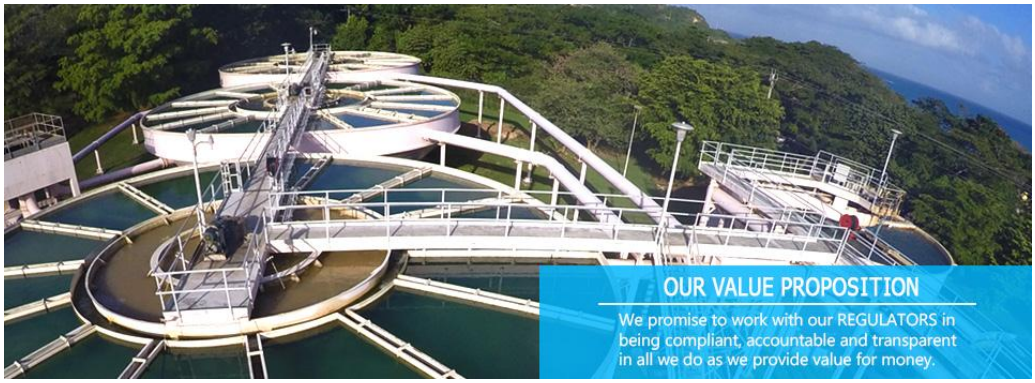
NATIONAL WATER COMMISSION

MID-TARIFF REVIEW

October 2013 to April 2016



Updated August 2016

NATIONAL WATER COMMISSION
Water is life

Contents

1 Introduction

1.1 October 2013 Tariff Determination

National Water Commission (NWC) submitted an application to the Office of Utilities Regulation (OUR) for an adjustment to its rates and service, as well as its operational standards, on March 11 2013. After consideration of this application and public consultations, the OUR made its determination of tariff for water supply and sewerage services provided by NWC. This determination was set out in its document entitled *National Water Commission Review of Rates – Determination Notice (2013/WAS/004/DET.003)* dated October 1st 2013. The tariff regime became effective on October 3rd 2013 and was established for a five (5) year period, October 2013 to September 2018.

The OUR indicated in its October 2013 Tariff Determination that it will conduct a mid-tariff review on the Guaranteed Standards Scheme and that it reserves the right to amend the schedule for the K-Factor and X-Factor at that time. We are now at the mid-tariff stage and we invite the OUR to conduct the mid-tariff review, not just of the Guaranteed Standards Scheme and K-Factor/X-Factor schedule, but to extend this to include other issues such as the criteria for K-Factor eligible projects. We have also presented events that have materially affected the NWC's operations and financial health since 2013.

1.2 Main Aspects of the Tariff

Set out below are the key aspects of the October 2013 OUR Tariff Determination Notice for water supply and sewerage services provided by NWC

- The OUR granted an effective 19% increase in water rates and 8% in sewerage rates.
- There were revisions to the weights for the price adjustment mechanism (PAM) and these revisions are shown in Table 1.1 below:

Table 1.1 – Effective PAM Weights

Index	Weights Prior to Oct 2013	Weights After Oct 2013
CPI	47%	51%
Electricity	25%	25%
Foreign Exchange	28%	24%
Total	*100%*	*100%*

The OUR also determined that all the indices are to be applied on a monthly basis. The PAM will also be reset on its anniversary date at which time new base values for the three (3) components will be set. The base values for the PAM indices as at July 2013 were:

- Electricity: $31.41/kWh
- Exchange Rate: J$101.76 to US$1.00
- CPI All divisions: 200.9

- The OUR continued to allow the application of the K-factor on customers' bills to finance projects that are eligible for inclusion in the K-Factor Programme and for the efficiency gains from these projects to be passed back to the customer through the application of the X-Factor. After initially restricting the K-Factor programme to five (5) years in its original determination; the OUR changed its decision after the NWC submitted a request for reconsideration of certain aspects of the October 2013 Determination Notice. The K-Factor Programme was approved for an additional period of fifteen years up to 2032, being subject to review at each tariff determination. The schedule for the application of the K-Factor and the X-Factor through to 2018 is shown in table 1.2 below.

