in close coordination with PRASA's Bids Board). As part of the construction management services, the PMCs serve as PRASA's representative in the CIP projects, managing project schedules, negotiating project change orders and administration of construction contracts, among other activities. Finally, as part of the post-construction services, the PMCs provide support for project start-up, training, and all project close-out activities.

At the request of PRASA's Infrastructure Director and based on the performance results measured by PRASA's Infrastructure Department, on December 2014, PRASA's Governing Board approved the following modification in the PMC structure: re-assignment of the PMC responsibilities for the South Region from CDM-Smith (current PMC) to Black and Veatch (existing PMC of the East Region); to become effective during the second half of FY2015, after a transition period. In FY2015, an additional PMC structure modification was approved by PRASA's Governing Board, to become effective on FY2016. The West Region was modified by assigning the different phases of the construction management process to three different entities: Construction management was assigned to CH Caribe (existing PMC of the Metro and North Regions), Pre-construction services was assigned to ECR Engineering (currently subcontracted by the East and South Region's PMC), and the Post-construction was assigned to RER Environmental Engineering (subcontracted by the previous West Region's PMC).

The modified PMC structure is presented in Figure 5-1.

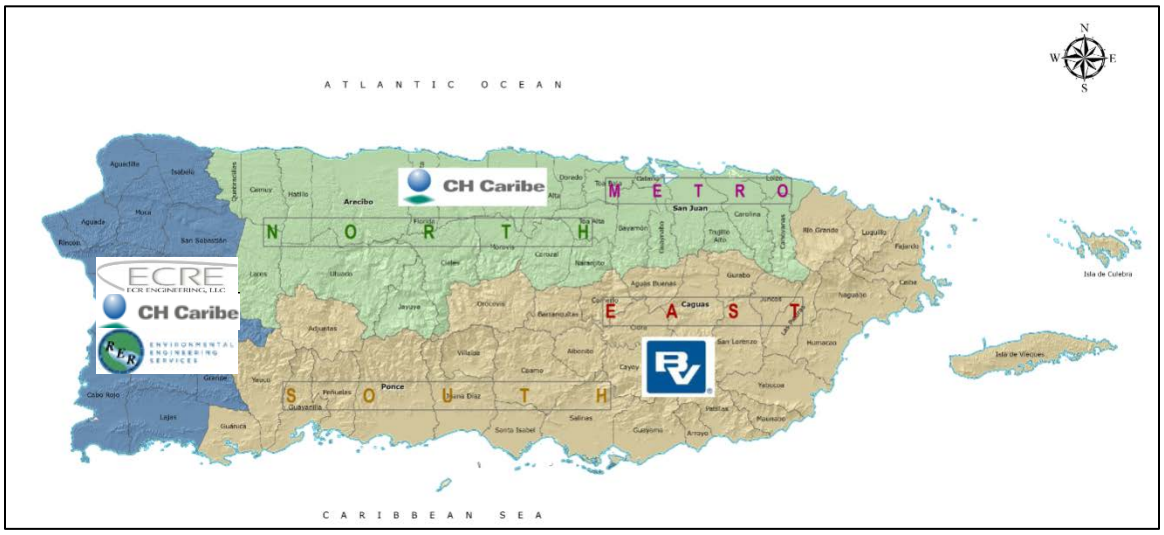

Figure 5-1: Program Management Consultants
(as approved by PRASA's Governing Board for FY2016)

In addition to the PMCs, PRASA continues to engage other engineering and consulting companies in areas such as planning, design, land acquisition and for other special assignments and initiatives.

5.3. CIP: Project Distribution and Costs

The CIP projects are divided into categories, groups and types. Additionally, 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 by the Consulting Engineer, as these have been prepared by PRASA in direct collaboration with the PMCs.

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, 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 (at least once a year), the changes to the CIP are presented to PRASA's Governing Board for 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)

Design costs use as a guideline the College of Engineers and Land Surveyors of Puerto Rico (CIAPR) professional services compensation guidelines (vary by project type and complexity) but due to the current fiscal situation and markets, most design costs are estimated lower than the CIAPR guidelines, about 6-7% of construction costs. The construction management and inspection costs are currently estimated at about 5.0% of the net construction cost; general, administrative and insurance costs are estimated at approximately 15% of net construction cost; while contingencies

are estimated to be about 10% of the net construction cost. PRASA is no longer including an annual inflation rate on construction costs over the project development period. PRASA eliminated the annual inflation rate of 3.8% previously used, considering the downturn in construction activity and lower project cost estimate results received during project bids. 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. PRASA reports that existing contract change order percent in construction projects is about 3%, which is much lower than typical industry values of about 15-20%. Finally, as previously mentioned in Section 4, PRASA is tracking KPIs for project costs and schedules; results for FY2015 and for the first three months of FY2016 show that PRASA is managing the project budgets and schedules effectively.

5.3.1. Project Classification and Prioritization

CIP projects are classified into mandatory and non-mandatory categories. Also, PRASA has added a new category called "Structure". As such, there are six CIP categories as listed below:

- Mandatory (USEPA, PRDOH, Civil Action, Administrative Orders)
- Non-Mandatory Compliance
- Non-Mandatory Quality, Efficiency, Reliability and Redundancy
- Non-Mandatory Growth
- Non-Mandatory Other
- Structure

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. Non-mandatory projects are those that, although not mandated by Regulatory Agencies, are necessary to maintain, upgrade, and grow the System. Structure category projects include R&R projects, as well as technology improvements, meter replacement, and fleet improvement projects.

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, WPSs, Tanks, amongst others. Wastewater system projects include projects for improvements or construction of new facilities regarding: wastewater collection, WWTP, WWPSs, amongst others.

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

and negotiated with Regulatory Agencies. Four main criteria were selected to prioritize CIP projects: Regulatory Compliance, Quality of Service and Reliability, Operational Efficiency and Improvements, and Population Impacted by Project. PRASA is in the process of finalizing its project prioritization system as part of the renegotiation process with USEPA and PRDOH. More detail is provided further in this section. The implementation schedule of future projects, currently not included in PRASA's CIP, will be subject to the prioritization system and PRASA's financial capacity.

5.3.2. Capital Improvement Program FY2016-FY2020

PRASA's programmed CIP for FY2016 through FY2020 amounts to $1,383.1M. This amount in addition to the approximately $40M in additional CIP uses due to delays in the implementation of certain CIP projects during FY2015 totals $1,423.1M. The projection for FY2016 in Table 5-1 below does not reflect the $40M revisions made by PRASA to the sources and uses of funds as it includes only the funds approved by PRASA's Governing Board under Board Resolution No. 2909.

The CIP includes $249.5M for Mandatory projects, as shown in Table 5-1. As presented in Table 5-1, the investment amount for Mandatory projects reduces significantly from FY2017 to FY2020. This reduction is mostly due to the terms renegotiated with Regulatory Agencies. Figure 5-2 shows the total projected capital expenditures by category for FY2016 through FY2020.

Table 5-1:
Capital Improvement Program FY2016-2020 by Category ($, Millions)

Project Category	Fiscal Year Ending June 30,					Total 2016-2020
	2016[2]	2017	2018	2019	2020	
Mandatory (Consent Decrees, Administrative Orders, Agreements)[1]	$105.1	$83.1	$36.7	$13.6	$11.1	$249.5
Non-Mandatory Compliance	71.1	65.8	42.8	44.1	49.7	273.6
Non-Mandatory Quality, Efficiency, Reliability & Redundancy	45.5	37.5	33.0	44.9	34.3	195.2
Non-Mandatory Growth	8.4	13.4	11.2	5.0	1.1	39.1
Non-Mandatory Other	36.0	32.9	30.1	23.3	14.8	137.1
Structure	99.4	77.0	91.2	109.7	111.4	488.7
Total [3]	$365.5	$309.8	$244.9	$240.5	$222.3	$1,383.1

[1] Includes Caño Martin Peña/ENLACE projects
[2] The projection for FY2016 does not reflect the revisions made by PRASA to the sources and uses of funds due to the delay in the implementation of certain CIP projects during FY2015 resulting from the delay in the issuance of bonds in 2015.
[3] Numbers may not add due to rounding.

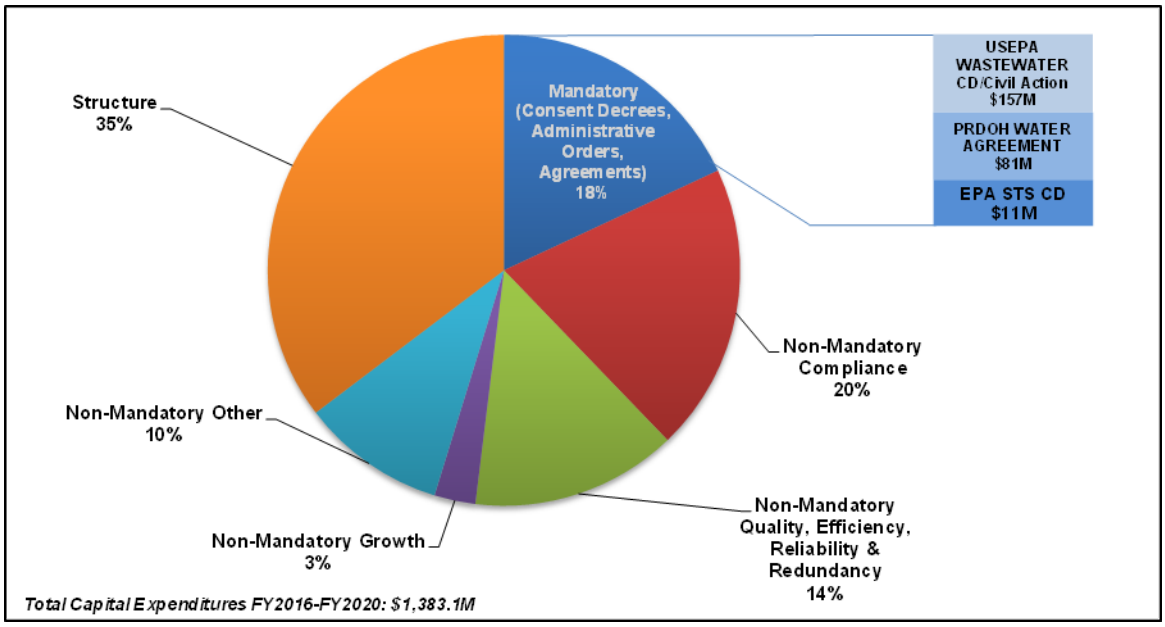

Figure 5-2: FY2016-FY2020 Capital Expenditures by Project Category

PRASA's five year CIP FY2016-2020, as approved by PRASA's Governing Board in March 2015, consists of a total of 738 projects. As of November 18, 2015, a total of 10 projects were currently active in construction, 13 projects were substantially completed and/or in start-up process, 13 projects were completed and in closeout process, 2 projects were suspended and 16 projects were already completed, for a total of 54 CIP construction projects. All CIP projects in the planning, design and bid phase are currently on hold.

5.3.2.1. Water System Projects

The water system projects include projects to improve compliance (mandated and not mandated), upgrades to WTPs, sludge treatment systems (STSs) and water distribution systems as well as construction of new water infrastructure. Total capital expenditures in water system projects for FY2016–FY2020, as approved by PRASA's Governing Board, are estimated at approximately $384.1M, of which approximately $92M is allocated for projects classified as mandatory.

5.3.2.2. 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 FY2016–FY2020, as approved by PRASA's Governing Board, are estimated at $376.3.2M, of which approximately $157M is allocated for projects classified as mandatory.

5.3.2.3. Other Projects: Structure, Operational, Planning, R&R and Technology

Total capital expenditures for all other capital projects, as approved by PRASA's Governing Board, are estimated at approximately $622.7M for FY2016–FY2020. These projects address renewal and

replacement (R&R), preventive maintenance, meter replacements, office and building improvements, fleet upgrades, minor repairs, and technology improvements.

Table 5-2 shows the project distribution and capital expenditure by group and type classification for FY2016 through FY2020.

Table 5-2:
Capital Improvement Program 2016-2020 by Project Type ($, Millions)[1]

Category Type	Sub-Category	Fiscal Year Ending on June 30,					Total
		2016[1]	2017	2018	2019	2020	2016-2020
Water System	Water Supply	$23.7	$23.7	$17.4	$23.5	$14.4	$102.7
	Water Pump Stations	0.0	0.0	0.0	0.5	1.8	2.3
	WTP Capacity Increase	0.8	0.0	0.0	0.0	0.0	0.8
	WTP Improvements	39.7	24.7	11.4	7.0	9.4	92.1
	WTP New	19.1	17.2	3.1	0.0	0.0	39.4
	Water Distribution	19.2	17.4	30.9	47.3	31.9	146.7
	STS	0.1	0.0	0.0	0.0	0.0	0.1
	SUBTOTAL	$102.6	$82.9	$62.8	$78.2	$57.6	$384.1
Wastewater System	Wastewater Pump Stations	$6.8	$7.8	$2.1	$0.0	$0.0	$16.6
	WWTP Capacity Increase	0.4	0.02	0.0	0.8	1.8	3.1
	WWTP Improvements	38.3	45.7	27.0	14.3	8.4	133.7
	WWTP New	0.0	0.0	0.0	0.0	0.0	0.0
	Wastewater Collection	76.9	72.7	40.7	16.9	15.8	222.9
	SUBTOTAL	$122.4	$126.1	$69.8	$32.0	$26.0	$376.3
Meters	Water Meters	$20.2	$20.7	$23.4	$22.1	$19.4	$105.7
Buildings	Buildings	10.3	5.8	1.2	0.1	0.0	17.4
Fleet	Fleet	2.9	5.7	8.0	8.8	7.3	32.7
IMP (R&R component only)[2]	Water & Wastewater	4.8	1.2	0.0	0.0	0.0	6.0
Minor Repairs	Water & Wastewater	34.6	12.3	18.5	29.7	27.9	123.0
Renovation & Replacement	Water & Wastewater	53.5	47.5	51.2	60.2	76.4	288.8
Technology	Water & Wastewater	14.2	7.6	10.1	9.3	7.8	49.1
	SUBTOTAL	$140.5	$100.8	$112.4	$130.3	$138.8	$622.7
TOTAL[2]		**$365.5**	**$309.8**	**$244.9**	**$240.5**	**$222.3**	**$1,383.1**

[1] The projection for FY2016 does not reflect the revisions made by PRASA to the sources and uses of funds revised due to the delay in the implementation of certain CIP projects during FY2015 resulting from the delay in the issuance of the 2015 Senior bonds, totaling approximately $40M.
[2] Numbers may not add due to rounding.

5.3.3. Delay in CIP Implementation

Due to the delay in the issuance of the 2015 Senior Bonds, PRASA voluntarily delayed some CIP projects to mitigate CIP cash flow deficiencies prior to the proposed bond issuance. These delays include approximately 108 projects in the pre-construction phase (planning, design or bid) that were placed on hold; of which 11 are mandatory projects under existing consent decrees with

Regulatory Agencies. Conversely, it impacted the ongoing construction projects. Out of the total 151 projects identified by PRASA as being in construction, start-up, or closeout, 12 projects had been delayed. Seven of these projects were suspended[17] (only one is mandatory) and five were terminated[18] (only one is mandatory). As of September 2015, a total of 54 construction projects were active, whose status is: 10 projects currently active in construction, 13 projects substantially completed and/or in start-up process, 13 projects completed and in closeout process, 2 projects suspended and 16 projects already completed. PRASA also reduced the contracted support from the PMCs engaged to facilitate the implementation, development and evolution of its CIP. More details on PRASA's financial situation and effect on the implementation and performance of the CIP is presented in Section 7 of this report under sub-section, Funding of PRASA CIP.

5.4. CIP and Current Regulatory Compliance

The primary focus of the CIP is to maintain, modernize and help bring the System into compliance with applicable environmental laws; it adequately addresses the requirements of existing consent decrees and agreements and considers proposed modifications to said consent decrees and agreements, as currently being negotiated by PRASA with Regulatory Agencies. 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 (USJD), USEPA, PRDOH and others, to cooperate with respect to the re-negotiations of existing consent decrees and agreements; and 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.

[17] A work stoppage for up to 90 days and for which PRASA pays overhead costs to contractors as agreed to in the respective construction contracts.
[18] Contract is cancelled by the parties and, for work to continue, a new contractor would have to be retained to complete the project.

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 STSs. These agreements include the following:

1. PRASA IV: 2003 Consent Decree, U.S. 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 WWPSs.
2. 2006 Wastewater Consent Decree, U.S. 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. 2006 PRDOH Drinking Water Settlement Agreement Civil Action KPE 2006-0858[19], as amended – 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 Safe Drinking Water Act (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, U.S. v. PRASA and Commonwealth of Puerto Rico – Addresses alleged violations to the SDWA and the CWA specifically to the National Primary Drinking Water Regulations.

PRASA is currently in an extensive renegotiation process with the Regulatory Agencies to amend these consent decrees and agreements. Section 5.5 provides more detail on these renegotiations. Once final approval is granted, a new USEPA Consent Decree, the 2015 USEPA Consent Decree, will consolidate and supersede all USEPA's Consent Decrees with PRASA (ie. PRASA IV: 2003 Consent Decree, 2006 Wastewater Consent Decree and 2010 USEPA STS Consent Decree). The 2015 USEPA Consent Decree final approval was granted on May 2016.

The consent decrees with USEPA and the agreement with PRDOH require PRASA to implement remedial plans, develop and implement CIP projects to bring the System into compliance with regulatory requirements, and conduct evaluation concerning specific System infrastructure and operational issues. PRASA currently estimates that the total cost (incurred and projected) of compliance with the existing consent decrees and agreements will be over $1,700M through fiscal year 2025. In the preparation of this CER, Arcadis reviewed the following reports, submitted to Regulatory Agencies in compliance with consent decree and agreement requirements:

[19] The Settlement Agreement was signed: March 15, 2007 and subsequently amended on June 16, 2008.

- PRASA IV Triannual Progress Report No. 36 and No. 37, covering the period from January 1 to April 30, 2015, and May 1 to August 31, 2015, respectively.
- 2006 USEPA Consent Decree Triannual Progress Report No. 26, No. 27, and No. 28 covering the period from October 1, 2014 to January 31, 2015; February 1 to May 31, 2015; and June 1 to September 14, 2015, respectively.
- 2006 PRDOH Agreement Quarterly Progress Reports No. 27, No. 28, No. 29 and No. 30, covering the period from October 1 to December 31, 2014; January 1 to March 31, 2015; April 1 to June 30, 2015; and July 1 to September 30, 2015, respectively.
- 2010 USEPA STS Consent Decree Triannual Progress Report No. 14, No. 15 and No. 16, covering the period from October 1 to December 31, 2014; January 1 to April 30, 2015; and May 1 to August 31, 2015, respectively.

5.4.1. PRASA IV: 2003 Consent Decree, Civil Action No. 01-1709 (JAF)

PRASA submitted to the USEPA the Triannual Progress Reports No. 36 and No.37 that cover the periods from January 1 to April 30, 2015, and May 1 to August 31, 2015, respectively. As of August 2015, all measures were implemented including the Supplemental Environmental Project (SEP), and the stipulated penalties for the bypass events associated to the WWPSs are still being assessed. A summary of the status of remedial actions is listed below.

- Remedial actions to be performed at the agreed upon pump stations – Pursuant to Section VI, paragraph 11, of the consent decree, PRASA was required to submit a detailed list of remedial actions to be performed at each agreed upon pump station and a proposed schedule for completion. As informed in the Triannual Report No. 12, all required Group A pump stations projects have been completed.
- Operation and Maintenance Plan – The agreed phased approach for integrating the wastewater pump stations to the IMP was completed. The major tasks performed during the period ending August 2015 were organizational structure and SAP PM Implementation. PRASA continues to conduct compliance inspections of all facilities to ensure on going and sustainable compliance with the basic elements of the implemented program.
- Spill Response and Cleanup Plan – Pursuant to Section VIII, paragraph 17 of the Consent Decree, PRASA was required to submit to USEPA for approval a spill response and cleanup plan that specifies actions to be taken by PRASA for unanticipated bypasses for any pump station facility. The PRASA spill response and cleanup plan is being reviewed to integrate pump stations unanticipated bypass and CSO events.

- Supplemental Environmental Project – All construction and related works were completed and the project was accepted by PRASA's Operational Area.

5.4.2. 2006 Wastewater Consent Decree, Civil Action No. 06-1624 (SEC)

PRASA submitted the Triannual Compliance Reports No. 26, No. 27, and No. 28 that cover the periods from October 1, 2014 to January 31, 2015; February 1 to May 31, 2015; and June 1 to September 14, 2015, respectively. The 2006 USEPA Consent Decree specifies that PRASA shall implement system-wide remedial measures at all WWTPs owned/operated by PRASA. These remedial actions are to be completed in three phases, consisting of short and mid-term remedial actions, and long-term CIP projects to be implemented over the course of 15 years.

- Short and mid-term measures – PRASA completed all short and mid-term remedial actions.
- Long-term measures – All long-term capital improvement projects included in the CIP Term 1 of the 2006 EPA Consent Decree were completed. All the CIP Term 2 and CIP Term 3 ending June 1, 2016 and June 1, 2021, respectively, will be in compliance with terms and conditions of the NPDES permits for each facility. The CIP Term 2 has a total of 24 projects, of which nine projects were completed within CIP Term 1 deadline and/or by the year 2014. These projects were: El Torito WWTP flow diversion, the Morovis WWTP new package plant, the Boquerón WWTP elimination, the Mayaguez WWTP seepage from the raw influent channel, the New Maunabo WWTP, the Playa Santa WWTP elimination, the Ponce WWTP ROV study of the sewer line from Mercedita PS to the Ponce WWTP, Orocovis WWTP Phosphorous removal improvements and the Alturas de Orocovis WWTP elimination (diverting flow to Orocovis WWTP). The CIP Term 3 has a total of 19 projects, of which one project was completed within CIP Term 1 deadline and/or by the year 2014 (Ciales WWTP expansion).

The following presents a status summary of the applicable standard and special conditions of probation:

- In accordance with special condition No. 3 of the consent decree, PRASA shall construct and complete capital improvements to replace, repair and upgrade the collection and wastewater treatment system in the Ponce de Leon Avenue area of San Juan of not less than $10M to remedy and prevent direct discharges to the Martin Peña Channel. The Ponce de Leon Ave. sewer separation project is a combined storm water and wastewater system that discharge combined wet weather flows into the Martin Peña Channel. The existing combined flow channel is approximately 10,700 feet, located in the center of Ponce de León Ave., which runs through a mainly business and commercial area within a heavily congested arterial. As agreed by all concerning entities, the project completion schedule will be in line with the requirements of the consent decree and this should not have a negative impact on PRASA's current compliance record.
- In accordance with special condition No. 9 of the consent decree, all PRASA plants shall have a licensed operator available at all times, 24 hours a day to ensure proper operation of the

treatment facilities. PRASA maintains USEPA informed of the agency's efforts to increase the percentage of licensed operators including in each triannual report a progress report on the status of the licensing process of the water and wastewater operators. PRASA continues the training and hiring process of water and wastewater operators. In order to increase the percentage of licensed operators, PRASA's training department has an on-going training program for the WWTPs and WTPs operators and other operational and compliance personnel.

- In accordance with special condition No. 19 of the consent decree, PRASA shall undertake all necessary measures to reduce the amount of sanitary sewage systems overflows. On May 21, 2012, PRASA submitted to USEPA a revised version of a spill response and cleanup plan, which specifies actions to be taken by PRASA for sanitary sewage systems overflows from all facilities owned and/or operated by PRASA. The response and cleanup plan has been completed for its collection systems and wastewater lift stations.
- Section IX of the consent decree specifies that PRASA shall develop and implement a Sanitary Sewer System Repair Plan (SSSRP) for five (5) of the seven (7) wastewater collection systems identified in the consent decree: the Aguadilla, Bayamón, Isabela, Juncos, La Parguera, San Sebastián New and Unibón Morovis WWTPs service areas. As required, Sanitary Sewer System Evaluation Plans ("SSSEPs") were performed for these initial seven systems, of which 5 demonstrated the need to perform system wide repairs. Furthermore, PRASA shall develop and implement a Preliminary Sanitary Sewer System Evaluation Plan (PSSSEP) for all facilities in Puerto Rico owned and/or operated by PRASA, except for the seven facilities specified above and shall perform specific SSSEPs for the facilities the PSSSEP identifies as requiring further evaluation (SSSWPs 2). Finally, as a result of those studies, PRASA may be required to implement repairs on those systems as well as needed. This process of evaluation and repairs project is a strategy focused to control the I/I issues in PRASA's wastewater collection system. PRASA completed the required evaluations and the next steps are included as part of the renegotiation of the consent decree.
- Section XXIII of the consent decree specifies that, as a SEP, PRASA shall commit at least $3M to provide sewer service (which shall include the connections to private residences in the community) to at least one community that historically has not been connected to PRASA's wastewater collection system. Essentially, the watersheds that shall be considered for this project are La Plata and Río Grande de Loíza watersheds. La Plata Community, located in Naranjito, Puerto Rico, was approved by USEPA on December 15, 2006. After the design was placed on hold in 2009 while USEPA and PRASA discussed the possibility of replacing the SEP, the project was issued for bid on November 2011 and the notice to proceed was issued in May 2012. Currently, the construction of the project is 100% completed, all punch list items were finalized by September 19, 2014 and is currently in operation.

5.4.3. 2006 PRDOH Drinking Water Settlement Agreement

PRASA submitted the Quarterly Settlement Agreement Reports No. 27, No. 28, No. 29 and No. 30 that cover the periods from October 1 to December 31, 2014; January 1 to March 31, 2015; April

1 to June 30, 2015; and July 1 to September 30, 2015, respectively. Article VII of the 2006 PRDOH Agreement states that PRASA will implement remedial actions in multiple systems or components. These remedial measures are classified as short, mid, and long term remedial measures. A summary of the status of the remedial actions as of September 2015 is described below.

- Short-term measures – A list of 540 remedial actions was identified to be completed within 12 months of PRASA and PRDOH entering into the 2006 PRDOH Agreement. All short-term measures were completed.
- Mid-term measures – A total of 115 remedial actions were identified to be completed by March 14, 2010. All mid-term remedial measures were completed.
- Long-term measures – The long-term measures are divided into three terms to be respectively completed in the scheduled time frames. Term 1 (five years or no later than December 15, 2011) includes 38 total projects which were all completed. The periods to implement the remedial measures for Term 2 and Term 3 have due dates from December 31, 2016 through December 31, 2021. The Term 2 measures have a total of 18 projects of which thirteen have already been completed. Finally, the Term 3 measures have a total of 13 projects in which three have already been completed. These three projects are Enrique Ortega WTP Phase-A improvements, the Improvements to Esperanza WTP and Improvements to Guzmán Arriba WTP. In addition, La Máquina WTP ceased operations on August 22, 2015 as part of Maginas WTP Phase II project although project is still ongoing.
- Article VII of the Settlement Agreement stated that PRASA will develop a program aimed to optimize treatment processes to be implemented in larger systems. According to PRASA, on May 24, 2013, PRASA submitted to PRDOH a report that summarizes their efforts in the optimization program and their proposed strategy to provide monitoring and continuity of the program. PRDOH submitted comments to PRASA. On June 6, 2014, a meeting was performed between PRASA and PRDOH to discuss the status of the optimization program.
- The SEP project presented to PRDOH, was divided in three projects and it impacts Non-PRASA Water Systems that due to technical, administrative or financial limitations, find it difficult to operate and maintain a public water system in compliance with state and federal laws and regulations. The project is divided as follows:

    1) Sampling and analysis of regulated chemical contaminants in potable water (was completed, but PRASA and PRDOH agreed to extend the project for an additional year). On December 23, 2014, a motion was filed proposing PRASA to perform the sample analysis of 34 Non-PRASA systems for a period of one year.
    2) Installation of disinfection equipment, which was already completed as previously reported.
    3) PRASA service connections to schools served by Non-PRASA systems. For this last project, PRASA and PRDOH filed a motion on August 29, 2014, requesting an amendment

to select the Non-PRASA system of the project. The selected Non-PRASA system is called "*Asociación Pro-Desarrollo Comunal Bo. Florida de Naguabo, Puerto Rico*" and it provides water to a community in Naguabo. The amendment was approved by court on September 3, 2014. The project was completed and a letter of completion was sent to PRDOH on September 25, 2015. The project consisted in providing the installation of meter boxes and their respective supply connection to the property limit of each structure to allow the connection to PRASA's potable water system.

5.4.4. 2010 USEPA STS Consent Decree

PRASA submitted the Triannual Progress Report No. 14, No. 15 and No. 16, covering the periods from October 1 to December 31, 2014; January 1 to April 30, 2015; and May 1 to August 31, 2015, respectively. The report summarizes all PRASA's activities, any applicable stipulated penalties, along with all pertinent deliverables required to be submitted. In general, PRASA has mostly complied with the requirements of the consent decree. PRASA reports to have made several requests for deadline extensions for certain projects. These extensions have been approved, as applicable, by USEPA and U.S. Court. PRASA reports to have assessed, in various occasions, penalties as a result of violations to interim and final effluent compliance parameters. A summary of the compliance status as of August 2015, is described below.

- The remedial measures are divided in three phases, consisting of short and mid-term remedial actions, and long-term capital improvements. PRASA agreed to undertake and substantially complete short-term remedial actions by December 31, 2010 and mid-term remedial actions by June 30, 2012. Long term CIP projects were further divided in three additional subdivisions referred as CIP-Term 1, CIP-Term 2 and CIP-Term 3, with variable termination dates ranging from June 30, 2012 up to June 30, 2024.
  - The short-term remedial actions were completed as required by the consent decree.
  - A motion was presented to and subsequently approved by the U.S. Court for the District of Puerto Rico on August 29, 2012 which modified certain requirements, including deadlines, for the 417 mid-term remedial measures included in the 2010 USEPA STS Consent Decree. The mid-terms remedial measures, which were scheduled for March 2013, were completed during the months of April 2013 to October 2013, except for Guayama WTP, for which, PRASA requested an additional time until July 2014. The remedial measures for Guayama WTP already were completed.
  - As of August 2015, all long-term CIP Term-1 remedial measures have been completed except for the new STS for San Sebastian WTP, which had its scope modified in the renegotiation and included in the prioritization list for completion on 2032. Also, four CIP Term 2 remedial measures have been completed. The other CIP-Term 2 and CIP-Term 3 remedial measures are underway.

- PRASA is complying with the interim limits set forth for each of the WTPs until the established deadlines for each one are met. Monitoring is being conducted as specified for each parameter in their respective NPDES permit, and the results are submitted in the monthly DMRs.
- PRASA operates and maintains all WTP's STSs in accordance with the USEPA-approved IMP. This program is meeting the requirements and schedules and, as previously presented, PRASA is well underway to complete the implementation no later than March 31, 2021. PRASA implemented an interim IMP in all STSs. This program includes at a minimum, regular inspections and procedures to support prompt repair of all equipment and routine preventive maintenance for all equipment. PRASA continues conducting compliance inspections of all facilities to ensure ongoing and sustainable compliance with the basic elements of the implemented program. PRASA also continues implementing a Process Control System (PCS) that includes at least the Standard Operating Procedures (SOPs) for the treatment of wash-water discharges at the STSs, accurate flow measurements, logs and records for all activities, processes and tests performed at the STSs, the troubleshooting guides for proper process control, and the organizational structure for implementation of PCS.
- PRASA completed the construction of the SEP of the Aeration of the Toa Vaca Lake. A first completion report was submitted on December 13, 2012 for USEPA's evaluation and approval. A second and final completion report that details the operation and maintenance of the project for the past five years will be submitted on December 31, 2017, for USEPA's evaluation and approval.

5.5. Consent Decree Renegotiation between PRASA and Regulatory Agencies

PRASA and the Regulatory Agencies entered in discussions to modify certain requirements of the existing consent decrees and agreements to re-align compliance priorities and, in turn, help alleviate PRASA's financial burden. In general terms, these modifications are expected to result in the postponement or advancement of the implementation of certain projects currently included in the CIP, and/or the modification of their scopes of work.

After an extensive negotiation process and under the terms agreed upon by PRASA and USEPA, on September 15, 2015 the USDOJ filed the 2015 USEPA Consent Decree executed among USEPA, PRASA and the Commonwealth of Puerto Rico in settlement of the matters addressed in a complaint brought against PRASA by USDOJ on behalf of USEPA (the Complaint) also filed on such date. The 2015 USEPA Consent Decree will be subject to the approval of the Federal District Court after a thirty-day public comment which expired on November 8, 2015. Once comments, if any, are addressed and a final approval is granted, the 2015 USEPA Consent Decree will consolidate and supersede all USEPA's Consent Decrees with PRASA (i.e. PRASA IV: 2003 Consent Decree, 2006 Wastewater Consent Decree and 2010 USEPA STS Consent Decree). Final approval was granted on May 2016.

In terms of the negotiation process of the 2006 PRDOH Drinking Water Settlement Agreement between PRASA and PRDOH, after a period of waiting for filing of the 2015 USEPA Consent Decree, discussions started to advance in December 2015. PRASA continues the Proposed Drinking Water Settlement Agreement negotiations with the PRDOH.

The 2015 USEPA Consent Decree includes, and the Proposed PRDOH Drinking Water Settlement Agreement is expected to include, the following modifications:

- The postponement or advancement in deadlines and completion dates of certain projects currently included in the CIP. Compliance deadlines were extended through approximately 2034.
- A revision to the scope of work negotiated for certain projects to better address certain facilities' current needs.
- The elimination of certain projects from the consent decrees and agreements given that the facility is in compliance and/or due to the declining population trends the project no longer needs to be performed or because the project has already been completed and certified. The 2006 Wastewater Consent Decree CIP Term 2 has four projects that were eliminated through the renegotiation. These projects are: Fajardo WWTP expansion, Lares WWTP expansion, Santa Isabel WWTP outfall improvements, and Barceloneta WWTP expansion. The CIP Term 3, on the other hand, has six projects that were eliminated through the renegotiation. These projects are: the Comerío WWTP flow diversion, the Dorado and Vega Baja WWTPs' retrofit and flow diversion, the Unibón flow diversion, and the Las Marías and Maricao WWTPs' retrofit and capacity increase. Two projects were eliminated from the 2010 USEPA STS Consent Decree CIP Term 2 and 3 remedial measures. These projects are: Perchas WTP STS construction and Quebradillas WTP STS construction.
- The addition of new compliance projects (categorized as Other Regulatory Projects and New Mandatory Projects) – Several projects that were not originally included in the consent decrees or the agreement were negotiated to be included. Additional projects proposed for the 2006 PRDOH Agreement involve compliance projects required by the Long Term 2 (LT2) Enhanced Surface Water Treatment Rule. This rule requires further treatment of cryptosporidium and other pathogenic microorganisms with the purpose of reducing the illness associated with them (detailed information on Section 5.6). Additional projects added to the USEPA Consent Decrees include: capacity evaluation projects for compliance of STSs, I/I studies, and Caño Martin Peña/ENLACE projects. These additional projects are included in the approved PRASA's CIP plan for FY2016 through FY2020 with the exception of four I/I studies for the Isabela, Bayamón, Caguas and Unibón services areas to be completed by 2034. PRASA should update its CIP plan to include these projects.
- The inclusion of the operation, maintenance and capital improvement program requirements related to the Puerto Nuevo wastewater collection system, including alleged CSOs. PRASA shall comply with all the requirements of its NPDES Permit and with the Permit concerning

CSOs. The most recent NPDES permit for the Puerto Nuevo WWTP requires that PRASA implement the Nine Minimum Control (NMC) measures and a Long-Term Control Plan (LTCP) for the Puerto Nuevo WWTP service area to address wastewater collection system and CSOs occurrences. As such, PRASA is currently undertaking the development and design of a Sewer System Operation & Maintenance Plan (SSOMP or S2OMP) for the Puerto Nuevo WWTP service area. The SSOMP will manage both the combined sewer systems and the sanitary sewer system requirements as stipulated in the NPDES permit (NMC and LTCP) in addition to a comprehensive capacity, management, operations, and maintenance program for all the Puerto Nuevo sanitary sewer system. No later than June 30, 2016, PRASA shall submit to for review and approval a SSOMP for the Puerto Nuevo WWTP service area. The following tasks, at a minimum, shall be performed by either PRASA personnel or a private contractor as part of the SSOMP: sewer system reconnaissance to enable complete inspections, observation and cleaning of the sewers; fats, oil and grease control; sewer cleaning; sanitary sewer overflows, dry-weather overflows and unauthorized release prevention and control; and mapping. PRASA shall submit an annual report on the status of the implementation of the SSOMP no later than January 30, 2017. Through these efforts, PRASA expects to identify System needs related to overflows (including CSOs) and to be able to better estimate the effort and expected costs of a future repair plan. Within 60 days of completing the sewer system reconnaissance of the Puerto Nuevo WWTP service area, PRASA shall submit to USEPA for review and approval its proposed plan to undertake the Condition Assessment of the Puerto Nuevo WWTP sewer system, which shall include a series of remedial measures.

- Amendments to the interim limits – PRASA expects to request interim limits for its water and wastewater treatment plants to comply with newly implemented regulations regarding numeric nutrient criteria for nitrogen and phosphorus. It is anticipated that in order to comply with the lower discharge limits to be imposed by USEPA for these parameters in NPDES permits, operational modifications and even additional capital improvements to the WWTPs may be required, which would be subject to the CIP Prioritization System.
- Development of a Prioritization System – The Prioritization System is a comprehensive and holistic project scheduling methodology developed to provide an objective and systematic guideline to prioritize the implementation of infrastructure projects and required regulatory projects. Specific criteria were defined for each project category (water, wastewater or STS) and a scoring methodology was developed to objectively prioritize, as much as possible, the list of projects. The criteria consider regulatory and environmental compliance, operational requirements and needs, as well as population served, among other characteristics. The prioritization system establishes the relative priority of all planned upcoming projects with the objectives of allocating PRASA's limited financial resources according to such priority. Hence, for example, any projects to address future regulations would only be funded if it was within PRASA's approved annual spending level and based on its priority score.
- Completion of scheduled mandatory projects under the Base List of projects – Includes high priority mandatory compliance projects that have already started the process of planning,

design or construction and will not be subjected to the prioritization process. Specific deadlines for these high priority projects were individually discussed and negotiated between PRASA, USEPA and PRDOH.

As of the date hereof, the 2015 EPA Consent Decree was approved in the form filed in the District Court however no assurance can be given that the Proposed PRDOH Drinking Water Settlement Agreement will be approved under terms substantially similar to those currently being negotiated with DOH.

5.6. Future Regulations and Other Regulatory Requirements

The CIP was also reviewed for adequacy to comply with future regulations and other regulatory requirements that could impact compliance limits for PRASA's water and wastewater facilities.

Regarding the wastewater system, PRASA has indicated that once it completes the sanitary sewer efforts in the Puerto Nuevo WWTP service area, it will expand the program to the rest of the Metro Region and, eventually, to the rest of the island (where applicable). At this time, PRASA does not have a specific time frame for when this will occur. However, it is likely that USEPA will include conditions and requirements such as those included in the Puerto Nuevo WWTP NPDES, in NPDES permits for other facilities.

Regarding the water system, anticipated future regulations for potable water systems (PWSs) at the time of this report writing include:

- *Unregulated Contaminant Monitoring Program* – The USEPA uses the Unregulated Contaminant Monitoring Program to collect data for contaminants suspected to be present in drinking water, but do not have health based standards set under the SDWA. Every five years, the USEPA reviews the list of contaminants, largely based on the Contaminant Candidate List (CCL). To date, two rounds of unregulated contaminant monitoring have occurred; the results will help USEPA shape the future regulatory environment.
- *Candidate Contaminant List* – Is a list of contaminants which are currently not subject to any proposed or promulgated national primary drinking water regulations, but are known or anticipated to occur in public water systems, and that may require regulation under the SDWA. The list includes, among others, pesticides, DBPs, chemicals used in commerce, waterborne pathogens, pharmaceuticals and biological toxins.

Also, as previously noted, PRASA will be likely required to implement remediation measures in well facilities that, under the GWUDI regulation, are found to be influenced by superficial water sources. Currently, the evaluation program is still underway. PRASA continues the evaluation process at these facilities to determine the improvement needs and to develop the well remediation program and action plan. Finally, PRASA may identify additional CIP needs to bring the water system into compliance with the Stage 2 D/DBPR. As noted in Section 3, since the implementation

of the Stage 2 D/DBPR, several PWSs that were previously in compliance are now exhibiting compliance problems as a result of the stricter monitoring and sampling requirements imposed by this regulation. For now, PRASA is currently implementing changes in its O&M practices to bring the PWSs into compliance. However, any additional needs identified and included in PRASA's CIP will be entered into the CIP prioritization system.

5.7. Master Plan Updating

As reported in previous CERs, in 2011 PRASA updated its water and wastewater infrastructure Master Plan (FY2011 Master Plan). However, recognizing the need to keep this document up to date, in FY2013 PRASA began revising it to reflect infrastructure needs based on the analysis of the most recent population projections using the data provided in the U.S. Census 2010, the PRPB 2013 population projections, and PRASA's updated compliance and capacity data. The updated Master Plan provides PRASA with a revised roadmap for the implementation of its future investments in water and wastewater infrastructure through the year 2030. In addition, the updated Master Plan also takes into consideration recent renegotiation agreements with Regulatory Agencies and the projects' prioritization system.

In FY2014, PRASA completed the first two tasks of the Master Plan Update; Task 1: Water and Wastewater Service Area Re-Assessment Evaluation and Demands Update, and Task 2: Water and Wastewater Infrastructure Needs and Project Scopes Update. As presented in the 2013 PRPB population projections and the 2010 US Census, and in line with recent trends, the population of Puerto Rico is projected to decline by 2030, resulting in a decrease in the island's overall water demand. The Master Plan Update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030. In contrast, the water demand trend estimated in the FY2011 Master Plan, presented an increase in water demand from 650 MGD in 2010 to 667 MGD by 2030.

Consequently, results presented in the Master Plan Update show that fewer projects than those recommended in the FY2011 Master Plan will be required over the planning period. Instead of moving towards the construction of more WTPs, intakes and reservoirs; more transfers, WTPs elimination and wells inactivation are recommended. As such, the Master Plan Update focuses more in the maintenance and optimization of the System. In terms of compliance, although a different approach was used – FY2011 Master Plan evaluated the facilities individually, whereas the Master Plan Update evaluated PRASA's water distribution systems or PWSs (eg. subsurface and surface systems) – improvements in both compliance with water quality parameters and discharge requirements were observed.

In FY2015 the last two tasks of the Master Plan Update were completed; Task 3: CIP Reconciliation, and Task 4: Prioritization and Scheduling. However, the implementation and consolidation of the resulting projects with the CIP has yet to be performed. The plan is to continuously revise PRASA's Master Plan 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 and needs arise.

5.8. Climate Change Vulnerability Study and Adaptation Plan

On February 2013, the Governor of the Commonwealth of Puerto Rico signed an Executive Order requiring all public infrastructure agencies in Puerto Rico to, among other tasks, develop and publish a Vulnerability Study on the impacts of climate change in their infrastructure and to present an Adaptation Plan to be, in turn, integrated to the agencies' CIP or Master Plan.

Complying with the Governor's Executive Order, during FY2015 PRASA completed a Vulnerability Study and Adaptation Plan for its entire infrastructure. The Vulnerability Study assessed PRASA's infrastructure to identify potential climate change risks and impacts caused by five indicators or stressors: temperature, precipitation, sea level rise, hurricanes and tropical storms, and ocean acidification. These stressors were defined by DNER. Each stressor was evaluated for two scenarios: for the year 2050 and 2100, based on the climate change expected influences published by the DNER (which also incorporates the Intergovernmental Panel on Climate Change, projections and studies). The overall infrastructure of PRASA was evaluated and individual risks were identified for each given stressor. In turn, each identified risk was qualitatively and quantitatively evaluated based on the scale of the impact, probability of occurrence, special scale and time lapse expected for occurrence.

The vulnerability analysis showed that many of PRASA's infrastructure will in fact be potentially impacted by the effects of climate change. The stressors that present the most impacts to the water and wastewater infrastructure are: sea level rise, precipitation, and hurricanes and tropical storms. Sea level rise threatens flooding coastal infrastructure and forcing to have to discontinue the use of it. Precipitation, on either side of the spectrum has the ability to impact the infrastructure. On the one hand, more precipitation at a short term causes more turbidity affecting the water quality of the system, and on the other hand, less precipitation at a long term causes droughts and threatens the reliability of the system by causing interruptions. Also, a higher intensity expected for hurricane and storm events will generate significant and costly expenses to the agency.

The Adaptation Plan analyzed all the climate change impacts identified in the Vulnerability Study and developed a set of actions and strategies to be performed in order to minimize its effects on facilities and operations. Four different actions were identified: accept the impact and consequences, or abandon, adapt (mitigate) or protect the infrastructure. These actions were also evaluated and prioritized based on the following parameters: urgency for implementation, secondary benefit provided by the action, action necessary to prevent compromising basic needs, feasibility of the action, regulatory compliance affected by the impact, quality of service and reliability, operational efficiency or maintenance required by the action, and impacted population. Most of the actions were driven to either adapt (mitigate) or abandon the infrastructure (due mostly to sea level rise inundation).

The Climate Change Vulnerability Study findings and the strategies selected in the Adaptation Plan will be further assessed and CIP projects shall then be developed. These projects will follow the same guidelines set in the prioritization system. These climate change based projects will serve as a roadmap for PRASA in the planning process and in its preparation towards the expected impacts of climate change in the near and not so distant future. Currently, PRASA's CIP does not include projects or studies for addressing identified climate change vulnerabilities or adaptation actions.

5.9. Material Updates after September 30, 2015

5.9.1. Renegotiation Process

In May 2016, the 2015 Consent Decree between USEPA and PRASA was officially logged and accepted by the Court, placing an end to the extensive renegotiation process that started in 2013. PRASA's settlement agreement with the PRDOH is still under renegotiation.

5.9.2. CIP Suspension

Considering the Commonwealth's fiscal situation, which consequently has had a major impact to PRASA's own fiscal situation and the lack of external financing to cover immediate CIP related expenses, PRASA used operating funds to cover its CIP projects, which historically, have been funded with external financing and federal assistance. In FY2016, after expending all its surplus operating income and reserves to cover a portion of its unfunded CIP, PRASA was forced to postpone or terminate all its active construction projects. PRASA suspended the execution of $352M in 55 projects that were under construction, in addition to stopping its CIP development, which was expected to start 86 projects with an investment of an additional $247M. Out of the 55 projects, 37 were completed or forced to terminate and 18 were put on hold. Because of the delays in the issuance of new revenue bonds and the consequent suspension of the CIP, PRASA accumulated an outstanding debt in excess of $150M owed to its CIP contractors.

5.9.3. Forbearance Agreements

As another consequence to PRASA's financial situation and the delays in the issuance of revenue bonds, payment of debt service that was due to the USDA and to USEPA was not able to be transferred and forbearance agreements were signed. On July 1, 2016, PRASA entered into Forbearance Agreements related to payments due on such date for (i) certain of its loans granted under the Clean Water State Revolving Fund Program and the Drinking Water State Revolving Fund Program created under the federal CWA of 1972 and SDWA of 1974, as amended, and (ii) bonds issued by PRASA as part of the USDA's Rural Development Program. These Forbearance Agreements expire on March 30, 2017 and June 30, 2017, respectively, unless further extensions to such forbearance periods are granted.

5.9.4. PRASA's Revitalization

PRASA's management and Governing Board set out to identify financing alternatives that would allow it to fulfill its obligations with its CIP contractors, as well as continue its CIP. In March 2016,

the House of Representatives introduced a new legislative for the creation of a new corporation that would allow PRASA to obtain the necessary financing to restart its CIP and cover outstanding debt with vendors through a securitization bond transaction. On July 12, 2016, after several revisions and cycles of amendments within the two legislative branches, PRASA's Revitalization Act (Act 68-2016), was signed into law by the Governor. Act 68-2016 encourages the restructuring of a portion of PRASA's existing Senior Lien debt and provides for the issuance of up to $900M in new bonds to be issued by an independent securitization vehicle the law creates known as the PRASA Revitalization Corporation (the Corporation). The Corporation is a new bankruptcy remote, special purpose entity and governmental instrumentality that would be authorized to issue bonds.

On July 27, 2016, the first Board of Director's meeting of the Corporation was held during which the preliminary Financing Resolution and the explanatory report prepared by the Corporation, in support of the same, was approved. Considering such approval, both the proposed Financing Resolution and the report, along with all the appendices thereto, were published (on the same date), as required by Act 68-2016, on PRASA's website and on the Corporation's website.

As stated in the preliminary Financial Resolution, a monthly Revitalization Charge would be billed to PRASA's customers by the Corporation. However, this charge would be "credited" out in customer bills thereby not causing an increase in water and sewer costs. The expected reduction in PRASA's Service Revenues would be balanced with the expected savings to be achieved from the tender/exchange of current Senior Bonds, as bond rates and terms would be more favorable for PRASA. Additionally, the preliminary Financial Resolution included a draft Adjustment Mechanism that would allow the Corporation to increase or decrease the Revitalization Charge as necessary to generate sufficient revenues to meet debt service obligations on the bonds issued or tendered/exchanged through the securitization.

Based on the preliminary schedule established in the approved Proposed Financing Resolution and as required by Act 68-2016, the completion of the securitization bond transaction was projected to be completed by late FY2017, assuming there is adequate access to, and interest from capital markets.

As a result of Act 68-2016, PRASA updated its CIP to cover a period of 10 years (FY2017-FY2026). This version of the CIP has not yet been approved by PRASA's Governing Board because its implementation depends upon the guarantee of its financing. The FY2017-FY2026 CIP, includes a total of 923 project (including the 18 projects that had to be delayed and placed on hold) and amounts to approximately $3B. This CIP also considers recommendations made by Raftelis Financial Consulting, Inc. (RFC) in their *Professional Opinion Report*.

5.10. Conclusions

PRASA's CIP generally addresses the needs of the System and complies with PRASA's existing commitments with Regulatory Agencies (as proposed to be amended). 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 minor repair projects and PRASA's R&R program. As noted in previous reports, given PRASA's high rate of leaks and overflows and continuing aging infrastructure, additional funds and an acceleration of the R&R program are required to reduce/minimize these incidences. Hence, PRASA may need to realign and re-prioritize its projected CIP breakdown of funding sources. Finally, PRASA's CIP includes funding for 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 will need to perform additional assessments and implement operational changes or additional capital improvements to bring non-compliant facilities into compliance. However, PRASA's most recent facility compliance results, and record of compliance with the milestones of the consent decrees with USEPA and the agreement with PRDOH supports PRASA's ongoing commitment to continue to maintain its System in compliance with applicable regulations and environmental matters.

While PRASA has begun to identify the potential impact of new regulations, 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, although the CIP includes some contingencies to address future regulatory needs, 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. These CIP needs, as negotiated with Regulatory Agencies, will be prioritized and implementation schedules will depend on PRASA's financial capacity.

As a result of the CIP suspension and the delays in the issuance of bonds, PRASA has accumulated an outstanding debt in excess of $150M owed to its contractors and suppliers. Furthermore, in July 1, 2016 PRASA entered into Forbearance Agreements related to payments for certain loans granted under the Clean Water and Drinking Water State Revolving Funds and USDA's Rural Development bonds. Payments on these obligations are subordinate to the payment of PRASA's operating expenses. Finally, as stated above, PRASA's Revitalization Act (Act 68-2016) was enacted on July 12, 2016, which encourages the restructuring of a portion of PRASA's existing Senior Lien Debt and provides for the issuance of up to $900M in new bonds to be issued by an independent securitization vehicle. As part of this revitalization PRASA has updated its CIP to cover a 10-year period (FY2017-FY2026). However, as of the date of this report, this proposed CIP continues to be revised by PRASA as part of its 10-year Fiscal Planning efforts.

To the extent that PRASA's fiscal situation does not improve and that identification of CIP financing continues unresolved, PRASA's CIP implementation will continue on hold. The delay in CIP development and implementation could negatively affect the System's renewal, replacement, and overall up-keeping. It will also affect PRASA's ability to meet regulatory obligations. Finally, should PRASA not be able to extend the Forbearance Agreements with USDA and USEPA, access to federal grants and loans could be limited in the future.

6. Insurance Program

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."