Table 1.2 Schedules of Applicable K-Factor and X-Factor

Year Ending March	2014	2015	2016	2017	2018
K-Factor	14%	14%	14%	14%	14%
X-Factor	0	-5.5%	-9.7%	-12.7%	-15.2%

- A set of fifteen (15) Guaranteed Standards (WGS) came into effect on October 3, 2013; three were new Guaranteed Standards being introduced and five of the twelve that existed for the previous tariff regime were amended. A sixth Guaranteed Standard was amended following the reconsideration by the OUR in July 2014 at the request of NWC.

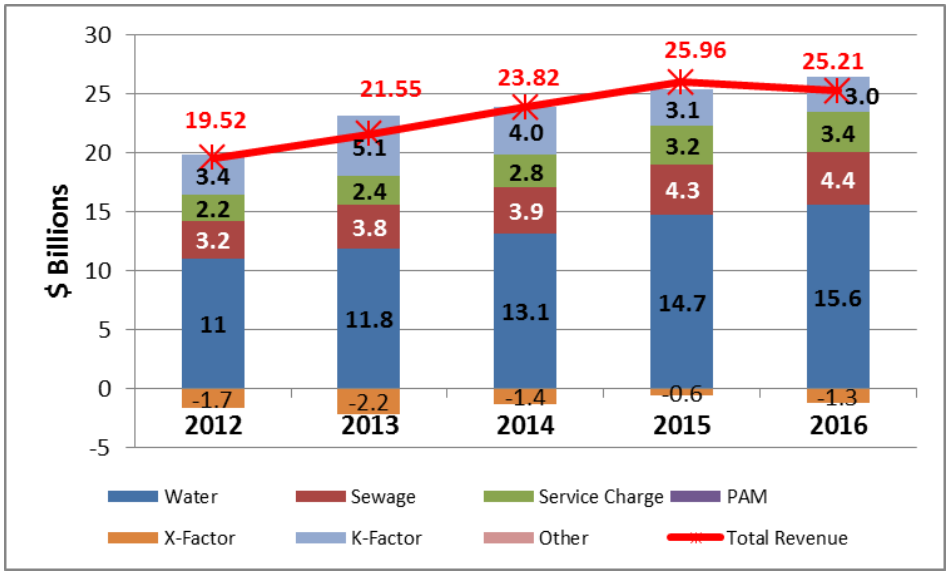
2 Review of NWC Financial Performance

2.1 Revenue

2.1.1 Revenue Trend

NWC's revenues steadily increased from $21.6 billion in 2012/13 to $26 billion in 2014/15, and then declined to $25.2 billion in 2015/16. Figure 2.1 below shows that NWC's largest revenue source is water billings, followed by sewerage billings and service charge respectively. The revenue increases between 2012/13 and 2014/15 were largely driven by the new tariff and PAM, while the decline in 2015/16 was mainly due to a negative PAM during that period and the application of the X-Factor (-5.5%).

Fig 2.1 – Revenue Breakdown (2011/12 to 20115/16)



The decrease in revenues in 2016 point to an important trend—if electricity prices continue to stay depressed and the OUR insists on higher X-factor deductions, NWC's revenues may continue to reduce or, at best, stay flat unless tariffs are increased or the rate of addition of new customers is increased.

2.1.2 Revenue is below Projections

Despite the increased revenues outlined above, NWC's actual annual revenues since the implementation of the tariff have been significantly lower than was projected. Table 2.1 compares the actual revenues with the projections that were made for the October 2013 determination. It shows that at the end of 2016 there is an accumulated adverse variance of $21 billion ($9.5 billion in 2015/16).