On November 25, 2014 Arcadis contracted MARSH Saldaña, Inc. (MARSH) to review PRASA's current insurance coverage and determine its adequacy considering the type and value of PRASA's fixed assets. MARSH 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. Arcadis met with PRASA's Insurance Department and reviewed material changes made to its insurance program. The data, opinions, and comments included in this section have been based on PRASA's copies of policies and other documents provided by PRASA for this purpose. Furthermore, also included are the responses to most of the recommendation by AON, PRASA's insurance Broker of Record (BOR).

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 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's Federal Emergency Management Agency (FEMA) and state (Commonwealth of Puerto Rico) including workers' compensation, and health/medical, among others.

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 the Occupational Safety and Health Administration (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.

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. Financial risks resulting in management liability related to economic downturns.
4. Regulatory issues that might result in liability or service interruption.
5. Theft of owned and non-owned property.
6. Theft of water production.
7. Liability risks, including suits from third parties for injury or loss of property, fines/penalties, injuries caused by vehicles or properties, advertising injury, products, libel, slander, false arrest/detainment and injuries occurring on or off premises.
8. Pollution liability claims and fines.
9. 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.
10. Reputation risk which includes incidents, events or human actions which seriously damage the image and reputation of the organization.
11. Epidemic or pandemic that causes wide-spread injury or sickness to PRASA employees.
12. Kidnap, ransom, extortion risks.
13. Privacy & Cyber Liability arising from alleged failure to adequately secure customer data.
14. Acts of Terrorism affecting PRASA's facilities or customers.

15. Strikes and Labor unrest causing loss of income, interruption of operations and an increase in operating expenses to continue operations.

6.3. Assessment of Insurance Program

This section of the report provides MARSH's summary, recommendations and AON's responses with respect to PRASA's insurance policies currently in force.

6.3.1. Property Insurance

The following were the findings and recommendations under the Commercial Property Program currently placed through AIG Insurance Company and London Markets.

PRASA's property is insured by a policy issued by AIG Insurance Company – Puerto Rico (AIG-PR). Four other insurance companies and the "London Market" are shown on the AIG-PR policy as "subscribers." This means they have each 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, underground piping and covers business interruption resulting from covered physical damage/loss to property for up to 18 months.

Major policy limits and deductibles are shown in Table 6-1.

Table 6-1:
2015-2016 Property Coverage, Limits and Deductibles

Coverage	Limit	Deductible
Total Insurable Value (TIV's)	**Unknown** (Should be stated in Policy Contract)	As stated below
Property – All Other Perils (AOP) (including Data Processing, In Transit and equipment breakdown)	$150 million per occurrence, Combined Single Limit for Property Damage and Business Interruption, excess of applicable deductibles.	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Windstorm	Included in $150 million limit	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Earthquake	$300 million Combined Single Limit for Property Damage and Business Interruption, excess of applicable deductibles.	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Flood	$300 million Combined Single Limit for Property Damage and Business Interruption, excess of applicable deductibles.	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.

Coverage	Limit	Deductible
Business Interruption	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Extra Expense	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Contingent Business Interruption	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages, subject to a $35 million Sublimit	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Newly Acquired Locations	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Boiler and Machinery	Included in $150 million property coverage	$25,000 each and every accident

6.3.1.1. Recommendations & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's property insurance policy. Also, included are the responses by AON to said recommendations:

1. As required by the Bureau of Public Insurance, entity in charge of administering the Insurance Programs for the State Government Instrumentalities, the Named Insured under the program should read **Puerto Rico Aqueduct and Sewer Authority &/or Commonwealth of Puerto Rico &/or Treasury Department c/o Bureau of Public Insurance**.

   AON is in agreement with this recommendation and will submit to the insurer (AIG-PR) for its approval to endorse the named insured in the policy accordingly to read as recommended.

2. MARSH recommends the Business Description on the Policy Contract to read **Water Manufacturing, Treatment, Filtering, and Distribution.**

   AON agrees and will endorse the business description in the policy accordingly to read as recommended.

3. Policy Contract should state the TIV's Limit, especially since the applicability of several Coverages and Conditions specified in the Policy Contract are subjected to this amount.

   AON indicates that the TIV's limit will be included in the next renewal.

4. Section 3, Notification of Loss, omits the Condition previously contained under the Policy Contract of Partial Payment of Loss, which stated that "in the event of loss covered by this Policy, it is understood and agreed that the Underwriters will issue partial payment(s) of claim

subject to the Policy Provisions, and shall not be less than the undisputed estimate of loss or damage between the Insured and the Underwriters." This Condition provided PRASA with the opportunity of being partially indemnified for losses over the established deductible, in order to expedite the repair and/or reconstruction process.

AON, as PRASA's BOR, states that a partial payment of loss clause is not necessary for the type of indemnification in this kind of policy.

5. On Page 4, Section 4. Waiver of Subrogation, it states that "the Insurers agree to hold harmless and waive any rights and remedies or relief to which they may become entitled by subrogation against: C. the Commonwealth of Puerto Rico, its instrumentalities, public corporations or any political sub-division". Given the magnitude of the deductible on this program, and the fact that PRASA would be reimbursed said deductible, partially or totally, from FEMA only in the event of a catastrophe if certified by the President of the US, MARSH believes the waiver of subrogation should not be automatic, since it deprives PRASA the opportunity of collecting from damages negligently caused by any other Governmental Instrumentality.

   AON, as PRASA's BOR, does not agree with this recommendation.

6. On Page 6, Item 9 Cancellation, the time frame being provided does not match the requirements presented by the Bureau of Public Insurance of the Department of Treasury. As per said Government Requirements, written cancellation notice should be given with, at least, 90 days prior notice, instead of the 45 days stated. For non-payment of premium, a 45-day prior written notice is required in order to cancel. Currently, under contract, a 10-day grace period is provided.

   With respect to any "unearned premium", the computation should always be on a "pro-rata basis", irrespective of whom elects to cancel the insurance program.

   On the sixth paragraph, which relates to the period of limitation for cancellation notices being void by "any law controlling the construction thereof", MARSH recommends to include after "law", "or any requisite of the Bureau of Public Insurance of the Treasury Department."

   AON is in agreement with this recommendation and will submit to the insurer (AIG-PR) for its approval to endorse the cancellation clause accordingly.

7. On Page 7, Item 14. Audit, it is stated that the Insurers "may examine and audit the Assured's books and records at any time during the Policy Period and extensions", up to three (3) years after the termination of the Policy. Government Entities and Public Corporations, as PRASA, work on Fiscal Year Budgets. An audit might affect said budgets, especially if conducted years after the termination of the Policy Contract.

   AON, as PRASA's BOR, states that Government Entities and Public Corporation, as PRASA, are used to this type of policy requirement.

8. Also on Page 7, Item 15. Misrepresentation and Fraud, the word "Assured" is too broad and should be limited to Executive Officers and Directors.

   AON, as PRASA's BOR, states that this recommendation will be a limitation to the coverage.

9. On Page 8, Section 17. Dispute Provisions, Item A. and B., limits the ability of PRASA to present a suit in the event of a dispute against the Carrier, and it further states that "in the event of the failure of the Insurers hereon to pay any amount claimed to be due hereunder, the Insurers hereon, at the request of the Assured, will submit to the jurisdiction of a Court of competent jurisdiction within the United States." Should clearly state that Puerto Rico is considered as a competent jurisdiction within the United States.

   AON, as PRASA's BOR, states that jurisdiction clause is correctly constructed in the 2015-2016 policy.

10. On Page 10, Section 24, Off Premises Services Clause, includes an exclusion for Overhead Transmission Lines. MARSH recommends this exclusion to be deleted.

    AON indicates that said exclusion was requested to insurer but deletion was not approved.

11. Page 11, Section 26, Joint Loss Clause, it is stated that this condition applies if "in the event of loss of or damage to property and a disagreement between the Insurers of this Policy and the Insurers of the Boiler and Machinery Policy ….". There is only one Policy issued covering both risks; therefore, this Condition should be eliminated.

    AON, as PRASA's BOR, does not agree with this recommendation.

12. On Page 12, Section 1, Insuring Agreement, it states that "the Policy insures against All Risk of direct physical loss or damage occurring during the Policy period to Property Insured from any external cause except as hereafter excluded ….". MARSH recommends the term "external cause" to be defined.

    AON, as PRASA's BOR, states that this recommendation will be a limitation to the coverage.

13. On Page 14, Section 4. Property Excluded, Item C. states that the Policy does not cover loss or damage to Excavations, Grading, and Filling". In the 2006 valorization made by Malcolm Pirnie of PRASA's Property Assets, this item was included in determining the replacement cost values for all buried infrastructure; therefore, this exclusion should be deleted from the Policy Contract.

    AON indicates that said exclusion was requested to insurer but deletion was not approved.

14. The deductible for Data Processing Equipment, which previously stood at $25,000, appears to now stand at the full $25 million deductible. MARSH recommends that a $25,000 deductible be negotiated.

AON will verify with the carrier.

6.3.1.2. Recommendations & Responses Unrelated to Policy Contract

1. The $25 million deductible applies whether the loss sustained by PRASA is due to a catastrophic peril as well as by any other insurable peril. FEMA would only reimburse PRASA if:

    a. The direct damage has been caused by a Catastrophic Peril (Windstorm, Flood or Earthquake)

    b. The affected area has been declared a Disaster Zone by the President of the United States.

    c. Subject to Availability of Funds.

    PRASA should be considering establishing a FUND to cover possible financial losses from any future catastrophic, but especially, from any non-catastrophic, peril that might affect infrastructure and operations and, therefore, impose an unexpected financial burden.

    AON is in agreement with this recommendation and will discuss with PRASA.

2. The current Probable Maximum Loss (PML) Estimates for PRASA for quantifying Catastrophic Risk Exposures were performed in 2010 by MARSH Risk Consulting, through AIR Worldwide Corporation, based on a valorization study from 2006. Since then, modules, maps and projections have changed, and new modules might prove economically beneficial to PRASA; therefore, MARSH strongly recommended that PRASA undertake a new PML Study.

    AON is in agreement with this recommendation and is currently in the data gathering stage for a PML Analysis.

6.3.2. Crime

PRASA maintains a crime policy issued by AIG Insurance Co. providing the coverage and limits shown in Table 6-2 for loss discovered during the policy period.

Table 6-2:
2015-2016 Crime Coverage, Limits and Deductibles

Coverage	Limit	Deductible
Employee Dishonesty	$1 million	$10,000
Claim Preparation Expense (employee dishonesty)	$100,000	$0
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

Coverage	Limit	Deductible
Computer Fraud and Funds Transfer Fraud	$500,000	$10,000
Incoming Check Forgery	$500,000	$10,000
ERISA Extension	$500,000	$0
Extortion Threats to Persons	$100,000	$10,000
Extortion Threats to Property	$100,000	$10,000
Audit Expense – For Audit required by State of Federal bodies as result of employee dishonesty	$100,000	$0
Policy Aggregate	$1 million	Not Applicable

6.3.2.1. Recommendations & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's Crime Policy. Also, included are the responses by AON to said recommendations:

1. There is an opportunity to negotiate policy enhancements to broaden some of the aforementioned coverages.

2. The Crime Policy includes a $500,000 ERISA Extension. ERISA Act requires that the fidelity bond should be placed with sureties that are Treasury listed. MARSH recommended that an ERISA bond be purchased.

   AON disagrees with this recommendation indicating that the ERISA Act states that it should have to be placed with a Treasury listed carrier. Moreover, local carriers have recently decided not to place stand-alone ERISA bond coverages.

3. The Crime policy is written to cover losses that are sustained during the policy period and discovered either during such policy period or up to one year after the policy expires. The Negotiated Discovery Period endorsement that forms part of the PRASA policy has a detrimental effect of reducing the Discovery Period to 90 days. Moreover, in a policy cancellation or non-renewal scenario, the endorsement requires PRASA to pay 75% annual premium for an Optional Extended Reporting Period of a year that would be provided in the policy contract with no additional cost.

   AON is in agreement with this recommendation and will request insurer for amendments to endorsement.

4. A 45-day notice to the Insured is required by the Public Insurance Department for cancellation due to non-payment and 90 days for cancellation or non-renewal. The current policy says that it will be immediately terminated in its entity upon the receipt by PRASA of a written notice from the Underwriter of its desire to cancel the policy; therefore, an amendment is necessary.

   AON states that a 90-day cancellation endorsement is included in the renewed policy.

5. Knowledge or Discovery of Loss clauses should be re-negotiated to specifically identify positions triggering knowledge of incidents in order to minimize the risk of carrier declines for late reporting.

   AON is in agreement with this recommendation and will request insurer for an endorsement.

6.3.3. General Liability

PRASA's current commercial general liability program is issued by MAPFRE PRAICO Insurance Company (MAPFRE) with the limits detailed in Table 6-3, below. Aggregate limits apply per location and per project as per ISO forms CG-2504 (03-97) and CG-2503 (03-97), attached to the MAPFRE policy. A $100,000 Self Insured Retention, which contemplates both Indemnity and claims adjustment expenses, applies to each occurrence. This Self-Insured Retention has a $750,000 Aggregate or Cap as respects claims adjustment expenses, so once this amount is paid by PRASA, the Insurance Company will pay these amounts from the first dollar and the Self Insured Retention would apply to Indemnity payments only.

Table 6-3:
General Liability Coverage and Limits

Coverage	Limit
General Liability – Each Occurrence	$1,000,000
General Liability – General Aggregate	$2,000,000
Personal and Advertising Injury	$1,000,000
Products - Completed Operations Aggregate	$2,000,000
Employer's Liability Stop-Gap	$1,000,000
Employee Benefits Liability	$1,000,000
Fire Damage	$1,000,000
Medical Expense	$10,000

6.3.3.1. Recommendations & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's general liability program. Also, included are the responses by AON to said recommendations:

1. Under the "Special Conditions" endorsement attached to the MAPFRE policy, MARSH recommends the following amendments be performed.

   a. Severity of Interest (item 8) should be revised to read Severability of Interest.

      AON is in agreement with this recommendation and will request insurer for correction.

   b. The language utilized under Item 12, Erroneous Notice of Occurrence, is quite confusing and MARSH recommends it be substituted by the following:

It is agreed that only an executive officer, risk manager or person designated by the insured, shall be responsible to give notice to the insurer after having knowledge of an accident, occurrence, claim or suit. Failure to give an immediate notice of any loss or damage, or of any suit, or to forward to the insurer any demand, notice, summons or other process received, shall not invalidate any claims made by the insured or free the company form any responsibility under this policy.

AON is in agreement that the language used might be confusing and has requested clarification to the insurer (MAPFRE). Thus, does not see the need for the proposed clause.

2. ISO Form CG 0300 (01-96) "Deductible Liability Insurance" should specify that the Deductible included in MAPFRE's policy applies for Bodily Injury and/or Property Damage Liability Combined, since the Declarations Page is not clear as to the applicability of said deductible.

   AON is in agreement with this recommendation and has requested clarification to the insurer.

3. ISO Form CG-2230 (07-98) "Corporal Punishment Exclusion" should be eliminated since it is not applicable to any of PRASA's operations, unless PRASA owns or operates any educational facility or day care operations.

   AON indicates that said exclusion was eliminated from the policies on the policy renewal.

4. Although Item 14 of the Special Conditions deletes any "Explosion, Collapse or Underground Property Damage Hazard" (XCU) exclusion. ISO Form CG-2142 (01-96) which excludes XCU hazards should be eliminated from the Forms and Endorsements scheduled under the policy.

   AON is in agreement with this recommendation and has requested clarification to the insurer.

5. Commercial General Liability program excludes coverage for any Terrorism event. Considering the Insured operations and act of Terrorism is an important and potentially severe exposure with considerable implications. MARSH recommended that Terrorism coverage should be considered under PRASA's Commercial General Liability program.

   AON is in agreement with this recommendation and has urge PRASA to include such coverage on renewals but PRASA has declined the recommendation.

6. The applicability of the Medical Expenses coverage should be addressed within the policy. PRASA's commercial general liability program provides a $10,000 per person limit for Medical Expenses, but the policy has a $100,000 self-insured retention. MARSH recommended that an endorsement in the policy be included that states that the Self Insured Retention will not apply to Medical Expenses hence coverage would be first dollar.

AON is in agreement with this recommendation and has requested its inclusion to the insurer.

6.3.4. Automobile Liability

PRASA maintains automobile liability coverage through MAPFRE for:

- Bodily Injury and /or Property Damage caused by **Any** automobile, including Hired and Non-Owned, with a $1,000,000 Combined Single Limit per accident and includes a $5,000 per person Medical Expense limit for owned autos only.
- Physical Damage to owned autos of the Insured is not included in the policy except for Specific Catastrophic events which includes Lightning, Fire, Explosion, Windstorm, Hail, Flood and Earthquake, with a limit of $2,000,000 per event and subject to a $50,000 per event deductible.
- Drive other car Coverage is included for Liability coverage on a blanket basis for up to 50 individuals.
- Policy provides automatic Physical damage coverage for Hired autos with a value up to $40,000 with a $100 Deductible. Any vehicle with a value greater than $40,000 must be submitted to the company. This coverage is subject to a deposit premium and an annual revision at a rate of 7.5%.
- Garage liability coverage is for any automobile with a $1,000,000 per accident limit and a $3,000,000 aggregate limit for garage operations and is written on a Direct Primary basis.
- Garage Keeper coverage is included on a Direct Primary basis for Comprehensive and Collision with a limit of $1,000,000 per event for each covered location for "Autos left with you for service, repair, storage or safekeeping". Comprehensive coverage is subject to a $250 per event deductible subject to a maximum of $1,000 per event and collision coverage is subject to a $500 deductible.
- Comprehensive and collision Trailer interchange coverage is provided for non-owned trailers, with a physical damage limit of $35,000 each trailer and subject to a $100 deductible.

6.3.4.1. Recommendations & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's Commercial Auto, Garage Liability and Garage Keeper's programs. Also, included are the responses by AON to said recommendations:

1. Coverage such as Rental Reimbursement, Damage to Temporary or Substitute vehicles, Auto Loan/Lease Gap and Confiscation typically compliment Physical Damage coverage. Since PRASA's Commercial Auto policy does not contemplate Physical Damage coverage except for specified catastrophic events, MARSH recommended that Physical Damage coverage be included in order to ensure the most comprehensive coverage.

AON, as PRASA's BOR, disagrees with this recommendation stating that changing the allocation coverage will cause a substantial increase in premium that will not suffice PRASA's needs in the same manner.

2. As respects to the $50,000 per event deductible included for Physical Damage for specified Catastrophic events, MARSH recommended that it be revised to a per vehicle amount with a maximum of $50,000 per event.

   AON, as PRASA's BOR, disagrees with this recommendation stating that it would require a limit increase and conversely a substantial premium increase which PRASA's does not want to incur at the moment.

3. Hired and non – owned Physical Damage coverage for vehicles less than $40,000 should be included within the premium being charged and not subject to an annual adjustment of 7.5%. In fact, this amount should be increased to at least $60,000. Vehicles that exceed this amount should be included for a flat charge and not subject to an annual adjustment of 7.5%.

   AON is in agreement with this recommendation and will submit it to the insurer (MAPFRE) for review and quoting. It is the BOR's opinion that it might result in a premium increase.

4. MARSH recommended that form U-6 (11-93) "Liability Coverage Exclusion Endorsement" be eliminated since the language utilized is too broad and may present coverage interpretations unfavorable to PRASA.

   AON is in agreement with this recommendation and will submit it to the insurer for review and approval.

5. For Trailer Interchange coverage, valuation should be revised to a Replacement Cost basis in lieu of "Actual Cash Value".

   AON, as PRASA's BOR, disagrees with this recommendation stating that Trailers are subject to Actual Cash Value as other units in the commercial auto policy. The approved forms that apply in Puerto Rico (1984) are on an "Actual Cash Value" basis.

6. Limits for Garage Liability and Garage Keeper apply per covered location and the only location scheduled in the policy is "Anywhere in the Commonwealth of Puerto Rico". This needs to be clarified in order to have coverage on a per location basis.

   AON, as PRASA's BOR, disagrees with this recommendation stating that limiting the coverage to specific locations is not in the best interest of the client. This broad coverage was obtained after thorough negotiation.

7. Drive other Car coverage is included only for Liability. MARSH recommends that it be broadened to include both Physical Damage and Medical Payments coverage.

AON is in agreement with this recommendation and will submit it to the insurer for review and approval.

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 & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's Excess Liability program. Also, included are the responses by AON to said recommendations:

1. Include the Garage Liability policy issued by MAPFRE under the Commercial Umbrella's "Schedule of Underlying Insurance", in order to achieve the higher limits provided by the Excess Liability program for any Garage Liability claim that could exceed policy limits or could be excluded from coverage under said program.

   AON is in agreement with this recommendation and will submit it to the insurer (MAPFRE) for review and approval.

2. Commercial Umbrella program does not include an Insuring Agreement which would state what terms and conditions apply to the Commercial Umbrella and whether the Excess Liability programs is following form or not. This needs to be included in order to avoid any misinterpretations at the time of a large loss which could trigger coverage under the Excess Liability program. The latter should be fully follow form.

   AON, as PRASA's BOR, disagrees with this recommendation stating that the underlying policy in the excess is clearly stated.

3. MARSH completed a benchmarking analysis, shown in Figure 6-1 using proprietary information to determine in absolute terms if the limit purchased by PRASA is aligned with limits carried by 49 industry peers. The report showed that on average, limits of $53MM were carried.

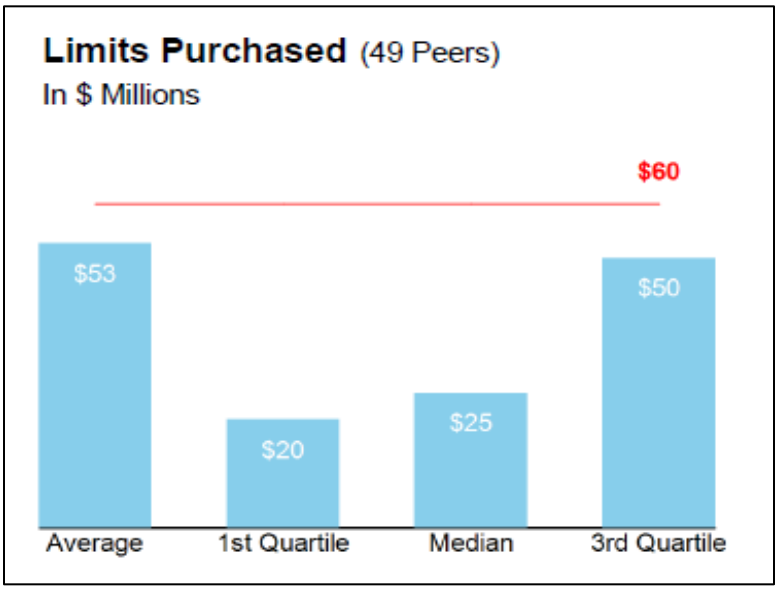

Figure 6-1: Umbrella and Excess Liability Benchmarking Analysis

AON is in agreement with this recommendation and has offered PRASA an additional amount of $40MM in excess of $60MM but PRASA declined.

4. Notwithstanding the above, a risk exists for a catastrophic failure of a PRASA dam that 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 previously and MARSH understands that there is a potential for a substantial loss of life were a PRASA dam to collapse. In such an event, according to MARSH, $60M total liability limit may not be enough to settle claims if PRASA was found to be negligent.

   As stated above, AON has offered PRASA an additional amount of $40MM in excess of $60MM but PRASA declined.

6.3.6. Directors and Officers Liability

PRASA maintains one primary and two excess layers of directors & officers (D&O) liability insurance. Coverage is written on a claims-made basis and is subject to a prior litigation date of July 1, 2007 on the primary policy, July 1, 2010 on the first excess issued by Liberty and July 1, 2014 for the second and last excess issued by Berkley Insurance Co. The D&O carriers and limits are shown in Table 6-4.

Table 6-4:
Directors and Officers Liability

Insurer	Limit
ACE Insurance Company (Primary)	$20 million
Liberty International Underwriters (First Excess Layer)	$10 million excess of $20 million
Berkley Insurance Company (Second Excess Layer)	$5 million excess of $30 million
Total D&O Limit	$35 million

The primary layer of D&O insurance is subject to a $200,000 SIR for claims against indemnified persons or a claim against PRASA alleging a breach of duties.

MARSH completed a benchmarking analysis, shown in Figure 6-2 using proprietary information to determine in absolute terms if the limit purchased by PRASA is aligned with limits carried by peers.

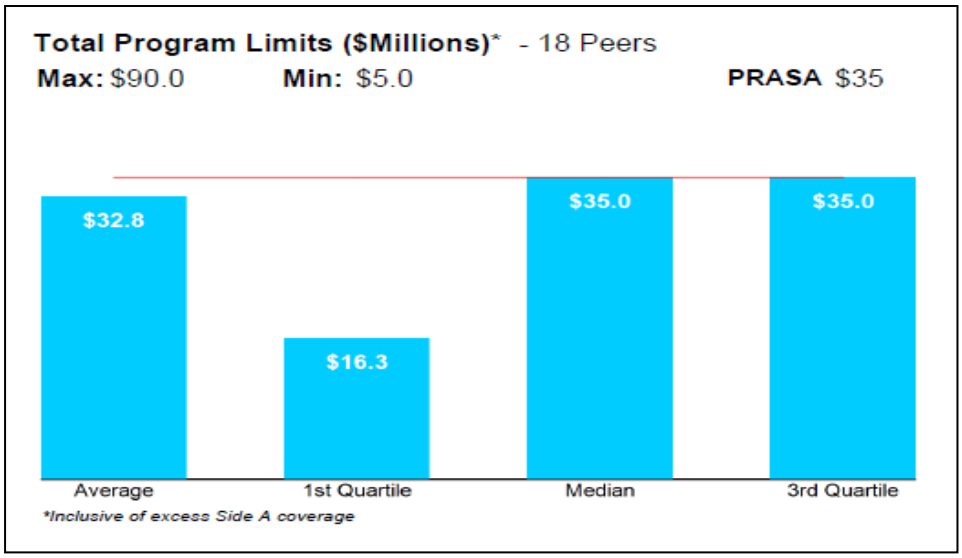

Figure 6-2: Directors and Officers Liability Benchmarking Analysis

With regard to the terms and conditions of the policy, the policy form is a fairly basic Directors & Officers Liability coverage that provides coverage for allegations of wrongful acts made against an Insured. The definition of Insured includes the corporate entity, PRASA, and its employees.

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's Directors and Officers insurance. Also, included are the responses by AON to said recommendations:

1. **Consider Re-negotiating Definition of Application Endorsement so that it is pertinent**. The Amend Definition of Application Endorsement makes reference to documents filed with the Securities & Exchange Commission. The intent of this endorsement should be to limit

information used in underwriting to information received within the last year. This clarification is important because when faced with large claims insurance carriers frequently evaluate the opportunity to rescind the policy. When documentation is limited to that submitted within the past year, it is more difficult for them to rescind the policy.

AON is in agreement with this recommendation and will request insurer for the correct endorsement.

2. **Consider Eliminating the Private Company Endorsement**. There appears to be a conflict in wording regarding the Securities Coverage. The policy has a Private Company Endorsement that adds coverage for the corporate entity by changing Insuring Clause C. from Company Securities Liability to Company Liability eliminating the securities coverage. The Private Company endorsement has a specific Public Offering of Securities exclusion. MARSH recommends eliminating the Private Company endorsement. ACE can include the employees as Insured's by an additional endorsement.

   AON, as PRASA's BOR, won't recommend eliminating the Private Company endorsement but will instead revise its wording to harmonize the securities coverage.

3. **Consider Amending Securities Claim Definition** to include administrative or regulatory proceeding against PRASA when such proceeding is also commenced and continuously maintained against an Insured Person. Currently, such proceedings are specifically excluded.

   AON is in agreement with this recommendation and will request insurer for the amendment.

4. **Consider Including a Priority of Payments clause** be added to the policy specifying that the Insurer is first liable to pay on behalf of the Insured Persons under Insuring Agreement A (Non – indemnifiable D&O claims); second, the Insurer should pay that Loss for which they may be liable to pay on behalf of the Company under Insuring Agreement B (Corporate Reimbursement); lastly, any payments under Insuring Agreement C (Company Securities Liability) would be made.

   AON indicates that the Priority of Payments clause was included on the policy renewal.

5. **Consider Increasing Coverage Threshold for Securities Claims**. The policy has a Securities Exclusion with a carve – out for Claims arising from the offering, sale or purchase of securities, whether debt or equity in a transaction exempt from registration with the SEC in which the total consideration for the offering does not exceed $50M. Given that the majority of the offerings exceed this amount MARSH recommended establishing a strategy to progressively increase this threshold.

   AON, as PRASA's BOR, disagrees with this recommendation stating that it will be included on a need basis.

6. **Consider Incorporating Amendments to Claim Reporting Threshold Endorsement**. The policy has a Claims Reporting Threshold that allows for periodic bordereaux. Instead of amending Section IV Defense, Settlement and Allocation, the endorsement should amend Section 6 Notice. MARSH recommended that a 45-day grace period be granted after the quarter end for the reports to be submitted. The endorsement should also include a ninety-day window after policy expiration for reporting claims.

   AON, as PRASA's BOR, disagrees with this recommendation stating that a 90-day window is included in the policy. AON will revise the wording to clarify the intent.

7. **Consider Eliminating the Specific Matter Exclusion – Regulatory & Water Price**. It is understood that the D&O policy does not respond to disgorgement remedies; however, this endorsement goes far beyond excluding all claims brought by clients, customers or any entity on behalf of such clients or customers as it related to the Insured's regulator capacity in establishing tariffs for water consumption to clients, customers and cogeneration companies. (This last reference is also unclear).

   AON indicates that said exclusion elimination was requested to insurer but deletion was not approved.

8. **Consider Requesting Clarification to Discovery Period endorsement**. Lastly, it appears that the intent of the Discovery Period (90 Days) endorsement is to allow 90 days for PRASA to pay the premium for the extended reporting period. To achieve this, the only amendment necessary is to change the thirty day term to 90 days in Section 4. Paragraph one. The current wording references a bond policy, which is not the case and creates the impression that the premium for a 90 day extension is 75% of the annual premium when generally ACE charges 75% for a one year extension term.

   AON is in agreement with this recommendation and will request a revision of the wording to the carrier in order to clarify the intention of the endorsement.

9. **Consider Requesting Amendments so that the Second layer is follow form and "drops down".** The second excess layer issued by Berkley should be follow form and as such should be amended to eliminate the Bankruptcy exclusion and a drop down exclusion allowing the underlying limit to be eroded by either payment under the policy or payment of the underlying limit by another source should be added.

   AON, as PRASA's BOR, disagrees with this recommendation stating that a Drop-Down Endorsement has already been requested to the insurer.

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,

employment related misrepresentation, sexual harassment, retaliation or other violation of an employee's civil rights. A $100,000 SIR applies to each claim. Primary coverage is provided through ACE Insurance Company (ACE). Excess EPL coverage is through Berkley Insurance Company.

6.3.7.1. Recommendations & Responses

A benchmarking study, shown in Figure 6-3 based on limits carried by other public corporations in the industry class with similar level of corporate and economical characteristics showed that on average, limits of $6.8MM were carried.

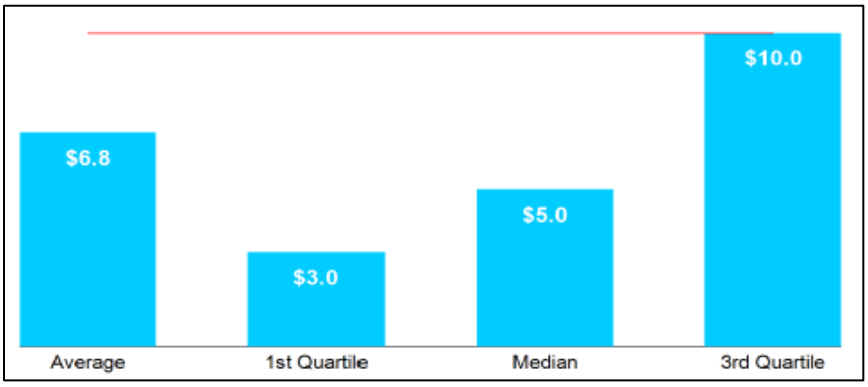

Figure 6-3: Employment Practices Liability Benchmarking Analysis

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's Employment Practices policies. Also, included are the responses by AON to said recommendations:

1. At a minimum, coverage for defense costs for "Mesada" Claims should be included. Options Law 80 Statutory Severance remedy should also be explored.

   AON, as PRASA's BOR, disagrees with this recommendation stating that the only market that currently provides "Mesada" coverage is AIG. The market was approach with insurer and declined.

2. The EPL Excess does not include a Drop Down Endorsement to govern when and how such excess policy will respond on behalf of the Insured in the event of the primary policy's exhaustion.

   AON states that a Drop-Down Endorsement has already been requested to the insurer.

6.3.8. Premises Pollution Liability

ACE Insurance Company provides pollution liability coverage on a claims-made basis at $5M per pollution condition, $10M annual aggregate limits. Coverage is subject to a $250,000 per accident SIR. A retroactive date of July 1, 2002 applies.

6.3.8.1. Recommendations & Responses

The following recommendation was made by MARSH regarding the 2013-2014 policy and the 2014-2015 renewal binder for the pollution liability. Also, included is the response by AON:

1. **Consider increasing limits.** The limit of "per pollution condition" may be increased to $10M due to all the exposure PRASA has on the covered locations mentioned on the policy, "All those locations which PRASA operates, maintains, and manages throughout Puerto Rico, Vieques and Culebra". The aggregate limit may be increased to $20M as well.

   AON states that the limits were increased in the 2015-2016 renewal to $10M per pollution condition and $10M annual aggregate limits.

6.3.9. Professional Liability

PRASA maintains a miscellaneous errors & omissions liability policy through ACE Insurance, providing a $25M per claim limit and a $50M annual aggregate limit, subject to a $250,000 per claim deductible. The policy is written on a claims-made basis and claims and defense costs are included within the limit. The policy has a September 21, 2004 retroactive date. Coverage applies to contract administration, design, engineering, consulting, inspection, and construction management, including planning, permitting, regulatory compliance services, land acquisition, assisting in construction, procurement assistance, start-up services, testing and extended commissioning under the PRASA multi-year CIP as modified by the PRASA Board of Directors from time to time.

6.3.9.1. Recommendations & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's Errors & Omissions policy. Also, included are the responses by AON to said recommendations:

1. **Consider amending the Defense and Claims Expenses (Section I, B).** The second paragraph of the Defense and Claims Expenses agreement says the insurer is not obligated to investigate or defend a claim after the limit of liability has been exhausted, "*or after the Company (the insurer) has deposited the remaining available limit of liability into a court of competent jurisdiction.*" Defense costs can be high and can surpass the cost of damage or injury in the event of serious loss. A provision which allows the insurer to walk away from defending the insured by depositing the balance of the liability limit with a court means the insured can be left with the cost of defending itself from that point forward, and forced to finance defense costs it had expected the insurer to pay. MARSH recommends that the broker attempt to delete the phrase shown in italics above which allows the insurer to deposit the remaining liability limit with the court and avoid defense costs.

   AON states that action to delete was requested but denied.

2. **Consider amending the Section IV. Conditions, Item G. Settlement.** Item G says the insurer cannot settle any claim without the insured's permission. However, in the event the insurer recommends settlement and the insured is unwilling to settle, the insurer then has the right to cease its defense efforts. In that event the limit of liability is then limited to the amount the claim could have been settled for at the time the insurer recommended settlement. This "hammer clause" is harsh compared to similar clauses in many policy settlement provisions.

   Most errors & omissions policy settlement provisions allow the insured to not settle upon the insurer's recommendation, and the insurer is then obligated to provide a defense and ultimately pay damages and defense costs. Some policies have a "soft hammer" clause where the Insured assumes part of the damages and defense costs in excess of the floor established when the carrier recommended the settlement recommendation. The percentage of damages and defense costs assumed by the Insured might vary from 50% to 25% of the damages and defense costs incurred above the settlement amount for which the claim could have been settled. MARSH recommends that an attempt be made to renegotiate this clause at the June 2015 renewal.

   AON states that this action was requested in the 2015-2016 renewal.

3. **Consider amending Section III. Definition, Item G. Client**, to mean any Third Party with whom the Insured has a formal written contract in place eliminating "for the supply of the Insured's Professional Services in return for a fee". Most claims under this policy are centered around contract disputes with contractors. The current policy definition does not accurately reflect the intent of an Owner Controlled Insurance Program of this type.

   AON is in agreement with this recommendation and will request an amendment.

4. **Consider amending the Section III. Definition, Item CC. Professional Services** to mean only those services specified in Item 5. Of the Declaration and performed by an Insured or by any person or entity for whom the Insured is liable. The current definition requires that the services be performed for others for a fee. The services provided by the contractors & sub – contractors are for another Insured, PRASA.

   AON states that this amendment was performed in the renewal, when named BOR.

5. **Consider amending Section IV. Conditions, Item J. Other Insurance Clause and Endorsement 15,** to allow contractors and sub – contractors to use their E&O policies as a primary policy to meet the $250K deductible requirement. Currently, Endorsement 15 stipulates that PRASA's policy shall be primary to any other policy.

   AON, as PRASA's BOR, disagrees with this recommendation stating that issues with claims on this matter have arisen. The insurer (ACE) will no longer be including a carve back in deductible for E&O policies.

6. **Consider amending Section IV. Condition, Item L. Territory** to eliminate the requirement that all Claims be brought in the Commonwealth of Puerto Rico, thus covering claims filed against PRASA worldwide.

   AON states that this action was requested in the 2015-2016 renewal.

7. **Consider amending Section V., Item M.,** Contractual Liability exclusion to add a clarification at the end of the exclusion as follows: "however, this exclusion will not apply to Professional Services as defined in Item 5." Many of the claims filed under the policy have to do with contract administration. This exclusion might preclude coverage for these claims.

   AON is in agreement with this recommendation and will request an amendment.

8. **Consider amending Endorsement #2 to change the reference to the description of professional services from Endorsement #5 to Item 5. of the Declarations Page.** This appears to be an oversight in the policy revision process.

   AON states that this amendment was performed in the renewal, when named BOR.

9. **Consider amending Endorsement #3** to include the schedule of projects referenced in the endorsement for clarity purposes.

   AON, as PRASA's BOR, disagrees with this recommendation stating that it will limit coverage.

10. **Consider eliminating Endorsement #12, Bankruptcy Exclusion** that excludes coverage under the policy for any claim arising out of or resulting from the alleged bankruptcy of the Insured; except when arising from a Wrongful Act in the rendering of Professional Services by the Insured.

    AON states that action to delete was requested but denied.

11. **Consider eliminating the Libel and Slander exclusion from Endorsement #13.** For most construction managers, engineers and architects, their professional liability policy is the only source of coverage for this risk as the General Liability policy will most likely have an exclusion.

    AON, as PRASA's BOR, disagrees with this recommendation stating that coverage should be included in the General Liability policy.

12. **Clarify in Extended Reporting Period Amendment Endorsement (Endorsement 1) the intent to provide an Extended Reporting Period for all projects.** Endorsement 1 includes an extended reporting period for all projects initiated or declared as commencing during the "Policy Period". However, as worded, it appears to restrict coverage for projects begun prior to the policy inception date. MARSH recommends that the endorsement language be amended to clarify that all projects commenced prior to the policy inception date as part of the Capital Improvement Plan are covered or a schedule of projects specifically to be covered be

included. MARSH recommends, that the policy's September 21, 2004 retroactive date be used as a starting point for any ongoing projects, that the endorsement be amended to apply to all projects initiated during the "Policy Period" or subsequent to any applicable retroactive date. A specific list of projects would eliminate potential future controversies.

MARSH recommended, to take advantage of the policy's September 21, 2004 retroactive date for any ongoing projects, amend the Extended Reporting Period Amendment Endorsement to apply to all projects initiated during the "Policy Period" or subsequent to any applicable retroactive date.

AON, as PRASA's BOR, disagrees with this recommendation stating that broadening the scheduled projects endorsement would result in an increase in premium. Premium is determined by the amount of projects scheduled for the policy period term. If any further projects are proposed during the year they are qualified by the insurer and included with an additional premium.

6.3.10. Cyber Liability

PRASA does not currently purchase cyber liability insurance. PRASA retains client information as part of the operations that might include data that is considered Personal Identification Information (PII) in Puerto Rico. This information includes social security numbers, driver's license numbers, bank account numbers (with or without access codes), among other things. There have been many well publicized breaches and cybersecurity awareness continues to grow. This new cyber consciousness has had an impact on litigation, cyber claims, and how companies respond to data breach attacks. A privacy breach or cyber-attack can affect any company.

6.3.10.1. Recommendations & Responses

The following recommendation was made by MARSH in its 2015 review, regarding PRASA's cyber liability policy. Also, included are the responses by AON to said recommendations:

1. **Consider cyber liability coverage.** MARSH recommended that PRASA complete a self-assessment to determine potential areas of weakness as compared to international standards and also to determine the potential frequency & severity of a breach. These two studies will help to gauge limits. With this information in hand, MARSH recommended that PRASA purchase a Privacy & Cyber Liability policy to insure against 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.

   AON is in agreement with this recommendation to purchase a Privacy & Cyber Liability Policy and has advocated so the last two renewals. Has not been approved by PRASA.

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, MARSH recommended that PRASA obtain liability coverage for this exposure. Coverage is now excluded from other liability policies.

AON, as PRASA's BOR, states that heliport is not operational and no future uses as a heliport or helipad is expected.

6.4. Owner Controlled Insurance Program

PRASA maintains an OCIP for its multi-year CIP. In addition to covering PRASA, the OCIP is designed to insure enrolled contractors, subcontractors (and design professionals for General Liability only) of all tiers working on the CIP. The OCIP does not cover vendors, installers, truckers, delivery persons, concrete/asphalt haulers, and/or contractors who do not have on-site dedicated payroll, except as otherwise endorsed into the policy. The OCIP program provides builder's risk, general liability, umbrella, pollution liability insurance and miscellaneous errors & omissions professional liability insurance. Each of these coverages is discussed below.

6.4.1. Contractors All Risk –Completed Value Builder's Risk

PRASA maintains a builder's risk policy as part of its OCIP program. AIG - PR and ACE Insurance Company (50% - 50% each) are the insurers. Coverage applies to all risks of direct physical loss, except as excluded by the policy. The maximum contract value per contract is US$50,000,000.00. The Limit of Liability in any one occurrence and in the annual aggregate for the policy term is US$100,000,000.00. Certain sub limits apply to additional exposures, such as off-site storage, inland transit and debris removal, but these sub limits are part of and not in addition to the Limit of Liability and are subject to the per project reported value as maximum limit of liability.

The AOP deductible is US$20,000.00 any one occurrence. Other deductibles are 2% for flood and 2% named windstorm, and 5% for earthquake of the total insured values at risk at the time and place of loss any one occurrence, with a minimum of US$100,000.00 any one occurrence for projects with a contract value of more than US$10,000,000.00. In addition, a US$100,000.00 deductible in any one occurrence applies for damage to Principal's existing property, property insured while undergoing testing and commissioning; and in respect to damage to existing property.

6.4.1.1. Recommendations & Responses

The following recommendations were made by MARSH in its 2015 review, regarding PRASA's OCIP builder's risk policy. Also, included are the responses by AON to said recommendations:

1. Request an endorsement to include a "Partial Occupancy Provision" to grant permission for partial occupancy of project areas. Therefore, coverage will not cease or expire due to the partial occupation of any project area or due to the project's substantial completion.

AON is in agreement with this recommendation and will submit it to the insurer for review and approval.

2. Request an endorsement to delete Exclusion I. Underground works other than laying pipelines and construction of underground sewer collectors systems.

   AON, as PRASA's BOR, disagrees with this recommendation stating that due to the nature of PRASA's projects, they believe it is not relevant. Even if excluded, underground works would be performed, and additional coverage must be provided subject to its premium.

3. Request an endorsement to delete Exclusion J. Horizontal directional drilling, pipe jacking, and micro tunneling.

   AON, as PRASA's BOR, disagrees with this recommendation stating that due to the nature of PRASA's projects, they believe it is not relevant. Even if excluded, underground works would be performed, and additional coverage must be provided subject to its premium.

4. MARSH recommended negotiating coverage for: Wet Works and any type of roads, ways, expressway works, overpasses and bridges, viaducts and tunneling works. These, are usually impacted during water mains and sewer pipes construction and should be covered with at least a reasonable sub limit.

   AON states that this kind of sublimit will require additional premium. Will discuss with PRASA for the next renewal presentation.

5. **Consider amending General Condition 3 – Misrepresentation & Fraud.** Section C-General Conditions, General Condition 3 voids the policy if the Named Insured has concealed or misrepresented any material fact or circumstance concerning this insurance. The definition of Named Insured in the second paragraph of Section A – Declarations, Item 1, A, includes joint venture companies and/or all contractors and/or subcontractors of any tier. Thus, if a sub-subcontractor failed to disclose their involvement in a loss, the policy would technically be void. MARSH recommends to amend the General Condition 3 to void the policy only with respect to the Named Insured which concealed or misrepresented any material fact or circumstance concerning this insurance.

   AON, as PRASA's BOR, disagrees with this recommendation stating that due to the nature of PRASA's projects, they believe it is not relevant.

6. Request deleting endorsement MR106- Warranty concerning sections limiting the length of certain ground works, to a maximum length of section of 1,000 feet.

   AON is in agreement with this recommendation and will submit it to the insurer for review and approval.

7. Consider including a "Claims Preparation Expense" additional coverage sublimit to provide for the necessary and reasonable fees or expenses incurred by the insured's customary auditors, accountants, architects or engineers that may assist the insured proving a claim.

   AON states that this kind of sublimit will require additional premium. Will discuss with PRASA for the next renewal presentation.

6.4.2. Commercial General Liability

The OCIP general liability policy is as "per occurrence" policy provided by ACE and includes the limits shown in Table 6-5.

Table 6-5:
2015-2016 OCIP General Liability Coverages and Limits

Coverage	Limit
Each Occurrence	$2 million
General liability – General Aggregate	$4 million
Personal and Advertising Injury	$2 million
Products/ Completed Operations - Aggregate	$4 million
Employer's Liability Stop Gap	$2 million
Fire Damage (Any One Fire)	$250,000
Medical Expense (Any One Person)	$5,000

A US$5,000 per claim deductible applies for bodily injury and a US$5,000 per claim deductible applies to property damage for each and every loss. Policy is silent as to who is responsible for deductibles. The OCIP Manual states the Contractor should assume this deductible.

This policy covers PRASA/AAA and contractors and all tiers of subcontractors and consultants performing operations at or from the project site in connection with the work for PRASA under the contract documents.

The Completed Operations coverage extension is for five (5) years from the termination date of the policy or its renewal(s). MARSH recommended changing it to ten (10) years to cover the full statutory limit (Statute of Limitations Law).

AON states that this kind of amendment will require additional premium. AON will submit this recommendation to the carrier to discuss it with PRASA for the next renewal presentation.

6.4.3. Commercial Umbrella Liability

The OCIP commercial umbrella liability policy is provided by ACE Insurance Company. The limits of insurance are US$ 50,000,000.00 Each Incident and US$100,000,000.00 Policy aggregate, in excess of the primary OCIP commercial general liability limits of insurance. Each incident retained limit is the underlying insurance or US$10,000.00 SIR.

The Completed Operations coverage extension is for five (5) years from the termination date of the policy or its renewal(s). MARSH recommended changing it to ten (10) years to cover the full statutory limit (Statute of Limitations Law).

MARSH recommended negotiating a limit for Care, Custody and Control exposures.

AON as PRASA's BOR, disagrees with this recommendation stating that the law stipulates 2 years for Completed operations coverage, thus policy is already providing coverage in excess of the law requirements.

6.4.4. Contractor's Pollution Liability

The OCIP contractor's pollution liability insurance is provided by ACE Insurance Company. Coverage applies on an occurrence basis and covers pollution arising from construction activities involving PRASA's wrap-up program. The policy provides a $25M limit each loss and annual aggregate subject to a $25,000 SIR, and covers PRASA and OCIP contractor participants. Defense costs and other claim expense erode the aggregate limit.

AON, as PRASA's BOR, disagrees with this recommendation stating that the limits and SIR are adequate due to its exposure, including the mentioned costs.

6.4.5. Conclusions

In the 2015 opinion of MARSH, the insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. MARSH provided several recommendations to PRASA's insurance program.

Particularly, PRASA should address the following key recommendations:

1. Re-Conduct a PML Study considering new CAT Modellings and parameters.

   As aforementioned, AON is in the process of data gathering for the PML Analysis.

2. Consider creating a Fund or Reserve in order to manage the considerable deductibles, in terms of severity and frequency, current and future, contained in Insurance Programs (Property, General Liability, Directors & Officers, EPL, OCIP).

   AON states the PRASA already has a reserve.

3. Thorough evaluation of PRASA's current Financial Lines (D&O, EPL) and Professional Liability Programs as per recommendations included in Section **6.3.6** and **6.6.9** of this Report.

4. Consider adding underground storage tank coverage to the pollution liability policy.

5. Consideration to Terrorism Coverage, which is excluded under all current PRASA's Insurance Programs.

7. System Assets and Financial Analysis

7.1. Introduction

Due to PRASA's continuing efforts to identify CIP financing, the delays in PRASA's intended bond issuance, and the uncertainty regarding future additional sources of funds reflected in PRASA's financial plan, Arcadis's financial analysis for this 2015 CER is limited to presenting the financial results prepared and provided by PRASA for FY2015, the preliminary results for FY2016, and the Board-approved Annual Budget for FY2017, as amended. Compliant with the MAT (as amended) and the 2012 FOA, Arcadis has reviewed and assessed the appropriateness of rates and charges for FY2017. An updated financial forecast will be provided by PRASA to be evaluated by Arcadis, as Consulting Engineer, and to be included in the 2016 CER along with year-to-date results for FY2017.

7.2. System Assets

7.2.1. Fixed Assets Changes

Table 7-1 shows that, as of June 30, 2015, PRASA had an estimated total book value of fixed (capital) assets of approximately $6,633M. Additionally, PRASA has approximately $795M of assets that are currently under construction or as "Work in Progress". Including land and other non-depreciable assets, as of June 30, 2015, the book value of PRASA's total fixed assets amounts to $7,502M (net of accumulated depreciation).

Table 7-2 provides a summary of the fixed assets changes from FY2013 to FY2014 and from FY2014 to FY2015. Please note that FY2013 values have been revised, as per PRASA's Restated Audited Financial Statements for years ended June 30, 2013 and 2012.

Table 7-1:
Estimated Fixed Assets Summary through June 30, 2015 ($, Millions)

	Original Cost	Accumulated Depreciation	Book Value
Fixed Assets	$10,433	($3,799)	$6,633
Work in Process	795	-	795
Land and other Non-Depreciable Assets	74	-	74
Total Fixed (Capital) Assets	$11,304	($3,799)	$7,502

Table 7-2:
Fixed Assets Changes ($, Thousands)

	FY2013[1]-FY2014	FY2014-FY2015
Fixed Assets (Net of Accumulated Depreciation)	$276,757	($111,698)
Work in Process	(173,160)	145,863

	FY2013[1]-FY2014	FY2014-FY2015
Land and other Non-Depreciable Assets	1,808	1,104
Total Fixed Asset Changes	$105,405	$35,269

[1]As restated.

PRASA's Total Assets were estimated at $8,210M as of September 30, 2015. Total Assets include: current assets (approximately $298M), restricted assets (approximately $378M in restricted cash and cash equivalents), total capital assets ($7,502M as previously mentioned), and other assets ($32M in deferred loss resulting from debt refunding). For additional discussion regarding PRASA's assets, please refer to PRASA's Audited Financial Statements available on PRASA's website, under Investor Relations section.

7.3. PRASA's Rate Structure

Tables 7-3 through 7-5 summarize the existing rates for residential customers as implemented on July 15, 2013.