Table 2.1 – Projected Revenue versus Actual in billions of dollars

	2013	2014	2015	2016
Projected Revenue	21,292,860	29,877,902	31,694,646	34,667,916
Actual Revenue	21,553,419	23,819,470	25,960,689	25,206,967
Variance *(Actual - Projected)*	260,559	(6,058,432)	(5,733,957)	(9,460,949)
Cumulative Shortfall		(5,797,873)	(11,792,389)	(20,992,779)

2.1.3 Billed Water Consumption& Sewerage Usage

The large variance in actual versus projected revenue is mainly due to declines in billed water consumption and associated sewerage charges. Billed water consumption decreased by 5% overall since the implementation of the October 2013 Tariff Determination and sewerage usage also decreased by 5% over the period. The decline in water sales and sewerage usage were driven by the extreme drought conditions that prevailed over the last two years. These drought conditions caused a reduction in the water available for treatment and distribution. Sewerage usage is related to water sales and therefore a reduction in water sales directly impacted on sewerage usage and revenue from sewerage.

Table 2.2 shows the declined in billed water consumption and sewerage usage since the October 2013 Tariff Determination.

Table 2.2 – Billed Water Consumption and Sewerage Usage

	2013	2014	2015	2016	2016 v 2013
Billed Water Consumption ('000 Gallons)	19,320,802	18,944,340	18,166,580	18,376,749	
% Change		*-1.9%*	*-4.1%*	*1.2%*	***-5%***
Billed Sewerage Usage ('000 Gallons)	5,527,849	4,020,357	5,271,405	5,275,954	
% Change		*-27.3%*	*31.1%*	*0.1%*	***-5%***

2.1.4 Revenue Impact of Loss of Major Water Users

NWC has lost nine major customers in St. Ann as a result of the "cherry picking" approach by some of the small water operators in the area. NWC has a tariff regime that is applied across the country, including areas such as Ocho Rios where the cost of water production and distribution is relatively low. Small operators have been able to leverage the relative low cost of producing and distributing water in

particular areas to lure some of our larger water users to be supplied by them. The annual loss of revenue resulting from this is estimated at $500M.

2.1.5 Revenue Impact from Growth in Number of Inactive Accounts

NWC has been aggressive in its treatment of delinquent customers; disconnecting services is part of the measures applied. These disconnected customers become "inactive" and NWC would therefore no longer generate revenue from these accounts. The challenging economic conditions have adversely impacted on a number of Jamaicans and many of these persons whose services were disconnected have found it difficult to settle their arrears. As a result there was an overall 15% increase in the number of inactive accounts at the end of 2016 compared to end 2013. The cumulative potential loss in revenue over the period, as a result of the increase in the number of inactive accounts, is estimated at $1.8 billion. Table 2.3 shows the trend in the number of inactive accounts and the potential annual revenue loss from the increased number of inactive accounts compared to that at the end 2013. The average potential revenue per account is estimated at $3,000 per month.

Table 2.3 – Inactive Accounts

	2012/13	2013/14	2014/15	2015/16
Inactive Accounts (No.)	100,599	112,189	123,015	115,999
Change *(using end 2012/13 as base)*		11,590	22,416	15,400
Potential Loss in Revenue ($M) - using end 2012/13 as		417	807	554
Cumulative Potential Loss in Revenue			*1,224*	*1,779*

2.2 Operational Expenses

2.2.1 Expenses are below Projections

NWC has been able to manage its operating expenses to the extent that actual expenses have been less than that projected during the current tariff regime as seen in table 2.5 below. The cumulative variance over the last three financial years amounted to a favourable $4.1B. This favourable variance in 2015/16 was in part due to the continued decrease in the cost of electricity during that period.