Table 7-3:
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"	18.40	15.86	34.26
1"	30.23	20.36	50.59
1-1/2"	57.12	31.32	88.44
2"	97.24	53.56	150.80
3"	149.15	89.23	238.38
4"	335.50	156.69	492.19
6"	894.72	731.19	1,625.91
8"	1,431.55	835.64	2,267.19
10"	2,290.50	1,337.02	3,627.52
12"	3,664.80	2,139.25	5,804.05

Table 7-4:
Residential Volumetric Rate per Cubic Meter[1]

Use Block (m^3)	Water	Wastewater	Water & Wastewater
>10 – 15	$1.25	$1.02	$2.27
>15 – 25	1.99	1.59	3.58
> 25-35	2.69	2.14	4.83
>35	2.84	2.27	5.11

[1]Under the Board-approved rate structure implemented on July 15, 2013, the number of residential volumetric blocks was increased from three to four and the use block thresholds were modified.

Table 7-5:
Residential Environmental Compliance and Regulatory Charge (ECRC)

Use Block (m3)	Water	Wastewater	Water & Wastewater
Base Charge (0 – 10)	$1.00	$1.00	$2.00
>10 - 15	6.50	6.50	13.00
>15 - 25	10.50	10.50	21.00
>25 - 35	17.50	17.50	35.00
> 35	31.50	31.50	63.00

Tables 7-6 through 7-9 summarize the existing rates for non-residential customers (includes commercial, industrial and certain government customer classes) as implemented on July 15, 2013, and amended on December 18, 2013. However, certain government customers continue to be billed using PRASA's previous non-residential rate structure as a result of the enactment of Act 66 of June 17, 2014 – Fiscal and Operational Sustainability Act for the Commonwealth of Puerto Rico (Act 66-2014), further discussed in Section 7.4.1.

Table 7-6:
Non-Residential Monthly Base Charge per Account[1]

Water Service Line	Water	Wastewater	Water & Wastewater
1/2" & 5/8"	$24.37	$20.10	$44.47
3/4"	36.09	31.85	67.94
1"	61.10	44.85	105.95
1-1/2"	122.43	75.23	197.66
2"	194.62	117.32	311.94
3"	436.87	243.86	680.73
4"	725.75	459.81	1,185.56
6"	1,858.58	1,474.93	3,303.51
8"	2,939.80	2,288.04	5,227.84
10"	4,703.70	3,660.87	8,364.57

Water Service Line	Water	Wastewater	Water & Wastewater
12"	7,525.91	5,857.39	13,383.30

[1]Under the Board-approved rate structure implemented on July 15, 2013, the allotment of the first 10 cubic meters of consumption previously included in the base charge was eliminated.

Table 7-7:
Commercial and Government Volumetric Rate per Cubic Meter

Use Block (m^3)	Water	Wastewater	Water & Wastewater
>0 – 100	$1.74	$1.44	$3.18
>100 – 200	2.16	1.73	3.89
> 200	2.84	2.27	5.11

Table 7-8:
Industrial Volumetric Rate per Cubic Meter

Use Block (m^3)	Water	Wastewater	Water & Wastewater
>0	$2.27	$1.82	$4.09

Table 7-9:
ECRC for Non-Residential Customers

Commercial and Government ECRC Meter Size Equal to or Less than 2-inches[1]			
Use Block (m^3)	**Water**	**Wastewater**	**Water & Wastewater**
>0-100	$1.18	$0.98	$2.16
>100-200	1.22	1.01	2.23
>200	1.26	1.04	2.30
Industrial ECRC Meter Size Equal to or Less than 2-inches			
>0	$1.54	$1.22	$2.76
Non-Residential ECRC Meter Size Greater than 2-inches			
Meter Size	**Water**	**Wastewater**	**Water & Wastewater**
3"	$482.00	$482.00	$964.00
4"	839.50	839.50	1,679.00
6"	2,340.00	2,340.00	4,680.00
8"	3,703.00	3,703.00	7,406.00
10"	5,924.50	5,924.50	11,849.00
12"	9,479.50	9,479.50	18,959.00

Additionally, in 2013 PRASA's Governing Board also included rate revisions to other services provided by PRASA including, but not limited to: new service connections, service re-connections, and sprinkler systems service. The revised rates for these services were designed to cover PRASA's cost of services. The new rates for these services were implemented on a phased approach over three fiscal years (FY2014 through FY2016).

7.3.1. Future Rate Increases

As approved by PRASA's Governing Board, future rate increases, which shall not be implemented before FY2018, shall follow the provisions, as amended, that had been previously approved under Resolution No. 2167 (dated October 6, 2005) as follows:

a) Adjustments and increases after July 1, 2017 will be calculated according to a specified formula (Coefficient of Annual Adjustment [CAA] described below);

b) Beginning July 1, 2017, there is a cap or limit on future annual increases of 4.5% and a limit on the cumulative increases of 25% (as approved by PRASA's Governing Board);

c) 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 required under Act 21 of 1985 (Act 21) requesting a rate increase.

Adjustments and increases implemented after July 1, 2017 are limited by the calculation of the CAA described in the Resolution and as presented herein. There are three steps to determining the CAA as follows:

- STEP 1 – Calculate the Coefficient of Deficiency (CD) for the applicable year:

  CD = Operating Expenses and Debt Service / Operating Revenues

- STEP 2 – Calculate the Coefficient of Annual Base (CAB) for the Base Year:

  CAB = Operating Expenses and Debt Service (FY2007) / 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 FY2017 greater than CAB, then the rates can be increased by the lesser of the CAA minus one (CAA-1) or 4.5% until the 25% cumulative maximum is reached. If the cumulative maximum is reached, or should PRASA in any given year require a higher rate increase than maximum annual adjustment amount of 4.5%, PRASA shall then follow the rate increase process required by Act 21, as amended, of the Commonwealth of Puerto Rico. The first step under Act 21 requires review and ratification by PRASA's Governing Board of the proposed rate structure and approval to initiate the rate

modification/increase process. The second step is the appointment of an independent Official Examiner that will conduct an independent review of the proposed changes and increases, and will lead public hearings. The third step is the development of a report by the Official Examiner that includes his findings and recommendations, to be considered by PRASA's management and Governing Board prior to final approval of the rate structure modifications and increases to be implemented. This report is published for public commentary. The fourth step and final step is the review and final approval by PRASA's Governing Board, considering the Official Examiner's recommendations.

7.4. Financial Results and Annual Budget

Arcadis reviewed the financial information provided by PRASA, which is summarized in Exhibit 1 and provided at the end of this Section. This section summarizes Arcadis's review and provides an assessment of PRASA's financial condition, particularly as it relates to assessing PRASA's financial results for FY2015 and FY2016, the sufficiency of the revenues necessary to support operations and capital costs in FY2017 as shown in Exhibit 1; PRASA's DSC results, and its ability to make required deposits and payments in compliance with the MAT (as amended) during FY2017.

The following information, provided by PRASA, was reviewed:

- MAT and FOA, as amended and restated
- Sixth Supplemental Agreement of Trust
- Audited financial statements for FY2015
- PRASA's FY2016 preliminary results
- PRASA's FY2017 Annual Budget
- Resolution Number 3005, amending the approved FY2017 Annual Budget.
- Debt service schedules for all currently outstanding debt service and preliminary projected debt obligations, and DSCs.

7.4.1. Operating Revenues

As defined in the MAT, **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 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)."

PRASA's actual operating revenues for FY2015, preliminary results for FY2016, and projections for FY2017, on a cash basis, are presented in Table 7-10.

Table 7-10:
PRASA Operating Revenues ($, Thousands)

FY2015 Actual	FY2016 Preliminary[1]	FY2017 Annual Budget[2]
$1,080,327	**$1,107,883**	**$1,023,035**

[1] Based on Operating Revenues collected through June 30, 2016.
[2] As approved by PRASA's Governing Board through Resolution No. 3005.

A discussion on PRASA's Operating Revenue assumptions is presented below.

1. Base Fee and Service Charges, Net of Subsidies (Exhibit 1, line 1) – PRASA's single largest source of revenue is from the monthly base charge and volume rate for services, the ECRC, and the Special Charge of $2.00. PRASA's actual FY2015 revenues from Service Revenues net of subsidies, amounted to $1,006M. PRASA's preliminary Base Fee and Service Charges for FY2016, net of subsidies (Service Revenues) through June 30, 2016 amounted to $898M, which is approximately $59.5M less than what was budgeted for FY2016. This reduction is

mostly due to a decrease in consumption mainly because of the water rationing program implemented during the drought period experienced during the first two quarters of FY2016. PRASA's FY2016 preliminary results also consider reduced government charges because of Act 66-2014 (estimated at approximately $37M). PRASA's approved Annual Budget for FY2017 includes Service Revenues, also net of subsidies, in the amount of $977.1M, which partially excludes the reduction experience in FY2016 due to the drought and represents a net increase of $74.5M over FY2016 preliminary results. Table 7-11 provides a breakdown of PRASA's Service Revenues for FY2015 through FY2017.

Table 7-11:
PRASA Service Revenues – Excluding Operational Initiatives ($, Thousands)

Service Revenue Category	FY2015 Actual	FY2016 Preliminary[3]	FY2017 Annual Budget
Base Fee, Volume Charges, and ECRC[1]	$977,388	$869,226	$948,632
Special Charges ($2.00)	29,079	28,999	28,500
Rate Adjustments[2]	-	-	-
Total (Net of Subsidies)	**$1,006,467**	**$898,225**	**$977,132**

[1] Based on existing rates, includes rate adjustments, and projected reductions due to consumption reduction.
[2] Revenues generated from rate adjustments implemented in each year.
[3] Based on Operating Revenues collected through June 30, 2016.

PRASA's Service Revenues are presented net of subsidies. While all customers pay for service, PRASA provides a 35% subsidy to the base charge for residents over the age of 65 who are eligible under the PAN (*Programa de Asistencia Nutricional* by its Spanish acronym) Program or residents under the TANF (*Programa de Asistencia Temporal para Familias Necesitadas* by its Spanish acronym) Program; both government assistance programs. Also, since FY2010, and in compliance with Act 69 of August 2009, now Law 22-2016, PRASA provides a subsidy to all public housing residential customers limiting the monthly payments of these customers to only the water and wastewater base fee charge. Tables 7-12 and 7-13 summarize the number of residential customers that are provided a subsidy for water and wastewater bills as of June 30, 2015 and 2016, respectively. The number of customers benefiting from the PAN subsidy increased from 48,873 reported by PRASA for FY2015 to 56,229 in FY2016; also, the number of customers benefiting from the TANF subsidy increased from 11,676 in FY2015 to 15,912 in FY2016. The number of public housing customers under a fixed tariff increased from 51,919 in FY2015 to 56,535 in FY2016.

Table 7-12:
Water and Wastewater Subsidized Customer Accounts

Subsidy	Number of Customers	Percent of Total Residential Customers[1]
PAN Subsidy	56,229	4.8%
TANF Subsidy	15,912	1.4%
Fixed Tariff (Public Housing)	56,535	4.8%
Total	**135,145**	**11.5%**

[1]Based on a total number of residential customers of 1,175,072 as of June 30, 2015

Table 7-13:
Water and Wastewater Subsidized Customer Accounts

Subsidy	Number of Customers	Percent of Total Residential Customers[1]
PAN Subsidy	56,229	4.8%
TANF Subsidy	15,912	1.4%
Fixed Tariff (Public Housing)	56,535	4.8%
Total	**128,676**	**11.0%**

[1]Based on a total number of residential customers of 1,174,710 provided by PRASA as of June 30, 2016.

PRASA's Service Revenue projections are based on certain assumptions, including growth and consumption assumptions that could be affected by various factors. For example, the continued strain on the economy could cause a further decline in the consumption patterns of PRASA customers, which in turn, would affect Service Revenues. Additional discussion on PRASA's Service Revenue assumptions is provided below.

Growth and Consumption Assumptions

PRASA has experiences a compound annual reduction in number of accounts of about 1.38% per year in the last five fiscal years. More recently, as shown in Table 7-14, from FY2015 to FY2016 the number of customer accounts has experienced a minimal overall decrease of 0.1%. There was a negligible decrease in the residential accounts. However, compared to FY2015 results, the higher percentage reduction was observed in the number of industrial accounts, which resulted in a reduction of about 2.4%, and in the number of commercial and government accounts, which decreased by approximately 1.7% and 1.2%, respectively.

Table 7-14:
Customer Accounts

Fiscal Year	Customer Class				Total
	Residential	Commercial	Industrial	Government	
FY 2015[1]	1,175,072	51,869	864	10,334	1,238,139

Fiscal Year	Customer Class				Total
	Residential	Commercial	Industrial	Government	
FY 2016[2]	1,174,710	50,994	843	10,209	1,236,756
% Difference	**0.0%**	**-1.7%**	**-2.4%**	**-1.2%**	**-0.1%**

[1] Number of accounts by customer class through June 30, 2015.
[2] Number of accounts by customer class through June 30, 2016.

PRASA's total average monthly billed consumption in FY2016 decreased by approximately 8.5% compared to FY2015, as shown in Table 2-15. This decrease in total consumption and in customers' accounts resulted in a reduction in the average billed consumption per account of approximately 8.4%, as shown in Table 2-16. The largest reduction in the average monthly consumption per account in FY2016, as compared to FY2015, was observed in the government customer class (14.9%), followed by commercial (8.5%), and residential (8.4%). The average monthly consumption per account for industrial customers, however, resulted in an increase of 13.7% as compared to FY2015, even when this category had the highest decrease in number of accounts from FY2015 to FY2016.

Table 7-15:
Average Monthly Billed Consumption by Class FY2015 – FY2016
(1,000 Cubic Meters)

Fiscal Year	Customer Class				Total
	Residential	Commercial	Industrial	Government	
FY 2015[1]	17,654	2,790	1,098	2,472	24,014
FY 2016[2]	16,170	2,510	1,218	2,078	21,977
% Difference	**-8.4%**	**-10.0%**	**11.0%**	**-15.9%**	**-8.5%**

[1] Based on information through June 30, 2015.
[2] Based on information through June 30, 2016.

Table 7-16:
Average Monthly Consumption per Account FY2015 – FY2016
(Cubic Meters)

Fiscal Year	Customer Class				Average All Customer Classes
	Residential	Commercial	Industrial	Government	
FY 2015[1]	15.0	53.8	1,270.8	239.2	19.4
FY 2016[2]	13.8	49.2	1,445.2	203.5	17.8
% Difference	**-8.4%**	**-8.5%**	**13.7%**	**-14.9%**	**-8.4%**

[1] Based on information through June 30, 2015.
[2] Based on information through June 30, 2016.

In recent years, the average monthly billed consumption per account fluctuated from an increase of 2.6% from FY2012 to FY2013, to a reduction of 4.2% from FY2013 to FY2014, a

reduction of 5.8% from FY2014 to FY2015 and now by this additional reduction of 8.4% as shown in Table 2-4. In other words, since FY2013 PRASA has experienced a compound annual reduction in average monthly billed consumption per account of about 4.0% per year. According to the U.S. Census Bureau, there was a 4.4% decline in Puerto Rico's population between 2012 and 2015.20 Additionally, both the U.S. Census Bureau and the Puerto Rico Planning Board (PRPB) are projecting that Puerto Rico's population will continue to decline over the next nine years at an estimated annual rate of 1.3%. This trend in population decline is one of the reasons of the water consumption reduction pattern experienced in the recent years, which worsened in 2016 due to the drought that affected a large portion of the Island towards the end of FY2015 and the first half of FY2016.

To account for the possibility of further reductions in customer accounts and consumption during FY2017, the FY2017 Annual Budget includes a reduction in Service Revenues of 1% from FY2016 results after being adjusted to partially exclude the impact of the drought. Note that, given the drought adjustments made in both FY2016 and FY2017, this 1% reduction assumption is not apparent in the results presented in Table 7-11. However, considering the projected 1.3% reduction in population and the average monthly billed consumption per account of the past five fiscal years, this 1% reduction assumption could be optimistic. If population continues to decline at a rate of 1.3% per year, and average consumption per account does not increase above current levels, revenues could decrease at a higher rate than the projected 1% reduction. As such, PRASA must continue to proactively monitor year-to-date trends in customer accounts and billed consumption and adjust projections as necessary.

Act 66-2014 Assumptions

A fiscal emergency for the Commonwealth of Puerto Rico was declared through the enactment of Act 66-2014, which required that its instrumentalities (i.e., utilities, government agencies, and public corporations such as PRASA) implement certain measures to reduce its expenses. Act 66-2014 has primacy over any other law and will remain in place for three years, up to FY2017, or until certain economic and financial conditions are met. Act 66-2014 requires, among others, the following measures:

- 10% reduction in contracted services expense when compared to FY2014
- 20% reduction in appointed employees' costs when compared to FY2012
- Freeze or reduction of some payroll benefits or compensation

[20] The U.S. Census Bureau shows Puerto Rico population in 2012 was 3,634,487 and 3,474,182 in 2015.

Given the current economic fiscal crisis and as a budget balancing measure, executive branch agencies whose operating costs are covered in whole or in part with funds from the General Fund are not required to pay the rate increase implemented by PRASA on July 15, 2013, as amended on December 18, 2013. This represented a reduction of billings estimated at approximately $20M for FY2014 and of about $37M in each fiscal year thereafter.

2015 Drought and Water Rationing Plan

On May 11, 2015, PRASA announced a water rationing plan (or water control measures) covering certain areas located within the municipalities of San Juan, Carolina, Gurabo, Trujillo Alto and Canóvanas serviced by the Sergio Cuevas Water Treatment Plant (WTP), which impacted approximately 162,000 customers. Subsequently, on June 15, 2015 PRASA extended the water rationing plan to certain areas located within the municipalities of Bayamón, Cataño, Toa Alta and Toa Baja serviced by the Enrique Ortega WTP, which impacted approximately 110,000 additional customers. During the month of July 2015 (FY2016), the water rationing plan was expanded on several occasions to cover additional customers in Guaynabo, and additional areas of Bayamón, San Juan, Corozal, Naranjito, Caguas, Gurabo, Río Grande, Loíza, Luquillo, Juncos, Coamo, Salinas and Santa Isabel as a direct consequence of the escalating drought condition affecting most of Puerto Rico[21]. In early August 2015, approximately 415,000 customers were affected by the water rationing plan. The water rationing plan divided each of the affected areas into zones, which experienced water rationing periods of 72, 48, 24 or 12 hours, depending on the affected area. On September 21, 2015, the water rationing plan affecting the municipalities of San Juan, Carolina, Gurabo, Trujillo Alto and Canóvanas serviced by the Sergio Cuevas WTP, and the municipalities of Caguas, areas of Gurabo, Río Grande, Loíza, Luquillo, Juncos was cancelled as a result of the recovery of raw water reservoir levels. However, up until October 2015, other affected areas and municipalities previously mentioned were still affected by the water rationing plan experiencing water rationing periods of 24 or 6 hours, depending on the affected area.

PRASA estimated that it would experience a reduction of monthly Service Revenues of approximately $10M per month because of the drought. This expected reduction in monthly revenue did not account for measures available to customers to reduce the impact of the rationing plan such as the installation and use of cisterns and other water storage units, which may provide customers with the opportunity to even out water consumption during the rationing periods. The financial impact of the drought was estimated as a reduction of $60M in Service Revenues. In its FY2017 Annual Budget, PRASA only adjusted back its Service Revenues by $50M. PRASA did not adjust the full $60M given that monthly billed

[21] Source: United States Drought Monitor (http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?PR)

consumption during the first three months of FY2017 had not returned to pre-drought levels and PRASA projects that this trend will remain throughout the rest of the fiscal year.

Act 68-2016

PRASA's FY2017 Annual Budget does not consider the impacts of Act 68-2016. At this time there is not enough information available to determine the impact that the securitization transaction will have on PRASA's Services Revenues. Although it is likely that the impact will be significant, it is expected that the projected savings on debt service obligations will be sufficient to net out such impact.

Arcadis believes that PRASA's assumptions for Service Revenues are reasonable based on historical results and the assumptions listed above. Nevertheless, the following should be noted:

- Historical results show that average consumption per account has continued a downward trend in recent years.
- Continued strain on the economy, the high unemployment rate in Puerto Rico[22], and the reduction in new construction permits and economic activity index[23], among other economic factors, could continue to materially affect consumption profiles, resulting in further declines in the consumption patterns and/or number of PRASA customers.
- Due to the water rationing program in FY2016, it is possible that the full amount of consumption lost during those years may not be regained in FY2017 as a result of changes in behavior. This could result in further declines in water consumption during the fiscal year.
- Impacts of Act 68-2016 should be further analyzed as details on the securitization transaction become available.

2. Transfers from the Rate Stabilization Account (Exhibit 1, line 2) – In accordance with the MAT, a Rate Stabilization Account, the balance of which is determined in the annual budget, shall be established. This account is established within the Surplus Fund, which contains any remaining moneys after all required deposits are made. Equivalent monthly deposits during the fiscal year must be made into the account equal to the balance set forth in the annual budget.

   In compliance with the MAT, Operating Revenues shall include all transfers from the Rate Stabilization Account minus any deposits made to the Rate Stabilization Account during the same fiscal year. PRASA's July 15, 2013 increase was projected to generate excess Service Revenues during FY2014 and FY2015 that PRASA planned to use in future years to meet its

[22] Based on the U.S. Bureau of Labor Statistics, as of June of 2016 the unemployment rate in Puerto Rico was 11.2%, which is 6.7% lower than reported in June of 2015; Source: www.bls.gov/lau/
[23] Source: Puerto Rico Economic Indicators; Puerto Rico Planning Board

operational and debt service obligations. In FY2014 PRASA transferred $93M to the Rate Stabilization Account from net revenues available given the lower debt service payments (a delay in PRASA's planned bond issuances reduced the debt service payments due in FY2014), and lower electricity and maintenance and repair costs.

In its FY2015 Annual Budget, PRASA projected to transfer (deposit) to the Rate Stabilization Account approximately $51M. PRASA revised this projection throughout the year considering additional savings to be achieved from certain cost reduction initiatives, reductions in the projected debt service amount due in FY2015 (as a result in the delay of issuance of bonds), and a projected net transfer from the CIP account to the Operational account which was considered a repayment for CIP project payments made by PRASA (to be funded with bond proceeds) and a projected deposit of the CIP fund for projects to be funded with the Special Charges paid by PRASA's customers. However, because PRASA's bond issuance did not materialize during FY2015, and given PRASA's need to continue funding its CIP, PRASA opted to forego the budgeted deposit to the Rate Stabilization Account and used Operating Revenues to partially fund its CIP.

In its Revised FY2016 Budget Forecast, PRASA did not plan to transfer funds from the Rate Stabilization Account. However, in its FY2016 preliminary results, PRASA made a total transfer from the Rate Stabilization Account of $90M to pay the outstanding balance of financing facilities used to pay for its CIP and related financing, legal and interest costs. The FY2016 ending balance of the Rate Stabilization Account's available for use in future years was about $1.2M. In FY2017, PRASA is not budgeting transfers (deposits) into the Rate Stabilization Account.

3. Operational Initiatives (Exhibit 1, lines 3 & 4) – PRASA's operational initiatives include: 1) Revenue Optimization Program which is a set of programs implemented by PRASA to increase revenues and collections, and 2) Additional NRW Reduction Initiatives. Table 7-17 presents a summary of the revenues generated in FY2015 and FY2016, and budgeted in FY2017 (actual amount budgeted is less than PRASA's projected opportunity).

Table 7-17:
Revenue Optimization Program Initiatives ($, Thousands)

	FY2015 Actual	FY2016 Preliminary[1]	FY2017 Annual Budget
Additional Billings	$99,893	$103,182	$97,905
Collections from Prior Years	$14,793	$8,516	$4,500

[1] Based on Operating Revenues collected through June 30, 2016.

Arcadis believes that PRASA has a strong commitment to its Operational Initiatives (as evidenced by historical results), and to achieving the goals outlined for each initiative. Considering the historical performance of Operational Initiatives, and the projected benefits that could be achieved (as detailed below), Arcadis finds the projections reasonable. Nonetheless, PRASA's assumptions for the incremental revenues from Operational Initiatives rely on the effective and timely implementation of these initiatives. Any changes to the implementation schedule could materially affect PRASA's projections. As such, PRASA should continuously monitor its results and make adjustments as necessary.

Revenue Optimization Program Assumptions

As part of the NRW Reduction Program, PRASA's 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 five fiscal years.

Figure 7-1 presents this increasing tendency in revenue generated from PRASA's Revenue Optimization Program from FY2012 to FY2016. PRASA has consistently exceeded its budgeted amount for operational initiatives. In FY2016, PRASA collected approximately $111.7M. It should be noted that the significant increase from FY2013 results to FY2014 results (an increase of approximately 32%) and from there on, considers the rate increase implemented by PRASA in July of 2013.

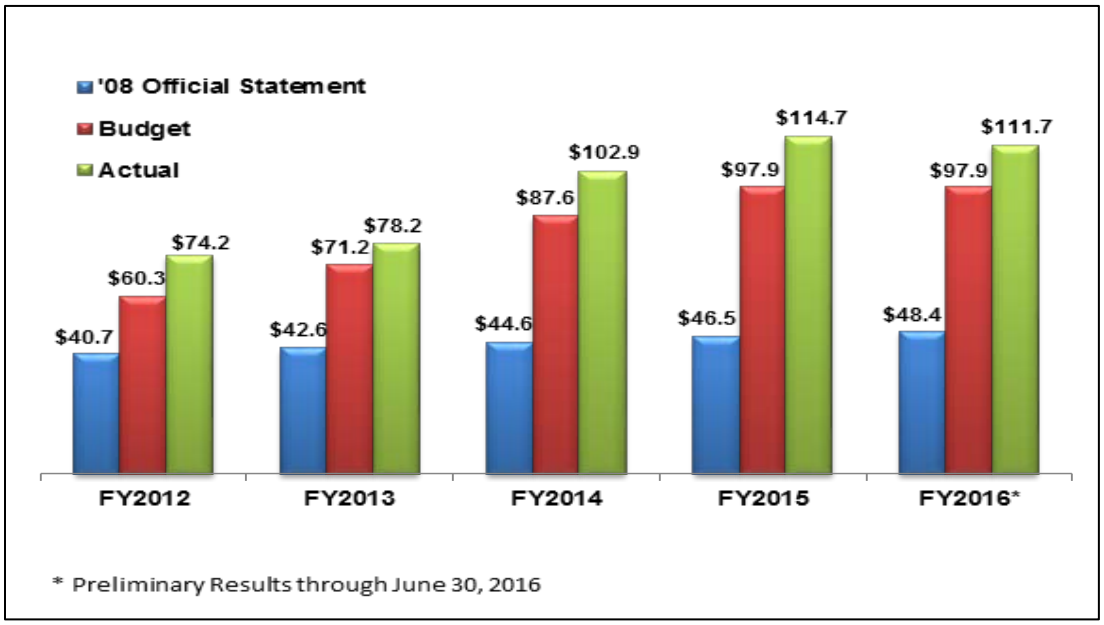

Figure 7-1: Revenue Optimization Program Results FY2012-FY2016 ($, Millions)

Table 7-18 below, presents a breakdown of the Revenue Optimization Program initiatives, the FY2015 actual and the FY2016 preliminary results; and the targeted best-case scenario for FY2017. PRASA has included in its Annual Budget a more conservative estimate totaling $102.4M. The reason for this decrease in the FY2017 Annual Budget is to offset the slowdown in the meter replacement initiatives. The expected cost of all the initiatives is projected at $10M per year plus the cost of financing the required capital investments, which has been included in PRASA's model.