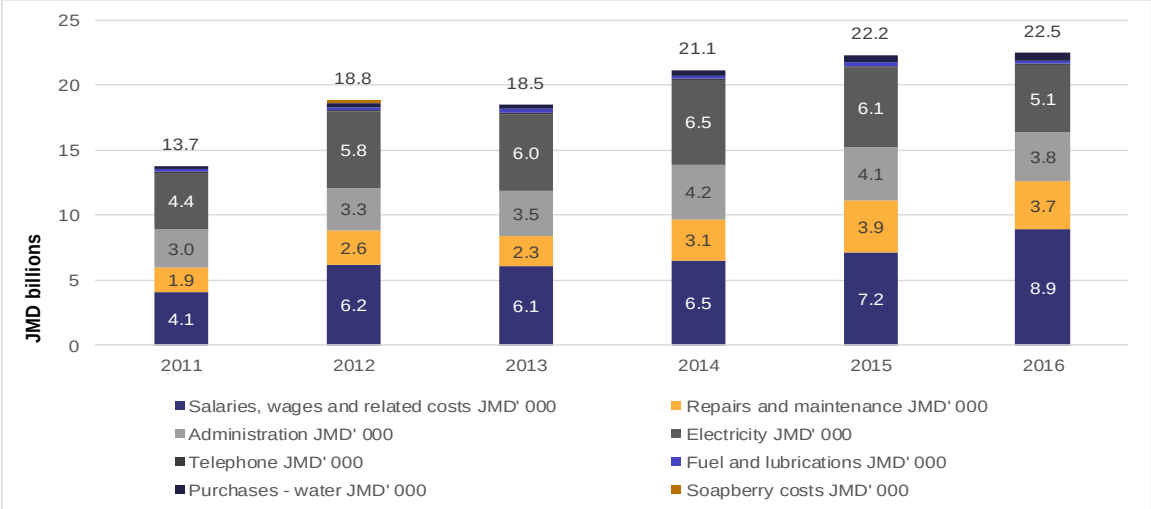
Table 2.5 – Projected Expenses versus Actual

	2013	2014	2015	2016
Projected Expenses	17,293,681	21,608,733	22,919,472	24,295,259
Actual Expenses	18,470,030	21,093,427	22,245,397	21,364,991
Variance (Actual - Projections)	1,176,349	(515,306)	(674,075)	(2,930,268)
Cumulative Variance		661,043	(1,189,381)	(4,119,649)

2.2.2 Main Components of Operational Expenses

Figure 2.2 shows the breakdown of operational expenses from 2011 to 2016.

Figure 2.2 – Breakdown of Operational Expenses



It is seen that there were increases in salaries, wages and related costs ($6.1B in 2013 increasing to $8.9B in 2016). The main drivers for this trend were:

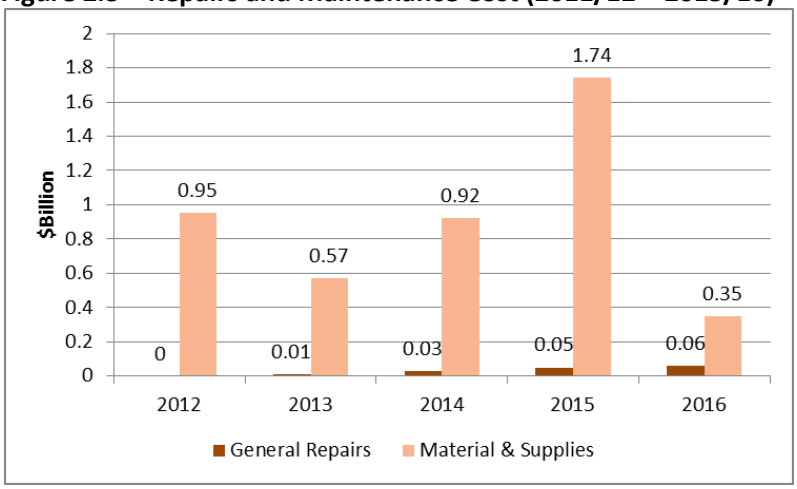
- The extended drought from 2014 to 2015 put significant pressure on staff and hence, overtime work increased appreciably;
- The rise in pension payments due to a re-measurement of the employees benefits obligation, resulting in increased pay-outs for pensions.
- Impact of organization restructuring that took place after the 2013 OUR tariff determination, with new positions added.

The 2014-2015 drought also explains the increase in repairs and maintenance costs seen, increasing from $2.3 billion in 2012/13 to $3.9 billion in 2014/2015. As the drought ended in late 2015, repairs and maintenance costs decreased over the remaining months of financial year 2015/16 resulting in the year ending at $3.7 billion, slightly lower than that in 2014/15.

The impact of the drought is also reflected in the increase in the materials and supplies cost as shown in Figure 2.3 below. Expenses for materials and supplies increased from $0.57 billion in 2012/13 to $0.92 billion in 2013/14 and $1.74 billion in 2014/15. This fell dramatically in 2015/16 to $0.35 billion. The drought was clearly the main factor having an impact on these expenses as it dramatically rose during the drought and dramatically fell after it ended.

Electricity costs have been decreasing in recent years due to lower electricity prices. The reduced electricity costs have helped to offset some of the increases in other expenses.

Figure 2.3 – Repairs and Maintenance Cost (2011/12 – 2015/16)



It would be noted that administration costs increased between 2012/13 and 2013/14, but decreased in the following years to 2015/16. Administration costs are largely NWC's provisions for all accounts receivables due for more than 360 days. Administration costs increased from $3.5 billion in 2013 to $4.1 billion in 2015 as NWC recognized bad debts in its books. This was part of a wider program to streamline and increase collections. Consequently, bad debts have reduced in 2016 which decreased the overall administration costs.

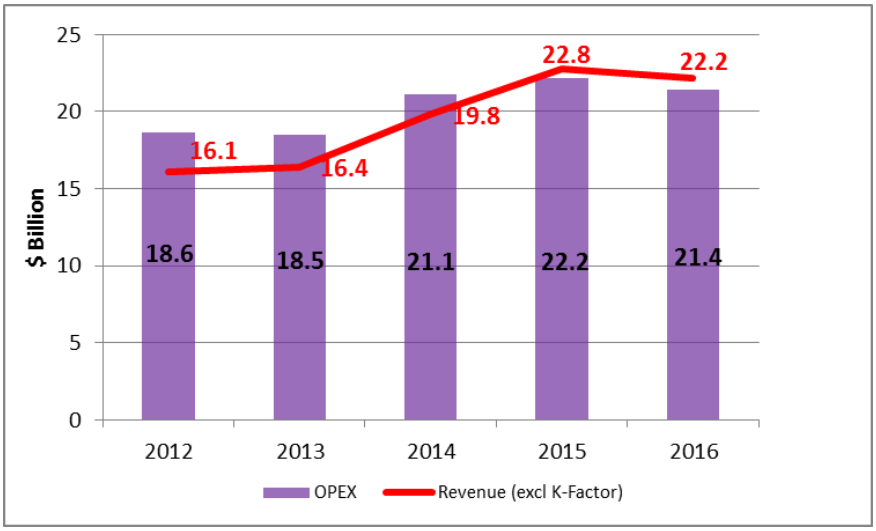
2.2.3 Revenue (excluding K-Factor) versus Operating Expenses

Figure 2.4 shows that the revenues that NWC receives (excluding revenue from the K-factor) have not adequately covered the level of operating expenses. Operating expenses include staff costs, repairs and maintenance costs, administration costs, electricity, fuel and lubricants, and water purchases, and do not include depreciation. Administration costs include a provision for all accounts receivables due for more than 360 days.

Since revenue (excluding K-Factor) did not cover operating expenses in 2013/14 and barely did so in 2014/15 and 2015/16; and with the collection rate low, it would appear that NWC would be facing a cash shortfall. NWC has had cash to cover its operating expenses because some of the operating expenses are not cash expenses:

- In 2015/16, NWC made provisions of $2.2 billion for bad debt, which is about 10% of the revenue (excluding K-Factor) - this is not a cash expense.
- Staff costs include some pension costs that are not cash expenses but only provisions.