Table 7-18:
Revenue Optimization Program Initiatives ($, Thousands)

Initiative	FY2015 Actual	FY2016 Preliminary[1]	FY2017 Annual Budget[2]
Small Meters (net of degradation)	$42,065	$39,429	$46,233
Large Meters	16,443	14,475	17,869
Theft and Inactive (Tx) Accounts	30,709	36,613	44,251
Sprinklers	2,460	2,277	1,508
Disconnections and Collections Efforts	14,159	11,479	4,500
Class Correction	1,966	1,701	1,929
Condominiums	583	662	486
Miscellaneous	6,299	5,062	2,123
Total Additional Revenues[2]	**$114,684**	**$111,697**	**$118,899**

[1] Based on Operating Revenues collected through June 30, 2016.
[2] Projected additional revenues to be generated; actual budgeted amount is lower.
[3] Numbers may not add up due to rounding.

A description of each of the initiatives, and underlying assumptions regarding their projected revenue impact, is discussed below.

- **Small Meters** – This operational initiative consists of replacing meters of 1-inch or less in diameter that are more than 10 years old, as these meters lose precision and account for less water than is actually 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 reduction in 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 replaced over 690,000 small meters from February 2009 to June 2016. However, preliminary results for FY2016 indicate revenues from this initiative are about $15.3M under the revised budgeted amount. This reduction in expected revenues is primarily due to PRASA's current fiscal situation, which obligated PRASA to put on hold this initiative,

resulting in the replacement of only 22,171 small meters in FY2016. Additional combined revenues expected from the small meter replacements initiative (minus adjustment for degradation) is about $39M, including additional revenue generated from the previously replaced meters. The average additional monthly revenue per meter assumed, based on the results of prior replacements, was $8.50 per month for the first year, $7.50 for the second year, $7.00 for the third year, $6.00 for the fourth year and $5.00 for the fifth year. From then a yearly reduction is assumed until the tenth year when there is no additional monthly revenue to be gained. Finally, the average monthly consumption per meter assumed, based on the results of prior replacements during the last seven fiscal years, was an additional 2.35 cubic meters per month, as indicated by PRASA's Revenue Optimization consultant. PRASA estimates that in FY2017, small meter replacements will generate $46.2M in revenue.

- **Large Meters** – This operational initiative consists of replacing meters with a diameter 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.

  PRASA replaced over 5,000 large meters from February 2009 to June 2016. Preliminary results for FY2016 revenues from this initiative are estimated about $3.4M under the budgeted amount. Again, PRASA was able to replace a total of only 333 large meters in FY2016. The total projected additional revenue from these meter replacements, combined with the revenues from the meter replacements performed in previous fiscal years, amounts to approximately $14.5M. The average additional monthly revenue per meter assumed, based on the results of prior replacements, was $301 per month for the first year, $275 for the second year, $250 for the third year, $225 for the years thereafter. Finally, the average monthly consumption per meter assumed, based on the results of prior replacements during the last eight fiscal years, was an additional 4.76 cubic meters per month, as indicated by PRASA's Revenue Optimization Consultant. For FY2017, PRASA estimates to generate $17.9M in revenue from this initiative.

- **Theft and Inactive Accounts** – The intervention of theft accounts initiative focuses on converting connected and non-paying customers into paying customers. This includes: (1) Tx accounts which are 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.

Over the last eight fiscal years PRASA has normalized a total of 77,389 customers. However, it is expected that as accounts are handled and normalized, the number of inactive accounts with consumption will reduce over time. FY2016 preliminary results indicate that revenues from this initiative are estimated about $4M under the revised budgeted amount. FY2016 preliminary results indicate that PRASA normalized a total 14,622 accounts, which yielded about $36.6M in additional revenues to PRASA. The total projected revenue for this initiative during FY2017, including amounts generated from accounts normalized in previous years, amounts to approximately $44.3M.

- **Fire Protection and Sprinkler Initiative** – PRASA currently provides fire protection sprinkler service to 1,389 accounts. 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. From FY2011 through FY2015, PRASA normalized about 540 customers, which represented additional revenues in the amount of $7.6M. Based on FY2016 preliminary results, PRASA normalized a total of 52 new accounts, collecting 2.3M in additional revenue. For FY2017, PRASA projects to normalize 100 sprinkler accounts.

- **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 continue to be a major factor contributing to revenues collected under these initiatives. Over the last eight fiscal years PRASA has performed over 1,350,000 disconnections. Between FY2009 and FY2015, PRASA collected about $84.7M in additional revenues from this initiative.

  FY2016 preliminary results indicate that, PRASA performed 94,462 disconnections and collected additional revenues in the order of $11.5M, which is approximately $6.1M over the projected amount. For FY2017, PRASA estimates to collect a conservative amount of $4.5M through this initiative.

- **Class Correction** – This initiative includes revenues from rate classification/ categorization (class and meter size) corrections and from a specialized taskforce to improve collections. Over the last eight fiscal years PRASA has normalized a total of 2,975 customers, and has collected over $18.3M from this initiative. PRASA reported additional revenues from this initiative in its FY2016 preliminary results of $1.7M, this result is about

$0.2M over the projected amount. PRASA has included $1.9M from this initiative in the FY2017 Annual Budget.

- **Condominiums** – This initiative consists of billing the master meter of the condominiums which were not being billed as a result of meter reading and billing problems. These meters were normalized and are being billed on a monthly basis without exceptions. FY2016 preliminary revenue results are about $0.1M above the FY2016 projected. PRASA has included $0.5M from this initiative in the FY2017 Annual Budget.

- **Miscellaneous** – These initiatives include, among others:
  - Reductions of discounts to billed amounts due to deficiencies in service. The number of customers receiving deficient service credits was reduced from 27,000 in August of 2009 (up to $20,000 in credits per month in total) to 2,524 currently, focusing on the Municipalities of Carolina and Fajardo.
  - Sewer accounts not billed for the service. PRASA normalized 18,089 sewer accounts as of FY2016.
  - Inactive Accounts Debt Transfer. This initiative searches for inactive accounts with pending balance that also has an active account with same social security number. Then the pending balance from the inactive account is transferred to the active account in order to initiate the collection process.
  - Government Inactive Accounts. This new initiative (started and focused on FY2015) searches for government customers with inactive accounts with recorded consumption. This initiative also includes the normalization of large inactive clients. Some of the achieved additional revenues are one-time in nature (non-recurrent).

FY2016 results indicate that PRASA surpassed the revised projected FY2016 objective for this category by about $5.1M. PRASA estimates additional revenues of approximately $2.1M in its FY2017 objective from these miscellaneous initiatives.

4. Adjustment for Uncollectibles (Exhibit 1, line 5) – Prior to the rate increases implemented in 2005 and 2006, PRASA's historical percentage of Adjustment for Uncollectibles was approximately 4% of its Service Revenues. Although PRASA's rate of uncollectibles increased significantly in the years following the 2005/2006 rate increases, in FY2012 and FY2013, PRASA's rate of uncollectible accounts (including collections from prior years) stabilized below 5%.

   PRASA's FY2015 actual results include about $48.8M in adjustments for uncollectible accounts, which is about 4.8% of Service Revenues and additional billings. Unlike historical results, PRASA's collections surpassed its billings during FY2016 by $6.5M. Factors contributing to this unusual, and likely one-time, result include: (1) lower billings because of

reduced customer consumption and water control measures implemented during the drought, (2) time lag between billings and collections due to PRASA's billings cycle, and (3) proactive collections efforts of government accounts.

In FY2017, PRASA has assumed an Adjustment of Uncollectibles of Service Revenues and additional billings from Operational Initiatives of 6%, to account for the possibility of a reduction in collections given the fiscal crisis affecting the Commonwealth and considering historical results prior to FY2016. To maintain its rate of uncollectibles at or below this assumed level, PRASA has indicated that it will continue to promptly address complaints and service disconnections, and will continue to proactively pursue government account payments. Arcadis finds this amount reasonable; however, PRASA should closely monitor changes in economic indices for the Commonwealth and continuously monitor collection results given the uncertain economic and fiscal situation for Puerto Rico as a whole. Also, the assumed rate of uncollectibles could be materially affected if collections from Government accounts decrease as a result of cost controls and budgetary actions that may be imposed or required under PROMESA or by the Central Government, or as a result of a worsening economic situation in Puerto Rico.

5. Other Income (Exhibit 1, line 6) – PRASA's Other Income includes: Miscellaneous Income, Special Assessments (fees paid by developers), and income from other sources. Miscellaneous Income mainly includes interest income and other miscellaneous revenues. Special Assessments are fees paid by developers for construction projects or new development connections. These fees apply to new water and sewer connections to the System. The FY2015 and FY2016 fees were about $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 foreseeable future.

   PRASA's Other Income revenues for FY2015 totaled $7.9M, of which approximately $4.4M was from Miscellaneous Income and $3.6M from Special Assessments. The final phase of the revised rates for new service connections and some of the other services considered under Miscellaneous Income came into effect in FY2016. These increases vary, depending on the service, as follows: 8% increase in sprinkler service connection fees, 20% increase in new service connections and water meter test fees, 33% increase in residential services reconnection fees, and about a 40% increase in commercial and industrial services reconnection fees. The FY2016 preliminary results show that PRASA collected approximately $10M, of which approximately $6M was from Miscellaneous Income and $4M from Special Assessments. Over the past five fiscal years, Other Income has reduced at an annual rate of approximately 6.7%.

PRASA is projecting $8M ($4M from Miscellaneous Income and $4M from Special Assessments) in additional revenues from Other Income in FY2017.

7.4.2. Authority Revenues (Other Sources of Revenues)

Based on the MAT, **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), (iii) any amounts transferred from the Budgetary Reserve Fund to the Trustee and (iv) any amounts received by the Authority from any source of funding that does not otherwise constitute Authority Revenues as reimbursement for Costs of Improvements paid by the Authority in the current or the immediately preceding three fiscal years from Operating Revenues.*

In past fiscal years, PRASA has required other sources of revenues to be able to meet its obligations. Because PRASA delayed implementing a rate increase until FY2014, PRASA required support from the Central Government. 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. PRASA received $70.3M of the $183.9M approved from this assignment in FY2012. The difference was covered with a $95M draw from the Budgetary Reserve Fund, which was initially funded in FY2012 with bond proceeds from PRASA's 2012 bond issuance. In order to meet its FY2013 obligations and to comply with the requirements of Section 7.01 of the MAT, PRASA used $145M (remaining balance) from the Budgetary Reserve Fund. In FY2014 and FY2015 PRASA did not include additional revenues from other sources. In FY2016 PRASA included a total amount of $83M to be reimbursed from CIP funds to operating funds, with moneys from the expected bond issuance, which were not received as the bond issuance did not occur.

PRASA's FY2017 Annual Budget considers a significant reduction in the projected debt service obligation payments considering: (1) the forbearance agreements with the United States Department of Agriculture (USDA) Rural Development/Rural Utilities Services and with the United States Environmental Protection Agency's (USEPA) State Revolving Fund (SRF) Loans; (2) the exclusion of the note outstanding debt service payment related to the North Coast Superaqueduct System; (3) the exclusion of the payment of an existing line of credit with the GDB not covered under the MAT; and (4) the elimination of the reimbursement to the Operating Reserve

Fund for the advancement of Operating Revenues used for CIP investments in prior fiscal years. This, in turn, reduced PRASA's need for additional revenue sources in FY2017.

During FY2017, PRASA projects to receive $151M in additional revenues from proceeds of external sources of revenue or financing. This deposit depends on PRASA's ability to obtain these funds through the proposed securitization bond transaction previously discussed in Section 1.4 or a rate increase. However, it is likely that the projected schedule of said transaction may not be completed until the last quarter of FY2017. If the bonds are not issued in FY2017, PRASA will find itself forced to further delay: (1) the reactivation of its CIP maintaining it only at the minimum levels of renovation and replacement investment, and (2) projected past due payments to its CIP contractors.

However, in order to meet the FY2017 Annual Budget as approved by the Board, and if (1) the budgeted levels of the CIP remain unchanged, and (2) the existing forbearance agreements remain in place for the remainder of FY2017, PRASA would need to implement either an emergency or a permanent rate increase if the securitization bond transaction is not completed in FY2017. The rate increase could be in the range of 15% across all customer and rate classes. However, the actual percentage may vary considering delays in implementation and billing cycle lags, and PRASA's ability to continue to extend its forbearance agreements.

As presented in Exhibit 1, revenues to be generated under PRASA's existing rate structure, combined with the projected additional revenues of $151M in FY2017, whether obtained from an additional rate increase or from a bond issuance, appear to be sufficient for PRASA to meet its obligations in FY2017. However, at this time there is no certainty that the securitization transaction currently being pursued will be achieved, or that PRASA will be able to implement a rate increase during FY2017. As such, Arcadis believes PRASA's projected amount to be obtained from Other Revenue Sources will not materialize during FY2017 and is therefore overly optimistic. Hence, PRASA shall make the necessary budgetary adjustments including further delay of projected CIP investments, and initiate its rate revision process.

7.4.3. Operating (Current) 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. For purposes of the Rate Covenant and the Annual Budget required by Section 7.02 of the MAT, Current Expenses will be calculated on an accrual basis. For all other purposes of the 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.*"

PRASA's projections for Operating (Current) Expenses, on an accrual basis, and associated assumptions are discussed below.

1. Payroll and Benefits (Exhibit 1, line 13) – Payroll and Benefits continues to be PRASA's largest expense category. Over the past five fiscal years, PRASA has averaged approximately $310M annually for this expense category. Since FY2009, PRASA has implemented cost control methods to reduce its staff levels and, in turn, Payroll and Benefits costs. PRASA's FY2015 actual results for Payroll and Benefits, Net of Expense Reduction due to Act 66-2014, amounts to $292.3M, which is $6M over the budgeted amount. This increase is attributed to increase in overtime and a decrease in the estimated savings resulting from the Expense Reductions due to Act 66-2014.

   PRASA's FY2016 preliminary results for Payroll and Benefits, net of expense reduction due to Act 66-2014, amounts to $303.8M, or about $10M less than the revised budget. For FY2017, PRASA is projecting Payroll and Benefits, net of expenses reduction due to Act 66-2014 in the amount of $317.8M.

   Assumptions regarding payroll and benefits costs per employee and overtime costs (as a percentage of total payroll and benefits costs) have been increased mainly to cover increases in required contribution to the Employees Retirement System. However, for FY2017 PRASA is projecting to increase its headcount by about 258 (to 5,056) to fill positions that would in turn reduce overtime costs, and to replace essential positions left (or to be left) vacant. Based on the historical results and the assumptions made by PRASA in its projections, Arcadis believes that the Payroll and Benefits FY2017 Annual Budget is reasonable. However, as further discussed, PRASA must continue to closely monitor the overtime costs to assure that the expected reductions to be achieved through the new personnel to be hired are realized.

Headcount and Overtime Assumptions

Over the past five fiscal years PRASA has reduced its staff levels by about 1.4% each year, remaining at an average of approximately 4,968 employees since FY2012. As previously reported, PRASA ended FY2013 with 4,888 employees; however, this low staff level was mainly due to the one-time increase in personnel retirements, many of which occupied positions that PRASA would replace. During FY2014, PRASA was in the process of hiring new employees to fill certain critical operations positions that were left vacant as a result of the numerous personnel retirements that took place in FY2013 due to legislated changes to the retirement conditions. PRASA reported a 4.13% net increase of staff from FY2013 to FY2014. Although PRASA projected that staff levels would increase to about 5,373 during FY2014, actual staff levels on June 30, 2014 were 5,090. Similarly, PRASA had projected that during FY2015 it would hire about 283 new employees to reduce overtime hours (and costs) and contract positions, and fill certain open positions, which includes positions left vacant by employees who retired during FY2013 and FY2014. However, these hirings did not materialize and, as such, the costs budgeted to cover the additional headcount were spent toward overtime costs. PRASA staff levels on June 30, 2015 were at 4,989, a 101-headcount reduction compared to FY2014.

PRASA previously projected to increase headcount in FY2015 up to 5,373 and maintain it at this level going forward. As of June 30, 2016, PRASA had a total headcount amount of 4,798 employees. The FY2017 Annual Budget assumes a total of 5,056 employees, or a net increase of 258 employees. PRASA currently has over 230 vacant positions and is looking to supplement certain key areas (i.e. Program Management Office and NRW team). In June 2016, PRASA requested the OMB for the approval to fill these vacancies. These positions include: 98 vacancies to reduce overtime and improve the quality of the service in identified critical operational areas (vacancies include positions such as plant operators, specialists and system manager); 76 vacancies for positions dealing with compliance and maintenance of the system; 5 vacancies for administrative purposes, such as external auditors, accounting analysts, among others); and 51 vacancies identified as positions that may be covered by internal employees.

Based on FY2016 preliminary results through June 30, 2016, the current overtime level is at approximately 10% of total payroll costs. PRASA has assumed a rate of overtime of 7% (as percentage of payroll) along with other adjustments that result in an increase of the average annual cost per employee of up to $58,900 currently incorporated into the FY2017 Annual Budget.

Retirement System Contributions

As required by Act 116 of 2011, PRASA's contribution to the retirement system increased from 13.275% in FY2015 to 14.275% in FY2016, and is projected to increase up to 15.525% in FY2017 over FY2014 (base year) contributions. Subsequently PRASA is required to

increase the contributions to the retirement system from an annual increment of 1.25% up to FY2021. Additionally, as required by Act 3 and Act 32 of 2013, PRASA is also required to pay for benefits granted by special laws as announced by the retirement system and to cover an annual Additional Uniform Contribution, which was budgeted to increase by $5.0M for FY2017.

Collective Bargaining Agreements

In FY2012, PRASA and its largest employee union, the UIA-AAA, signed a new Collective Bargaining Agreement (CBA), effective from January 2012 through December 2015. It included certain retroactive and future economic agreements that have an impact on PRASA's payroll and benefits expense projections which started in FY2013. Also, PRASA and the HIEPAAA signed a new CBA effective from May 2012 through June 2016. It also contains certain economic agreements (i.e., salary increases) that also have an impact on PRASA's Payroll and Benefits expenses. However, the Commonwealth of Puerto Rico, through the enactment of Act 66-2014 declared a fiscal emergency and required that its instrumentalities (i.e., utilities, government agencies, and public corporations such as PRASA) implement certain measures to reduce its expenses. Act 66-2014 has primacy over any other law and will remain in place for three years or until certain economic and financial conditions are met. Under Act 66-2014, PRASA was able to negotiate some terms included under the CBAs with both UIA-AAA and HIEPAAA. Both UIA-AAA and HIEPAAA unionized personnel agreed with PRASA that the CBAs will continue as stipulated except for some terms which include: the saving plans, salary increases, holiday and sick day benefits, among others.

PRASA has included in its Payroll and Benefits FY2017 Annual Budget the costs associated with the negotiated terms with both UIA-AAA and HIEPAAA unionized personnel, as modified to comply with Act 66-2014.

Act 66-2014 Assumptions

As a result of Act 66-2014, PRASA projected an annual reduction of $37M in expenses. The savings include $13M in cash items such as bonuses for years of service and removal of liquidation of vacation and sick days, a reduction of about $10.9M in Payroll and Benefits (as a result of a decrease in collective agreements, in benefits including annual bonuses, etc.), an additional $7.5M in savings to be reduced from the costs of the health plan provided to employees and from contracted services, and $5.6M from universal brigades. However, PRASA's results for FY2015 show an expense reduction of $31M; approximately $18M in accrued expenses and $13M in reductions in cash payments related to vacations, sick and retirement bonuses, which were accrued but not paid pursuant to the provisions of Act 66-2014. The difference of $6M is primarily the result of a delay in the implementation of the universal brigades (flexibility of work shifts and functions) that were expected to generate savings in

overtime and maintenance expenses and which implementation is currently being negotiated with the UIA-AAA.

In FY2016, PRASA achieved the expected $37M expense reduction. To reach this savings level and to account for the delay in the implementation of the universal brigades, PRASA made adjustments in cash items such as Christmas bonuses. For comparison purposes, approximately a reduction of $20M was obtained from accrued expenses and $17M in reductions in cash payments related to vacations, sick and retirement bonuses. Still, PRASA is approximately $6M below the expected savings to be obtained due to Act 66-2014 when comparing FY2015 and FY2016 savings with the projected (expected) reductions.

2015 Drought and Water Rationing Plan Assumptions

As previously mentioned, from May to October of 2015, PRASA implemented a water rationing plan as a measure to counteract the effects that the drought had on raw water reserves particularly those that serve the Metropolitan region. The water rationing plan affected approximately 415,000 customers or a third of PRASA's customers. Based on the number of affected customers, in addition to the reduction of monthly Service Revenues previously discussed, PRASA estimated that it would experience an increase in its monthly operating expenses, including Payroll and Benefits as personnel worked overtime to operate valves in the System and dispatch water in oasis established in sectors affected by the water rationing plans. Hence, PRASA included in its Revised FY2016 Budget Forecast an increase of $4M in Payroll and Benefits costs (assumed an incremental cost of $1M per month and a duration of four months). FY2016 preliminary results show that the impact in Payroll and Benefits was approximately within the range of $10M, although the actual amounts attributable to the drought in Payroll and Benefits expenses cannot be specifically determined. No drought impacts have been included in the FY2017 Annual Budget.

Act 211-2015

As a result of the fiscal crisis, the Puerto Rico Government enacted Act 211 on December 8, 2015 (Act 211-2015), which created a "Voluntary Pre-Retirement Program". Act 211-2015 intends to create a program, *"whereby eligible employees of the Government of the Commonwealth of Puerto Rico may voluntarily separate from service by receiving incentives until they meet the requirements for retirement; provide for the requirement of credited years of service needed to qualify for this Program; establish the timeframe for employees to exercise their option to avail themselves of the Voluntary Pre-Retirement Program; provide the special incentives that shall be granted to employees who avail themselves of the Program; provide the requirements needed to implement the Program; and for other related purposes "*. The program seeks to offer incentives to employees who have been working for the Commonwealth of Puerto Rico and enrolled in the Retirement System before April 1st, 1990, or have begun working as a transitory or irregular employees before such date and were unable to contribute

to the Retirement System due to their job status, but was subsequently appointed in the career service under Act No. 1 of 1990 and has paid those previous years of service on or before June 30, 2013 in order to accumulate years of credited service retroactively to a date prior to April 1, 1990, without having received any reimbursement of their contributions and have at least 20 years of service. Under this program, eligible employees may voluntarily retire early and still receive compensation equal to sixty percent (60%) of their average salary, payout of unused vacation and sick leaves (as per Act 66-2014), and keep their health insurance coverage for a term of two years. Also, they can continue to contribute to their retirement plan. These incentives are applicable until they meet the requirements for full retirement. Consequently, the program attempts to reduce the workforce progressively and voluntarily, thus allowing for the economy to undergo a transition process. This may reduce expenses such as payroll and "fringe benefits" costs on PRASA but requires that the Puerto Rico OMB evaluate and certify that employees eligible for the program and under consideration represent savings for PRASA. Besides the reduction of expenses, Act 211-2015 stipulates that positions that become vacant upon implementation of the retirement program be eliminated, and that agencies take administrative or operational measures to restructure in the absence of these positions. However, the OMB might authorize to maintain positions, if certified to be essential, and in accordance with the plan submitted by PRASA. As it pertains to PRASA, most of the eligible employees occupy positions that are managerial or supervisory in nature, which may create organizational challenges. As stated, this pre-retirement program will impact headcount and consequently overtime. No impact from this legislation has been incorporated in PRASA's FY2017 Annual Budget.

2. Electric Power (Exhibit 1, line 14) – PRASA's electric power costs have historically increased at a compound annual growth rate (CAGR) of about 8% mainly because of price increases, and not from consumption increases. However, as a result of the preferential electric energy tariff approved by the Puerto Rico Electric Power Authority (PREPA) that went into effect in FY2014, PRASA's electric power costs has decreased, lowering the recent 10-year CAGR from 8% to 6%. Nonetheless, as of July 1, 2016, PREPA's preferential electric energy tariff has been revoked (further discussion is detailed below).

   PRASA's FY2015 actual results for Electric Power amount to $148.3M. PRASA's FY2016 preliminary results for electric power amount to $141.7M. This reduction is due to one-time adjustments of invoice disputes raised by PRASA and approved by PREPA. PRASA has projected an electric power expense of $140.8M for FY2017, $0.9M less than FY2016 preliminary results. The FY2017 Annual Budget is based on PRASA's projected cost of electric power considering the elimination of the preferential electricity all-in-rate tariff as well as the projected and expected reductions in consumption from Energy Performance Contracts (EPCs) and reductions in production from Power Purchase Agreements (PPAs, ie. renewable energy) that have been completed YTD as part of PRASA's Comprehensive Energy Management Program. As notified by PREPA, the preferential electricity all-in-rate tariff was revoked from

July 1, 2016 onward, and due to PRASA's fiscal situation the Comprehensive Energy Management Program projects that were projected to be completed in FY2016 and FY2017 were placed on hold thereby reducing the projected savings that these would generate. Considering these factors, PRASA's projected Electric Power expenses may be overly optimistic. Additional discussion on PRASA's Electric Power assumptions is provided below.