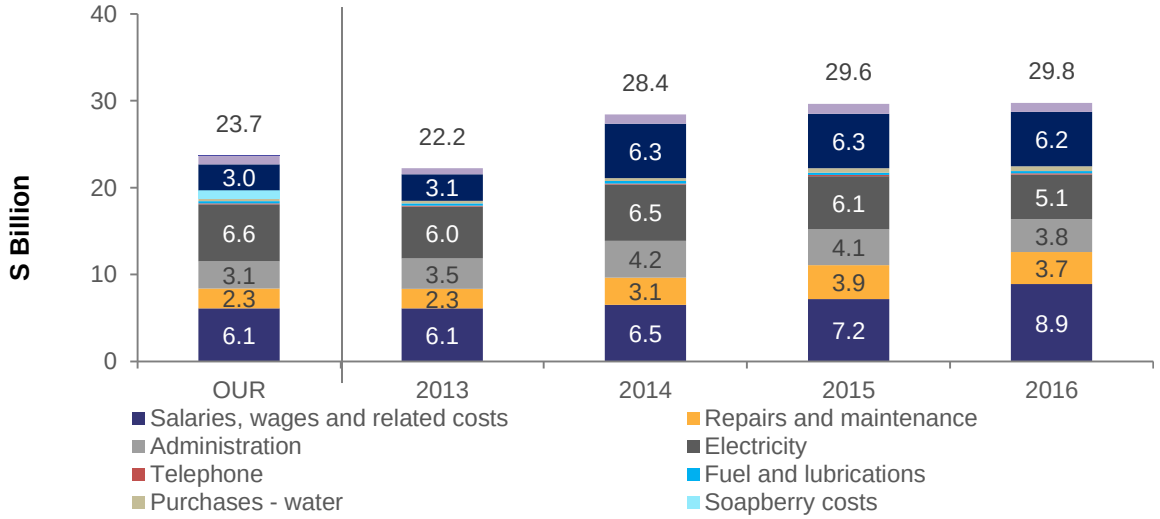
Fig 2.4 – Revenue (exclude K-Factor Revenue) vs Operating Expenses (2011/12 – 2015/16)



2.3 Actual Cost of Service versus the OUR's Cost Estimate

NWC's cost of service in 2013 was lower than the estimate used by the OUR in arriving at its 2013 Determination. From 2014, however, the total cost of service was significantly higher than the OUR's estimates. Figure 2.5 shows the breakdown of the OUR's estimates compared to NWC's actual cost from 2013 to 2016.

Figure 2.5 – Actual COS vs OUR Cost Estimates (2013- 2016)



As shown in Figure 2.5, the most significant differences between the estimated costs and the actual costs are seen in salaries, wages and related costs, electricity bills, depreciation, and repairs and maintenance.

It should be noted that depreciation costs increased from $ 3.1 billion in 2013 to $ 6.3 billion in 2015. This was due to the revaluation of some of NWC's fixed assets that took place in 2013.

2.4 Financial Targets

2.4.1 Targets versus Actual Performance

The OUR established Financial Performance Targets in the Regulatory Framework for the regulatory period October 2013 to September 2018 and these have been used to monitor the financial performance of the NWC. Table 2.6A shows the targets that were included in the Regulatory period 2008 – 2013 and continued in the 2013 – 2018 Tariff and NWC's actual performance against these targets.

Table 2.6A – Financial Targets versus Actual Performance ***(prior to 2013-2018 Regulatory Framework)***