Key Assumptions and Other Factors Considered

- *Costs and the Preferential Electric Energy Tariff:* As approved under Act 50 of June 2013 (Act 50-2013), a special all-in-rate of $0.22 per kilowatt-hour (kWh) for the first 750 million kWh of consumption was legislated for PRASA and, subsequently approved by PREPA's Governing Board. The excess amount consumed above the 750 million kWh must be paid at PREPA's average cost per kWh for the most recent audited fiscal year. This rate was effective from FY2014 to FY2016. Starting on FY2017 and going forward, and unless PREPA is able to provide electricity at a lower cost or PREPA's debt service coverages are negatively affected, the all-in-rate would decrease to $0.16 per kWh for the first 750 million kWh of consumption. A key benefit of the all-in-rate is that it has also helped PRASA to better forecast its operational expenses (in recent years, electric energy costs were very volatile and difficult to forecast and budget), in addition to stabilizing PRASA's electric energy costs. Nevertheless, Article 9 of Act 50-2013, stipulated the payment of PREPA bonds will have priority over any agreement between PRASA and PREPA.

  On September of 2014, a chief restructuring officer was appointed to evaluate PREPA's fiscal situation and develop a comprehensive fiscal turnaround plan, which was presented in June of 2015. The plan called for an overhaul of PREPA's management and its operational structure, along with a restructuring of its outstanding debt and improvements to its infrastructure. In FY2016, PREPA was under a forbearance agreement with its creditors and was able to later achieve progress with its creditors and work on the restructuration of its debt. On December 2015, and due to PREPA's fiscal situation, PREPA announced that the preferential electricity all-in-rate tariff with PRASA will be eliminated effective in July 1, 2016. After this date, PRASA will pay for the energy according to the corresponding current rate based on the facilities' electric current and voltage capacity. Nonetheless, since given the sustained low oil barrel costs, the electric power rate is now less than $0.22 per kWh. However, it should be noted that, as part of its financial and debt restructuring plan, PREPA has announced the implementation of a transitional charge of $0.013 per kWh. PRASA assumed a rate of $0.2064 per kWh to project Electric Power expenses for FY2017.

- *Consumption Growth Rate:* PRASA has reduced the electric power consumption from PREPA from 748 million kWh (FY2013) down to 622 million kWh (FY2016). For FY2017, PRASA is projecting that its total consumption will be 685 million kWh, of which 674 million kWh will be power consumption bought from PREPA. This PREPA

consumption projection considers the Regional Initiatives expected to be achieved in FY2017, and does not consider any additional contribution from EPCs. In its FY2017 annual budget, PRASA is projecting that electric power purchased from PREPA will increase by about 8.4% from FY2016. However, it is important to note that in FY2016 power consumption was reduced because of the drought.

- *Comprehensive Energy Management Program and Regional Initiatives:* PRASA has included projected savings in consumption and costs as a result of its Comprehensive Energy Management Program, which PRASA has undertaken to help manage and reduce its electricity expense. Since 2014, PRASA has implemented separate processes to engage the private sector in investing in energy related projects with Demand Side Projects through EPCs and Supply Side Projects through PPAs, and other internal measures such as Regional Initiatives and the rehabilitation of the Carraízo Hydroelectric facility. However, due to PRASA's fiscal situation, the stratus of such projects have been impacted as follows:
    - EPCs: EPCs were placed on hold during FY2016 and only two of the programmed contracts were able to be completed (Barceloneta and Bayamón WWTPs). PRASA is projecting that the EPCs will remain on hold during FY2017 and thus is not including any additional savings from EPCs (other than what is already being saved annually from the completed EPCs) in its FY2017 Annual Budget.
    - Regional Initiatives: PRASA has implemented a Regional level commitment to find savings at the operational level (with minimum or no investment). For example, simplifying and providing more flexibility to the system, reducing and optimizing the hours of operation at the facilities, identifying energy conservation measures in the operation of the equipment, among others. PRASA is projecting a reduction of approximately 14 million kWh during FY2017.
    - PPAs: PRASA is projecting to purchase 12 million kWh from alternate energy sources already installed and operational, at an average contracted rate of $0.15 per kWh, making up approximately $2M of the $140.8M annual budget for FY2017. However, additional PPAs projected to be in place during FY2017 from a request for proposal process completed in 2014 have also been placed on hold.
    - Carraízo Hydroelectric: Although PRASA was also considering a rehabilitation program for Carraízo's hydroelectric facility and despite completing the design and bid process for the project, it was placed on hold during FY2015 as PRASA evaluates next steps for this project, given that bids received were much higher than estimated.

While the FY2017 Annual Budget is reasonable, the expected savings to be achieved through the Comprehensive Energy Management Program may not be accomplished in its entirety, particularly the savings projected to be obtained from regional initiatives as they could be cancelled out by increasing energy usage of aging equipment that PRASA has had to delay

replacing because of lack of funding. Also, PRASA is now more susceptible to varying prices given the elimination of the preferential all-in-rate tariff. Close monitoring of electric energy usage must continue and PRASA shall adjust as necessary.

3. Maintenance and Repair (Exhibit 1, line 15) – PRASA's FY2015 actual results for Maintenance and Repair expenses amounted to $39.4M. FY2016 preliminary results for Maintenance and Repair amount to $39.2M, which is about $9.8M lower than the Revised FY2016 Budget Forecast amount. The reduction includes cost control measures implemented by PRASA, as well as, once again, a postponement in the cleaning of the Superaqueduct sludge lagoons. The FY2017 Annual Budget is $44.1M, which is about $4.8M higher than FY2016 preliminary results and about $5M lower than the Revised FY2016 Budget Forecast. Arcadis believes PRASA's FY2017 Annual Budget for Maintenance & Repair expenses is reasonable.

4. Chemicals (Exhibit 1, line 16) – PRASA's FY2015 results for Chemical expenses amount to $27.1M. FY2016 preliminary results for Chemical costs amount to $27.7M, which is $1.2M lower than the Revised FY2016 Budget Forecast amount. It should be noted that chemical costs in FY2016 preliminary results are close to those achieved in FY2008 ($27.6M). The three-year average for chemical cost is approximately $27.8M. Although Chemical costs are usually affected by inflation and worldwide demand as they are mostly commodities, over the past few years PRASA has been able to counteract these costs with savings as a result of optimizing consumption and its purchasing power. The compound annual reduction for the past five fiscal years for Chemical expenses has been approximately 6% per year. In FY2017, PRASA is projecting approximately $32.2M in Chemical costs, or an increase of about 16% (approximately $4.5M) over FY2016 preliminary results. Arcadis believes PRASA's FY2017 Annual Budget for Chemical expenses is reasonable.

5. Insurance (Exhibit 1, line 17) – Results for Insurance expenses in FY2015 totaled $8.1M. Preliminary results for Insurance expenses in FY2016 totaled $8.99M, which is $0.02M less than the Revised FY2016 Budget Forecast amount of $9.0M. PRASA has budgeted $8.3M for Insurance expenses in FY2017. This amount considers negotiated adjustments to PRASA's insurance premiums for the fiscal year. PRASA's FY2017 total Insurance program premium is projected at $8.3M; which is $0.7M lower than PRASA's Revised FY2016 Budget Forecast. Arcadis believes the FY2017 Annual Budget for Insurance expenses is reasonable.

6. Other Expenses (Exhibit 1, line 18) – Other Expenses include, for example: the Superaqueduct Operation & Maintenance (O&M) contract (previously included as separate expense category), professional services, materials and supplies, security, sludge treatment and disposition, rentals, and water transport. FY2015 actual results for this expense category totaled $145.1M. FY2016 preliminary results for Other Expenses total $136.7M or $24.2M less than the revised budget. This positive deviation is primarily due to a reduction in treatment and disposal of residuals, rentals, fuels and oils, third party vendors, contracted technical assistance, IT services/license, and telephone and network costs. Although other categories such as water

transport costs, and professional services were slightly higher than budgeted, the net results were favorable to PRASA mainly because of the drought.

PRASA has included $163.9M for Other Expenses in its FY2017 Annual Budget, which represents an increase of approximately 20% over FY2016 preliminary results. Material differences between the FY2016 preliminary results and the annual budget for FY2017 Other Expenses include: Professional Services costs increase of about $7.5M (mainly due to an increase in legal and financial consultancy services), Third Party Vendors costs increase of $8.1M (due to leak repair and the Sewer System Operation & Maintenance Plan as requested and agreed in the Consent Decree), Contracted Assistance costs increase of $8.9M (due to primary WWTPs compliance sample collection and dye testing studies at two facilities), Information Technology Services (IT) costs increase of $5.0M (mainly for potential incremental licenses costs and SAP upgrades), and an increase of about $3.5M for Water Purchase costs, and of $1.3M for Fuel and Oils costs. A reduction in costs as compared to FY2016 was projected for the following items: Materials and Supplies, Billings and Collections, Security, Contingencies and Fines, Treatment and Disposal of Residuals, Rentals, Water Transport, and Telephone and Network. The difference of $27.1M reduction in Water Transport Costs from FY2016 to the proposed FY2017 is mainly due to the impact of the drought period.

Regarding the Superaqueduct O&M fee, PRASA continues to contract CH2M Hill Puerto Rico, Inc. for the O&M of the Superaqueduct. PRASA is in the process of renewing CH2M Hill's contract for FY2017. The contract amount is expected to be equal to, or less than FY2016's contract amount. PRASA's FY2016 preliminary results for this expense category totals $3.7M. PRASA's FY2017 Annual Budget includes $3.8M.

Arcadis has reviewed PRASA's projections for this expense category and finds the budget amount reasonable. However, PRASA should monitor actual costs, particularly for fuels and oils, given the projected increases that could materialize throughout the fiscal year.

7. Additional Savings from Initiatives (Exhibit 1, line 19) – PRASA has included in its financial plan additional savings to be achieved from initiatives not already considered and previously discussed. These include: savings to be achieved from reduction of physical loses, further consolidation of facilities (i.e., commercial offices), optimization of operations, and further reductions in contracted services (i.e., cost savings from re-procurements). However, savings are not expected to be realized until FY2018 or beyond. As such, FY2015 results, FY2016 preliminary results, and the FY2017 Annual Budget do not include any additional operational expense savings.

8. Capitalized Expenses (Exhibit 1, line 20) – PRASA's external consultant, PJ Sun LLC, completed a more recent review of PRASA's capitalization rate on July 2015. The recommendations included in the updated report, as provided by PRASA, reduce PRASA's

capitalization rate from 5.1% to 4.7%. FY2015 actual results for Capitalized Expenses amounts to $25.4M. FY2016 preliminary results for Capitalized Expenses amount to $21.6M. For FY2017, PRASA is projecting a budget of $33.2M for Capitalized Expenses. Arcadis assumes that the estimation for expense capitalization used by PRASA is reasonable given that, in previous years, it has been accepted by PRASA's outside, independent auditors in the preparation of its financial statements. Arcadis has not reviewed this estimation in detail and, as such, is not providing an opinion on the reasonableness of the recommended capitalization percentage. However, it should be considered that to the extent that PRASA's financial situation places additional burden and budget constraints at the operational level, the actual amount of renewal and replacement and maintenance and repair expenditures that can be capitalized could be reduced, thereby reducing the amount of capitalized expenses.

7.4.4. Other Expense Considerations

In the FY2016 Annual Budget Review Report, Arcadis discussed the unknown impact that Act 72 of 2015 (Act 72-2015) could have on PRASA's expenses. Act 72-2015 modified the PR Code and introduced various significant changes to the current Commonwealth's taxation system, including among others, (i) a temporary increase in the local Sales and Use Tax (SUT) from 6% to 10.5%, which will remain in effect from July 1, 2015 through March 31, 2016; (ii) the temporary imposition of a new 4% SUT on services rendered by a business to another business and on certain professional services (including legal, accounting and other services rendered by licensed professionals), which is to remain in effect from October 1, 2015 through March 31, 2016; and (iii) the implementation of a Value Added Tax (VAT) of 10.5%, effective April 1, 2016, which would gradually phase out and replace the SUT. Nevertheless, during FY2016, through Act 54 of 2016 (Act 54-2016), Puerto Rico's legislative branches revoked the implementation of the VAT. As such, there is no projected impact on PRASA's finances during FY2017.

7.5. Debt Service

7.5.1. Master Agreement of Trust

The MAT contains specific DSC requirements that must be met by PRASA including, but not limited to, a Rate Covenant. As stated in the Rate Covenant defined in the 2012 MAT (as amended), PRASA has covenanted to establish and collect rates, fees and charges so that it meets the following four independent requirements[24] (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 sufficient to be at least equal to 250% of annual debt service with respect to Senior Indebtedness for the current fiscal year;

[24] Capitalized terms as defined in the 2012 MAT.

- Operating Revenues shall be sufficient to 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 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
- Authority Revenues, shall be sufficient 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 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 MAT (as amended) is outstanding, the additional bonds test (ABT) requirements of the 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 ABT requirements which PRASA must meet 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.

A summary of PRASA's MAT DSC and ABT requirements is presented in Table 7-19 below.

Table 7-19:
Summary of 2012 MAT DSC Requirements

Lien Level	Debt Secured	DSC for Additional Bonds Test (MADS)	DSC for Covenant Test	In Default if DSC not Achieved?
Senior	2008, 2012 & 2015 Senior Bonds	2.5/1.5	2.5	Yes
Senior Subordinate	Bond Anticipation Note & Senior Subordinate Bonds	2.0/1.5	2.0	Yes
Subordinate	Not currently applicable	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

[1] 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.

In accordance with the MAT, the flow of funds shall be as follows:

- 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 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.

7.5.2. Existing Debt Service

The 2008 Series A and B Senior Lien Revenue Bonds (the 2008 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 $1.3 billion 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 $284.7M 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.

The 2012 Series A and B Senior Lien Revenue Bonds (the Senior Lien Bonds) were issued as part of a comprehensive financial plan to continue to fund PRASA's CIP. The proceeds of PRASA's $1.8 billion tax exempt Senior Lien Bonds were used by PRASA to (i) refinance certain LOCs and bond anticipation notes (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 $295.2M taxable Senior Lien Bonds were used to refinance an existing $241M BAN and provide additional financial liquidity to PRASA.

7.5.3. Debt Service Coverage

A summary of PRASA's debt service obligations and coverages for FY2015, FY2016 and FY2017 are presented in Exhibit 1, and in Tables 7-20 through 7-22.

FY2015 debt service obligations totaled $445.5M, of which $355.5M were Senior lien obligations, and $90M were subordinated obligations. As shown in Table 7-23, PRASA met Rate Covenant requirements in FY2015.

PRASA's FY2016 preliminary Senior Debt Service was approximately $42.2M higher than the projected Senior Debt Service included in PRASA's Revised FY2016 Budget Forecast. The net increase results from a lower Senior Lien Bonds debt service obligation due to postponement of the bond issuance PRASA was planning to complete during FY2016 ($230.8M due and paid, versus $283.6M budgeted), and a payment of $90M (excluding interest, legal, and financial costs) made by PRASA to repay the outstanding balance of certain lines of credit that were provided to PRASA in anticipation of the bonds and that were to be refinanced through the bond issuance and settled with bond proceeds.

Also, in FY2016 PRASA only made partial fund deposits in the CGI Account of approximately $53.2M of the $88.4M amount due according to the corresponding debt amortization tables. Payments of debt service that were due to the USDA and USEPA in July 2016 were not made by PRASA. As previously mentioned, PRASA entered into forbearance agreements with both USDA and PRIFA (as operating agent for the SRFs) which expire on March 30, 2017 and June 30, 2017, respectively, unless further extensions to such forbearance periods are granted. Additionally, as in FY2015, no funds were deposited in the CSO Account during FY2016 and, accordingly, no funds were transferred by PRASA to the trustee of the PFC Bonds for the payment of debt service that was due on the PFC Bonds. Finally, during FY2016 PRASA did not make all the payments due under the Term Loan with the GDB. However, per bond counsel's opinion, this debt is not covered under the MAT.

As communicated by the Trustee via letter dated January 3, 2017, as of December 31, 2016, the Commonwealth Payments Fund deficiency is approximately $62.2M. Nevertheless, such deposit and payment shortfalls are not considered to be an Event of Default under the MAT.

Table 7-20:
FY2016 Debt Service Obligations and Preliminary Results ($, Thousands)

Debt Category	Revised FY2016 Budget Forecast	FY2016 Obligations without Forbearance Agreements[1]	FY2016 Preliminary Results[2]
Senior Debt	$283,641	$325,883	$325,883
Senior Subordinated Debt	2,732	2,721	2,721
Subordinated Debt	-	-	-
Commonwealth Guaranteed Indebtedness	90,290	88,116	53,198
Commonwealth Supported Obligations	8,999	8,999	-
Debt not Covered under the MAT[3]	-	8,752	2,393

[1] Considers the full debt service obligations due in FY2016 per amortization schedule; excludes forbearance agreements.
[2] Considers the forbearance agreements, no payment of the PFC bonds under the CSO, and partial payment of GDB Term-Loan.
[3] Term Loan with the GDB.

Table 7-21:
FY2017 Debt Service Obligations and Budget ($, Thousands)

Debt Category	FY2017 Obligations without Forbearance Agreements[1]	FY2017 Annual Budget[2]
Senior Debt	$230,789	$230,789
Senior Subordinated Debt	2,721	2,721
Subordinated Debt	-	-
Commonwealth Guaranteed Indebtedness	82,678	19,626
Commonwealth Supported Obligations	8,999	-
Debt not Covered under the MAT[3]	8,461	-

[1] Considers the full debt service obligations due in FY2017 per amortization schedules.
[2] Considers the forbearance agreements and no payment of the PFC bonds under the CSO nor the Term-Loan with the GDB.
[3] Term-Loan with the GDB.

Table 7-22:
FY2015 – FY2017 Debt Service Coverage

Debt Service Level	DSC Requirement	FY2015 Actual	FY2016 Preliminary DSC without Forbearance Agreements[3]	FY2017 Annual Budget DSC without Forbearance Agreements[4]
Senior Debt[1]	2.50	3.05	3.40	4.43
Senior Subordinated Debt[1]	2.00	3.04	3.37	4.38
Subordinated Debt [1]	1.50	3.04	3.37	4.38
All Obligations[2]	1.00	1.00	1.03	0.94

[1] DSC calculated with respect to Operating Revenues.
[2] DSC calculated with respect to Authority Revenues.
[3] Considers the full debt service obligations due in FY2016 per amortization schedule; excludes forbearance agreements.
[4] Considers the full debt service obligations due in FY2017 per amortization schedule, including CGI debt, CSO debt and debt not covered per MAT (GDB Term-Loan); excludes forbearance agreements

7.6. Reserve and Funds Deposit Requirements

7.6.1. Debt Service Reserve Funds

In accordance with the MAT as amended by the Sixth Supplemental Agreement of Trust, Reserve Funds for Senior Debt, Senior Subordinate, and Subordinate Debt must be maintained in a reserve account at least 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:

- Maximum Annual Debt Service on the Outstanding Bonds secured by such Account, payable in any fiscal year for the related Bonds,
- Ten percent (10%) of the proceeds of the Outstanding Bonds secured by such Account calculated in accordance the Code and
- 125% of the average Annual Debt Service for the payment of the principal of and interest on the Outstanding Bonds secured by such Account.

Debt service costs include the required contributions to the debt service reserves which were originally created and funded with 2008 bond proceeds. Should future bond issuances include required reserves, PRASA plans to contribute the additional funds in each of these reserves with part of the bond issuance proceeds, as necessary.

7.6.2. Operating Reserve Fund

The Sixth Supplemental Agreement to the MAT was executed on April 19, 2016. Before the Sixth Supplemental Agreement, the MAT required that an Operating Reserve Fund 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.

The Sixth Supplemental Agreement to the MAT, amended Section 5.10 (a) and (c) of the Operating Reserve Fund to read as follows:

(a) In each month, the Trustee shall deposit to the Operating Reserve Fund (i) beginning on the first Business Day of the month and after making the deposits required by Section 5.02 (b) (i) through (vii), an amount of the Authority Revenues equal to 1/60 of the amount, if any, necessary to restore the amount on deposit therein to the Operating Reserve Requirement and to pay interest on any reimbursement obligations due with respect to an Operating Reserve Facility. Earnings on moneys held in the Operating Reserve Fund shall be retained therein.

(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 application 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.

PRASA had a loan agreement (the GDB Loan Agreement) with the GDB under which the GDB provided a revolving line of credit to PRASA in the amount of $180M (previously $150M) that satisfied the balance that PRASA is required to maintain in the Operating Reserve Fund under the MAT. Under the GDB Loan Agreement, this line of credit is payable from moneys on deposit in the Operating Reserve Fund (after making deposits to the Current Expenses Fund) or proceeds from additional indebtedness issued under the MAT. The maturity of such line of credit was extended to June 30, 2018, contingent upon PRASA's successful completion of the 2015 Senior Bond issuance. Given that bonds were not issued on or before August 31, 2015, the facility matured on June 30, 2016. Therefore, PRASA is required to fund the Operating Reserve Fund at its requirement from Operating Revenues in accordance with the flow of funds (as defined in the MAT) or obtain a new line of credit to satisfy the Operating Reserve Fund Requirement.

Therefore, in accordance with the Sixth Supplemental Agreement to the MAT, PRASA is projecting to deposit $36M in the Operating Reserve Fund during FY2017 (funding of 1/5 of the

Operating Reserve Fund). This deposit will continue recurrently for four additional years, until PRASA achieves the reserve fund of three months of current expenses.

7.6.3. 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, or

(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 annual requirement. In addition, the following must be credited to the Fund:

(i) The proceeds of any condemnation awards,

(ii) The 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.

No deposits were made in FY2015 and, even though, PRASA budgeted a $50M deposit to the Capital Improvement Fund in FY2016, no deposit was made. PRASA projects to deposit $60M in the Capital Improvement Fund during FY2017 to finance a portion of its projected CIP as well as a projected $75M debt repayment to its contractors with either revenues to be generated from rate increases, from other sources of funding including bond proceeds from the securitization bond transaction currently being pursued, or a combination of the two.

7.6.4. Construction Fund

In accordance with the MAT, a Construction Fund must be established and funded with the following deposits:

(i) the amounts required to be deposited under the resolution of the Board authorizing the issuance of particular Series of Bonds or the applicable Supplemental Agreement and,

(ii) any moneys of the Authority that may properly be deposited to the credit of said Fund, or the proceeds of any grants received from any source, to be used for the purpose of paying the Cost of Improvements.

PRASA has included a deposit of $151.3M to the Construction Fund in its FY2017 Annual Budget from Other Sources of Revenues to be obtained from either external financing, debt restructuring or a rate increase. However, as previously mentioned, at this time no assurances can be made that the securitization transaction currently being pursued will be achieved, or that PRASA will be able to implement a rate increase during FY2017. As such, Arcadis believes PRASA's projected amount

to be obtained from Other Revenue Sources will likely not materialize during FY2017 and, therefore, the projected deposit to the Construction Fund will not be made.

7.6.5. Commonwealth Payments Fund

As previously mentioned, payment of debt service that was due to the USDA and USEPA on July 2016, was not able to be transferred and forbearance agreements were signed. In addition, no funds were deposited in the CSO Account during FY2016 and, accordingly, no funds were transferred by PRASA to the trustee of the PFC Bonds for the payment of debt service that was due on the PFC Bonds.

In its FY2017 Annual Budget, PRASA projects to make a $19.6M deposit to the Commonwealth Payments Fund considering (1) the extended forbearance agreements with USDA and USEPA, (2) the exclusion of the note outstanding debt service payment related to the North Coast Superaqueduct System, and (3) the exclusion of the payment of an existing line of credit with GDB which is not covered under the MAT. The budgeted deposit amount is about $80.5M less than actual deposits due based on CGI and CSO debt amortization schedules.

7.6.6. Budgetary Reserve Fund

Under the 2012 FOA, a new Budgetary Reserve Fund was created. PRASA initially funded the Budgetary Reserve Fund with $240M of the 2012 bond proceeds. According to the 2012 FOA, GDB will hold the Budgetary Reserve Fund in trust for, and for the benefit of, PRASA. The Commonwealth agrees that, no later than February 1, 2013 and by each February 1st thereafter it shall either (i) obtain an appropriation or a commitment for another source of funding for the projected Budgetary Reserve Requirement applicable to the next succeeding fiscal year or (ii) advise PRASA that it does not intend to request an appropriation or provide a commitment for another source of funding to cover all or a portion of the projected Budgetary Reserve Requirement for that fiscal year. The Budgetary Reserve Requirement will be projected by PRASA in its five-year *Fiscal Improvement Plan* (a requirement of the 2012 FOA) which will be reviewed and commented, as necessary, by GDB. The Budgetary Reserve Requirement will be recalculated annually in connection with the update to the *Fiscal Improvement Plan* each February 1st.

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 rate increases and/or revenue enhancement, expense reducing measures, or a combination of these measures, to satisfy the requirements of the Rate Covenant.

In FY2013, PRASA drew the $145M balance available in the Budgetary Reserve Fund for the purposes of satisfying the requirements of the Rate Covenant. Upon receiving the GDB's notice that it would not intend to request an appropriation or provide a commitment for another source of funding to cover all or a portion of PRASA's projected Budgetary Reserve Requirement for FY2014, PRASA proceeded to activate its rate revision process to implement the necessary rate increase which allowed PRASA to meet its obligations in FY2014 and FY2015. No additional

deposits to the Budgetary Reserve Fund were made in FY2016, nor included in the FY2017 Annual Budget.

7.6.7. Surplus Fund and Rate Stabilization Account

After all the deposits required by the MAT (as amended) have been accordingly made, any remaining moneys shall be deposited to the credit of the Surplus Fund which includes the Rate Stabilization Account. No deposit was made during FY2016 to the Rate Stabilization Account, while a $90M withdrawal was made to settle an outstanding LOC and part of the remaining balance was used for payment of interests accrued, and other disbursements made by PRASA as provided in its Rate Stabilization Account roll forward balance. PRASA is not projecting to make any deposits to the Rate Stabilization Account during FY2017. This would maintain the ending balance of the Rate Stabilization Account at $1.2M assuming PRASA makes no other withdrawals. If PRASA is not able to issue bonds or secure other sources of funds in FY2017, the balance in the Rate Stabilization Account would likely be depleted in FY2017.

7.7. Debt not Covered by MAT

As confirmed by PRASA's bond counsel, the outstanding Term Loan with GDB is not covered by the MAT. In the past, such debt was treated as CGI. In FY2016, the payment due to GDB totalled $8.8M. PRASA did not make this payment in full, and has not budgeted to make any payments thereunder in its FY2017 Annual Budget.

7.8. Other Considerations on Debt Service

In addition to providing the funds necessary to restart PRASA's CIP, the intended securitized bond transaction that would be issued under Act 68-2016 should also have a positive impact on PRASA's debt service coverage. Specifically, Act 68-2016 provides for a tender/exchange of PRASA's outstanding Senior Indebtedness, which, if finalized during FY2017 would accordingly lower PRASA's debt service payment requirements for FY2017.

Additionally, PRASA's Debt Service Requirements may be further reduced as a result of the restructuring of the USDA Rural Development Program and SRF Debt which is currently under negotiation, and which PRASA expects to be finalized before the end of FY2017.

7.9. Conclusions

PRASA's Operating Revenues and Expenses assumptions are reasonable considering recent historical performance (including FY2015 results and preliminary results for FY2016). However, the $151M Other Sources of Revenues budgeted amount is overly optimistic; failure to identify and obtain additional revenue sources in this amount will significantly impact PRASA's ability to meet its FY2017 Annual Budget, achieve its proposed CIP investments and make projected payments to CIP contractors. While Operating Revenues are projected to be sufficient to meet Senior Lien debt service payments and meet Rate Covenant DSC requirements for Senior Lien

Debt, Authority Revenues are not sufficient to meet All Obligations per the MAT which include the payment of the CGI and CSO debt service obligations in full. Therefore, PRASA will not meet its Rate Covenant Requirement of 1.0x coverage of its obligations in FY2017.

In order for PRASA to meet its Rate Covenant requirements and to continue to adequately maintain the water and sewer systems throughout FY2017, PRASA should implement an emergency rate increase that generates sufficient revenues to: meet All Obligations under the MAT (including its CGI and CSO in full amount), partially fund its CIP (covering at least the necessary/critical renewal and replacement investment needs), and pay off at least 50% of the outstanding payments owed to its CIP contractors. The amount of the rate increase would depend on the timing of its implementation and the CIP investment amount, among other factors that must be considered in a rate revision/adjustment process.

While a permanent rate increase could help PRASA meet its obligations and rate covenant requirements going forward, PRASA must consider the overall sustainability and affordability of its rates given the overall economic situation affecting Puerto Rico and recent trends affecting customer consumption profiles. As such, PRASA must develop and adopt a comprehensive fiscal plan that depends not only on rate adjustments as an additional revenue source, but that also includes revenues from additional operational initiatives (as identified and recommended by its consultants), savings in operational expenses and reductions in long-term debt service obligations.

Also, Arcadis cautions that the following events could have material negative effects on PRASA's FY2017 Annual Budget which would further exacerbate PRASA's financial situation and FY2017 results:

- Higher overtime than currently planned as a result of further delays in filling vacant positions.
- Lower savings achieved than those projected as a result of the enactment of Act 66-2014.
- Higher energy costs as a result of lower savings achieved through its Comprehensive Energy Management Program and/or higher PREPA electric costs (per kWh).
- Further postponement of PRASA's Revitalization Act (securitization) bond transaction, or inability to obtain other financing sources for the CIP at reasonable costs.
- Additional impacts imposed and required by the Financial Oversight and Management Board (formed under PROMESA) will have on PRASA, or other measures required by the Central Government.

The probability of PRASA achieving its FY2017 Annual Budget is conditioned on the following key assumptions:

1. **PRASA's ability to secure future CIP financing sources at an affordable cost and ability to complete the intended proposed securitization bond transaction –** PRASA's FY2017 Annual Budget assumes that it will be able to secure future financing from either the proposed

securitization bond transaction or through an emergency or permanent rate increase to finance its CIP and meet all obligations, including deposits to Debt Funds and Accounts. However, there is no certainty at this time that PRASA will be able to achieve either one of these during FY2017. PRASA's ability to meet its FY2017 Annual Budget assumes that the securitization bond transaction is successfully completed and PRASA is able to obtain the $151M it requires to balance its budget (currently reflected as an Other Source of Revenue under Authority Revenues). However, considering the timing and delay of the possible securitization bond transaction as the Financial Oversight and Management Board (formed under PROMESA) evaluates PRASA's Fiscal Plan, and PRASA's need to operate, maintain, renew and replace the System assets, PRASA should implement the following measures: (a) reduce its projected CIP spending to cover only the essential activities needed to continue to operate and maintain the System and renew and replace critical assets; (b) implement an emergency rate increase to cover these CIP expenditures and the deposits to its Debt Funds and Accounts, including the Commonwealth Payments Fund, in order to meet all its obligations and comply with its Rate Covenant; and (c) decrease its Operating (Current) Expenses to the extent possible by postponing any non-essential expenses.

2. **PRASA's ability to maintain its Service Revenues, billings, and collections in a very challenging economic environment** – Continued uncertainty and strain on the economy, and population shifts, and consumption patterns could continue to cause further declines in PRASA's billings (reflected in lower Service Revenues than budgeted) and collections (reflected in high Adjustment for Uncollectibles).

3. **PRASA's ability to continue to successfully implement its Operational Initiatives** – PRASA's FY2017 Annual Budget includes results from select Operational Initiatives that are described throughout this Report. The FY2017 Annual Budget also includes certain revenue enhancing and cost reduction initiatives that are currently underway. Any changes to the funding, framework and execution of the revenue optimization Operational Initiatives could significantly alter PRASA's projected Operational Revenues. Although PRASA has made a dedicated commitment to implement the initiatives described in this Report and as reflected in historical results, there is a possibility that the projected results and, more specifically, the timing of those results may not be achieved.

4. **PRASA's ability to continue to extend the forbearance agreements or restructure its CGI debt** – PRASA's FY2017 Annual Budget considers a significant reduction in debt service obligations due to, among other factors, forbearance agreements entered by and between PRASA and USEPA as well as PRASA and USDA. These agreements are due to expire in March and June 2017, respectively. Even though PRASA will continue to work with these federal entities, further extensions of the terms currently negotiated are not guaranteed.

UPDATED EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA [a] ($, Thousands)	FY2015 ACTUAL	FY2016 PRELIMINARY [b]	FY2017 ANNUAL BUDGET
	OPERATING REVENUES			
1.	Service Revenues (Base Fee and Service Charges, Net of Subsidies)	$1,006,467	$898,225	$977,132
2.	Transfer from Rate Stabilization Account [c]	-	90,000	-
3.	Operational Initiatives - Additional Billings	99,893	103,182	97,905
4.	Operational Initiatives - Collections from Prior Years	14,793	8,516	4,500
5.	Adjustment for Uncollectibles	(48,746)	(2,065)	(64,502)
6.	Other Income (Miscelaneous/Special Assessments/ZumFiber-PRASA Holdings)	7,920	10,025	8,000
7.	**Total Operating Revenues [Sum Lines 1-6]**	**$1,080,327**	**$1,107,883**	**$1,023,035**
	ADDITIONAL REVENUES			
8.	Transfer from Budgetary Reserve Fund	-	-	-
9.	General Fund Grants/Appropriations/Contributions	-	-	-
10.	Reimbursements to the Authority Revenues [c]	-	-	151,329
11.	**Total Other Sources of Revenue [Sum Lines 8-10]**	**$0**	**$0**	**$151,329**
12.	**Total Authority Revenues [Line 7 + Line 11]**	**$1,080,327**	**$1,107,883**	**$1,174,364**
	OPERATING EXPENSES			
13.	Payroll and Benefits	$292,253	$303,845	$317,824
14.	Electric Power	148,267	141,743	140,839
15.	Maintenance and Repair	39,416	39,229	44,060
16.	Chemicals	27,107	27,738	32,198
17.	Insurance	8,058	8,985	8,269
18.	Other Expenses	145,137	136,728	163,874
19.	Additional Savings from Operational Initiatives	-	-	-
20.	Capitalized Operating Expenses	(25,374)	(21,618)	(33,232)
21.	**Total Operating Expenses [Sum Lines 13-20]**	**$634,864**	**$636,650**	**$673,832**
22.	Adjustment for Non-Cash Reserves	-	-	-
23.	**Total Operating Expenses, Adjusted [Line 21 + Line 22]**	**$634,864**	**$636,650**	**$673,832**
	DEPOSITS			
24.	Deposit to the Senior Bond Fund	$354,313	$325,883	$230,789
25.	Deposit to the Senior Debt Service Reserve Fund	-	-	-
26.	Deposit to the Senior Subordinate Bond Fund	1,163	2,721	2,721
27.	Deposit to the Senior Subordinate Debt Service Reserve Fund	-	-	-
28.	Deposit to the Subordinate Bond Fund	-	-	-
29.	Deposit to the Subordinate Debt Service Reserve Fund	-	-	-
30.	Deposit to the Current Expense Fund	-	-	-
31.	Deposit to the Operating Reserve Fund	-	-	36,000
32.	Deposit to the Capital Improvement Fund	-	-	60,000
33.	Deposit to the Construction Fund	-	-	151,396
34.	Deposit to the Commowealth Payments Fund	89,986	53,198 [d,e]	19,626
35.	Deposit to the Surplus Fund	-	-	-
36.	Deposit to the Rate Stabilization Account		-	-
37.	**Total Deposits [Sum Lines 24-36]**	**$445,463**	**381,802**	**500,532**
38.	**Net Authority Revenues After Operational Expenses and Fund Deposits [Line 12-Line 23-Line 37]**	**$0**	**$89,431**	**-**
39.	**Net Authority Revenues Advanced to Pay CIP Related Expenses and Other Obligations**	**$0**	**($89,431)**	**-**
40.	**Final Balance [Line 38 - Line 39]**	**$0**	**$0**	**$0**
	DEBT SERVICE PAYMENT OBLIGATIONS AND COVERAGE CALCULATIONS PER MAT			
41.	Senior (S)	$354,313	$325,883	$230,789
42.	Senior Subordinated (SSUB)	1,163	2,721	2,721
43.	Subordinated (SUB)	-	-	-
44.	Commonwealth Guranteed Indebtedness (CGI)	88,392	88,116 [g]	82,678 [g]
45.	Commonwealth Supported Obligations (CSO)	1,594	8,999 [g]	8,999 [g]
46.	Debt Not Covered Under the MAT	-	8,752 [g,h]	8,461 [g,h]
47.	**Total Debt Service Including Debt Not Covered Under the MAT, Net of Existing Deposits**	**$445,463**	**$434,471**	**$333,649**
	RATE STABILIZATION ACCOUNT BALANCE			
48.	**Rate Stabilization Account Balance, ending balance** [i]	$93,000	$1,201 [i]	$1,201 [i]

[a] *Numbers may not add up due to rounding.*

[b] *Based on preliminary results through June 30, 2016.*

[c] *In accordance with the Sixth Supplemental Trust Agreement, any source of funding that does not otherwise constitute Authority Revenues as reimbursement for Costs of Improvements paid by PRASA in the current or the immediately preceding fiscal year from Operating Revenues, and may be used, at PRASA's discretion, to pay Current Expenses or to fund a deposit to the Senior Bond Fund or the Operating Reserve Fund.*

[d] *Not all budgeted funds were deposited in the Commonwealth Guaranteed Indebtness Account during FY2016 for payment of the Commonwealth obligations of PRASA included in the CGI for the payment of debt service that was due during the FY2016 ; a forebearance period was granted by USDA and USEPA on Rural Development and SRF loans, respectively. Per the MAT, this is not considered an Event of Default.*

[e] *No funds were deposited in the Commonwealth Supported Obligations Account during FY2016 for payment of the Puerto Rico Public Finance Corporation (PFC) debt included in the CSO; and, accordingly, no funds were transferred by PRASA to the trustee of the PFC Superaqueduct Bonds for the payment of debt service that was due in FY2016. Per the MAT, this is not considered an Event of Default.*

[f] *Considers only payments per existing forbearance agreeements with USDA and USEPA, and no payment of the CSO debt.*

[g] *Debt obligation due per debt amortization schedule.*

[h] *An existing Term Loan with GDB, which had been historically included under the CGI Debt, has been deemed as debt not covered under the MAT. PRASA did not make all payments due in FY2016 and did not budget for the payments amount due in FY2017.*

[i] *Net of transfers to/from, interests accrued, and other disbursements made by PRASA as provided in its Rate Stabilization Account rollforward balance.*

EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA DEBT SERVICE COVERAGE [a] ($, Thousands)	FY2015 ACTUAL	FY2016 PRELIMINARY	FY2017 ANNUAL APPROVED BUDGET
1.	Operating Revenues	$1,080,327	$1,107,883	$1,023,035
2.	Additional Revenues	-	-	151,329
3.	Authority Revenues [Line 1 + Line 2]	$1,080,327	$1,107,883	$1,174,364
4.	Senior Debt			
5.	Annual Debt Service Due	$354,313	$325,883	$230,789
6.	Deposit Available in Senior Bond Fund	-	-	-
7.	**DS Coverage Required = 2.50**	**3.05**	**3.40**	**4.43**
8.	Senior & Senior Subordinated Debt			
9.	Annual Debt Service	$355,476	$328,604	$233,510
10.	Deposits Available in Senior and Senior Subordinated Bond Funds	-	-	-
11.	**DS Coverage Required = 2.00**	**3.04**	**3.37**	**4.38**
12.	Senior, Subordinated Subordinated & Subordinated Debt			
13.	Annual Debt Service	$355,476	$328,604	$233,510
14.	Deposits Available in Senior, Senior Subordinated, and Subbordinated Bond Funds	-	-	-
15.	**DS Coverage Required = 1.50**	**3.04**	**3.37**	**4.38**
16.	Operating (Current) Expenses	$634,864	$636,650	$673,832
17.	Total CGI & CSO Debt	89,986	97,115	91,677
15.	Repayment from CIP to the Current Expense Fund	-	-	-
18.	Total Deposits to Other Funds, Accounts and Other Debt	-	8,752	255,857
19.	**Authority Revenues / All Obligations DS Coverage Required = 1.00**	**1.00**	**1.03**	**0.94**

[a] *Numbers may not add up due to rounding.*

8. Conclusions and Recommendations

8.1. Considerations and Assumptions

In preparation of this Report and the conclusions contained herein, Arcadis 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. Arcadis 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 by others, the actual results will vary from those forecast.

In the preparation of this report, Arcadis has made several considerations and assumptions (as provided throughout this report); some of the most notable are as follows:

1. Arcadis has made no determination as to the validity and enforceability of any contracts, agreements, existing laws, rules, or regulations applicable to PRASA and its operations. However, for purposes of this report, Arcadis has assumed that all such contracts, agreements, laws, rules and regulations will be fully enforceable in accordance with their terms.
2. PRASA will 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, the CIP will be largely implemented as planned and reflected in this report, and PRASA will make modifications to the CIP investment forecast if the overall System condition is negatively affected by the lower capital investment levels projected in future years.

Set forth below are the most relevant opinions which Arcadis has reached regarding the review of PRASA's System, CIP and financial projections.

1. Although PRASA continues to have some staffing needs at individual facilities or departments, PRASA's current organization is adequate for the operation, management and maintenance of the System. Nevertheless, filling certain vacant position could help PRASA reduce overtime costs and address System O&M needs more efficiently. As per AWWA's 2015 Benchmarking Performance indicators, PRASA's customer account per employee ratio falls on the lower side of the industry median, which can be attributed to the larger size and higher complexity of PRASA's System compared to U.S. systems. To the extent that PRASA is able to accelerate its staff management plan, additional cost efficiencies could be achieved.

2. PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer service, System performance, and budget controls as stipulated in PRASA's Strategic Plan.

KPI and metrics being measured, along with stronger management oversight have contributed to improvements and optimization of operations and overall organization.

3. The enactment of Act 66-2014 should help PRASA modify some of its O&M processes and lower O&M costs; however, expected O&M savings will be offset by lower revenues to be generated from certain government accounts. Also, enactment of Act 211-2015 may help PRASA reduce expenses but will likely affect PRASA's institutional knowledge and could have an adverse impact on PRASA's staff management plan.

4. In general, the condition of the facilities visited for the 2015 condition assessment, varied from those recently upgraded/rehabilitated to those requiring capital upgrades. Approximately 93% of the facilities inspected are in the adequate to good range. When compared to 2014 inspection results, there was a noticeable increase in facilities (11 facilities) in the poor rating. Comparing to the 2015-2016 assessment results by asset category with those of the 2014 condition assessment, some changes were found for Wells, WTPs, WPS and WWTPs. Only one dam, Cidra, was degraded to poor. Cidra is utilized by PRASA as a raw water source and represents a high hazard in the event of an uncontrolled release of impounded water or in the ability to provide constant quality drinking water. A small number of WTPs declined from good to adequate, performing slightly worse with respect to compliance with limits of effluent discharge parameters. This was mostly driven by: (a) a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 D/DBPR; and (b) the reduction and ultimate suspension of the CIP. Regarding the WWTP, some of the facilities which have being rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters. There were nine facilities rated as poor compared to only two in the 2014 inspections. Also, process control continues to be a challenge in some of the facilities. Factor affecting the condition of WWTPs include (a) recurring observations identified in previous inspections of issues that have not yet been addressed and (b) the slowing down of the CIP and R&R programs due to the fiscal situation and budget limitations. Finally, as it pertains to the ancillary assets, there was an equivalent or slight improvement in overall scores for WWPS and WPS and a slight decrease for water tanks. A significant lower rating in wells overall scores compared to the 2014 results was observed. Most of the deficiencies noted can be addressed through PRASA's R&R program and may not require major capital improvements.

5. PRASA recognizes that the current amount of NRW is high and is implementing sound strategic programs and initiatives to measure, manage, and reduce water losses and NRW. PRASA continues to work on and improve its leak detection and monitoring practices. PRASA has established a resource fully dedicated to NRW monitoring and is working on the creation of a NRW management team. PRASA is now conducting periodic water audits which are used to implement the necessary controls and develop action items to address NRW. The decreasing trend reported by PRASA since FY2012 demonstrates a positive change in PRASA's efforts to reduce water losses and NRW. However, significant capital investments and R&R funded

budgets are required to accelerate the NRW program and address leak occurrences in both a corrective and preventive manner.

6. Although the number of sanitary overflows is also high compared to the U.S., PRASA has continued to improve its response time and attention/repair effectiveness to minimize the duration of these overflow events and their environmental impact. However, it is important to indicate that the current fiscal situation can adversely affect the sewer overflow repair and attention rates as well.

7. PRASA's Operational Initiatives are well developed and address critical aspects of PRASA's operation such as NRW, energy management and efficiency, and revenue stream diversification. However, the development, implementation and overall schedules and benefits realization of these initiatives have been negatively affected due to funding issues. This, in turn, has affected the projected additional revenues and cost savings to be realized through some of these initiatives that had been projected for FY2016 and FY2017 and, more likely than not, for future fiscal years. Nevertheless, the Revenue Optimization Program has continued to provide significant benefits to PRASA in the form of increased revenues as evidenced by recent and historical financial results.

8. Except for buried infrastructure improvements, PRASA's Board-approved CIP along with the O&M initiatives are in alignment with the System needs. It is important that PRASA maintain an adequate level of R&R spend to maintain and renovate the System. U.S. industry guidelines recommend that assets, particularly buried infrastructure, be replaced at a rate of 1% of total assets (within an asset class) annually. PRASA's Board-approved CIP also adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies. While PRASA has begun to identify the potential impact of new regulations, 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. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. However, any additional CIP needs will be prioritized and implementation schedules will depend on PRASA's financial capacity. PRASA's CIP was suspended in FY2016 due to funding problems and PRASA accumulated an outstanding debt of approximately $150M owed to its contractors.

9. PRASA's Master Plan Update, which included the service area re-assessment evaluation and demands update; and the water and wastewater infrastructure needs and project scopes update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030 as a result of the projected continuing decline in population and demand. Thus, certain future infrastructure expansion and new infrastructure needs that had been previously planned for future years are no longer required. However, changes in Puerto Rico's long-term

population projections may affect these results. In FY2015 the last two tasks of the Master Plan Update were completed; Task 3: CIP Reconciliation, and Task 4: Prioritization and Scheduling. However, the implementation and consolidation of the resulting projects with the CIP has yet to be performed. Additional modifications to PRASA's Master Plan may be warranted as conversations with Regulatory Agencies continue and additional regulatory requirements and needs arise.

10. During FY2015 PRASA completed a Vulnerability Study and Adaptation Plan for its entire infrastructure. The Vulnerability Study assessed PRASA's infrastructure to identify potential climate change risks and impacts caused by five indicators or stressors: temperature, precipitation, sea level rise, hurricanes and tropical storms, and ocean acidification. The overall infrastructure of PRASA was evaluated and individual risks were identified for each given stressor. In turn, each identified risk was qualitatively and quantitatively evaluated based on the scale of the impact, probability of occurrence, special scale and time lapse expected for occurrence. The Adaptation Plan analyzed all the climate change impacts identified in the Vulnerability Study and developed a set of actions and strategies to be performed in order to minimize its effects on facilities and operations. The Climate Change Vulnerability Study findings and the strategies selected in the Adaptation Plan will be further assessed and projects shall then be developed and included in PRASA's CIP as needed. These projects shall follow the same guidelines set in the prioritization system. These climate change-based projects will serve as a roadmap for PRASA in the planning process and in its preparation towards the expected impacts of climate change in the near and not so distant future.

11. The insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. Also, the Owner Controlled Insurance Program (OCIP) covering PRASA's exposures to risks of accidental property and liability losses arising from construction activities provides reasonable coverage. PRASA should address the following key recommendations:

    - Re-Conduct a Probable Maximum Loss (PML) Study considering new Catastrophe (CAT) Modellings and parameters. AON is in the process of data gathering for the PML Analysis.
    - Complete a thorough evaluation of PRASA's current Professional Liability Programs.
    - Consider adding underground storage tank coverage to the pollution liability policy.
    - Consideration of Terrorism Coverage, which is excluded under all current PRASA's Insurance Programs.

12. Arcadis's financial review for this CER was limited to assessing the actual results for FY2015, preliminary results for FY2016 and FY2017 Annual Budget, as amended. PRASA met its Rate Covenant Requirements for FY2015 and FY2017. However, the probability of PRASA

achieving its FY2017 Annual Budget and meeting both its DSC requirements and its Rate Covenant, is conditioned on the following key assumptions:

- **PRASA's ability to secure future CIP financing sources at an affordable cost and ability to complete the intended proposed securitization bond transaction –** PRASA's FY2017 Annual Budget assumes that it will be able to secure future financing from either the proposed securitization bond transaction or through an emergency or permanent rate increase to finance its CIP and meet all obligations, including deposits to Debt Funds and Accounts. However, there is no certainty at this time that PRASA will be able to achieve either one of these during FY2017. PRASA's ability to meet its FY2017 Annual Budget assumes that the securitization bond transaction is successfully completed and PRASA is able to obtain the $151M it requires to balance its budget (currently reflected as an Other Source of Revenue under Authority Revenues). However, considering the timing and delay of the possible securitization bond transaction as the Financial Oversight and Management Board (formed under PROMESA) evaluates PRASA's Fiscal Plan, and PRASA's need to operate, maintain, renew and replace the System assets, PRASA should implement the following measures: (a) reduce its projected CIP spending to cover only the essential activities needed to continue to operate and maintain the System and renew and replace critical assets; (b) implement an emergency rate increase to cover these CIP expenditures and the deposits to its Debt Funds and Accounts, including the Commonwealth Payments Fund, in order to meet all its obligations and comply with its Rate Covenant; and (c) decrease its Operating (Current) Expenses to the extent possible by postponing any non-essential expenses.

- **PRASA's ability to maintain its Service Revenues, billings, and collections in a very challenging economic environment** – Continued uncertainty and strain on the economy, and population shifts, and consumption patterns could continue to cause further declines in PRASA's billings (reflected in lower Service Revenues than budgeted) and collections (reflected in high Adjustment for Uncollectibles).

- **PRASA's ability to continue to successfully implement its Operational Initiatives –** PRASA's FY2017 Annual Budget includes results from select Operational Initiatives. The FY2017 Annual Budget also includes certain revenue enhancing and cost reduction initiatives that are currently underway. Any changes to the funding, framework and execution of the revenue optimization Operational Initiatives could significantly alter PRASA's projected Operational Revenues. Although PRASA has made a dedicated commitment to implement the initiatives described in this Report and as reflected in historical results, there is a possibility that the projected results and, more specifically, the timing of those results may not be achieved.

- **PRASA's ability to continue to extend the forbearance agreements or restructure its CGI debt –** PRASA's FY2017 Annual Budget considers a significant reduction in debt

service obligations due to, among other factors, forbearance agreements entered by and between PRASA and USEPA as well as PRASA and USDA. These agreements are due to expire in March and June 2017, respectively. Even though PRASA will continue to work with these federal entities, further extensions of the terms currently negotiated are not guaranteed.

13. In order for PRASA to meet its Rate Covenant requirements and to continue to adequately maintain the water and sewer systems throughout FY2017, PRASA should implement an emergency rate increase that generates sufficient revenues to: meet All Obligations under the MAT (including its CGI and CSO in full amount), partially fund its CIP (covering at least the necessary/critical renewal and replacement investment needs), and pay off at least 50% of the outstanding payments owed to its CIP contractors. The amount of the rate increase would depend on the timing of its implementation and the CIP investment amount, among other factors that must be considered in a rate revision/adjustment process.

14. While a permanent rate increase could help PRASA meet its obligations and rate covenant requirements going forward, PRASA must consider the overall sustainability and affordability of its rates given the overall economic situation affecting Puerto Rico and recent trends affecting customer consumption profiles. As such, PRASA must develop and adopt a comprehensive fiscal plan that depends not only on rate adjustments as an additional revenue source, but that also includes revenues from additional operational initiatives (as identified and recommended by its consultants), savings in operational expenses and reductions in long-term debt service obligations.

These conclusions and recommendations, as well as the and the report in its entirety, is qualified by, and should be considered in light of, the limitations, conditions and considerations described in Section 1.5.

Respectfully Submitted,
Arcadis Caribe, P.S.C.

/s/ Melissa L. Pomales, P.E.
Director

Arcadis Caribe, P.S.C.

48 City View Plaza 1 Suite 401

Rd. 165, Km 1.2

Guaynabo, Puerto Rico 00968

Tel 787 777 4000

Fax 787 777 8086

Puerto Rico Aqueduct and Sewer Authority

COMMONWEALTH OF PUERTO RICO

Puerto Rico Aqueduct and Sewer Authority

ARCADIS Design & Consultancy for natural and built assets