Objective	Critical Measures	Definition	Min/ Max	2013/14	2014/15		2015/16	
				Performance	Target	Performance	Target (Min)	Performance
Receivables	Days of Sales Outstanding	(Net Accounts Receivables/ Revenue)*365	**Max**	81	**50**	83	**50**	82
Employee Efficiency	Staff Efficiency	No. Employees/ No. Water Connections (thousands)	**Max**	4.3	**4.5**	4.1	**4.5**	4.0
Billing & Collection	Collection Rate	Collected Revenue/Revenue	**Min**	84%	**92%**	87%	**92%**	92%
	Bad Debt Ratio	Uncollectable Revenue/Revenue	**Max**	11%	**8%**	10%	**8%**	6%
Asset Valuation	Assets should reflect fair market valuation	Asset values updated annually	**Min**	100%	**100%**	None done	**100%**	None done
X-Factor	Application of X-Factor	Consistent deduction of X-Factor from bill after normal rates & PAM	**Min**	100%	**100%**	100%	**100%**	100%
K-Factor	K-Factor application, accounting & reporting	Consistent application, accounting & reporting of K-Factor funds	**Min**	100%	**100%**	100%	**100%**	100%
K-Factor Monitoring	Reporting on impact of K-Factor projects	Post project evaluation of each K-Factor project		Partial reporting	**Full Reporting**	Partial reporting	**Full reporting**	Partial reporting

Table 2.6B shows the performance targets that NWC had proposed in its 2013 tariff application and which were accepted by the OUR for inclusion in the 2013-2018 Regulatory Framework and shows the actual performance of the NWC against these targets.

Table 2.6B – Financial Targets versus Actual Performance *(Added in the 2013-2018 Regulatory Framework)*

Objective	Critical Measures	Definition	Min/ Max	2013/14	2014/15		2015/16	
				Performance	Target	Performance	Target (Min)	Performance
Profitability	Profit Margin	Net Profit (Loss)/ Revenues	**Min**	-29%	**3%**	-5%	**8%**	-17%
	Net Profit Margin	Operating profit(loss)/ Revenues	**Min**	11%	**7%**	14%	**9%**	15%
Efficiency	EBITDA Margin	EBITDA /Billed Revenue	**Min**	11%	**36%**	14%	**41%**	15%
Liquidity	Quick Ratio	Current Assets / Current Liability (incl current portion of long term debt)	**Min**	0.68	**1.2**	0.65	**1.2**	0.73
	Quick Ratio	(Current Assets - Inventory) / Current Liability	**Min**	0.87	**1.0**	0.75	**1.2**	0.75
Bankability	Debt Service Coverage Ratio	EBITDA / Debt Repayment + Interests	**Min**	1.1	**2.5**	1.13	**2.5**	1.12
Gearing	Debt Ratio	Total Adjusted Liabilities / (Total Adjusted Liability + Equity)	**Max**	64%	**55%**	67%	**55%**	82%

The tables above show that NWC met some of the financial targets. For example, collection rate has improved from 84% of billing to 92% at the end of financial year 2015/16 and thereby achieving the target. The staff efficiency reduced from 4.5 employees per one thousand water accounts in 2013/14 to fewer than 3.9 by the end of financial year 2015/16; this was below the 4.5 employees per thousand water accounts target. It should be noted that staff efficiency here is based on total number of employees, including those for sewerage operations, and number of water connections. If the total number of employees is to be used then the total number of water and sewerage connections should be used to determine staff efficiency.

The actual performance of most of these financial indicators, however, did not achieve or exceed the targets. These are discussed below.

2.4.2 Profitability

NWC has exceeded the target for operating profit margin over the last 2 years, indicating that its revenue has been sufficiently covering its operating expenses. The impact of lower than anticipated revenue, bank charges, large interest on loan and high foreign exchange losses have adversely affected the net profit margin, resulting in significant losses during the period.

As was shown in earlier, there were significant increases in depreciation costs which surged from $3.1B in 2013 to$ 6.3B in 2015. This was due to the revaluation of some of NWC's fixed assets that took place in 2013. Increases in depreciation charges played a significant role in the fluctuation in profit margin which improved from -29% in 2014 to -5%, but deteriorated to -17% in 2016. Increased foreign exchange losses as a result of the devaluation of the Jamaican dollar over the period, as well as loan interest

payments and payment of taxes also adversely impacted on profit margin. (A breakdown of the effects of the Foreign Exchange losses can be seen in the appendices).

2.4.3 EBITDA Margin

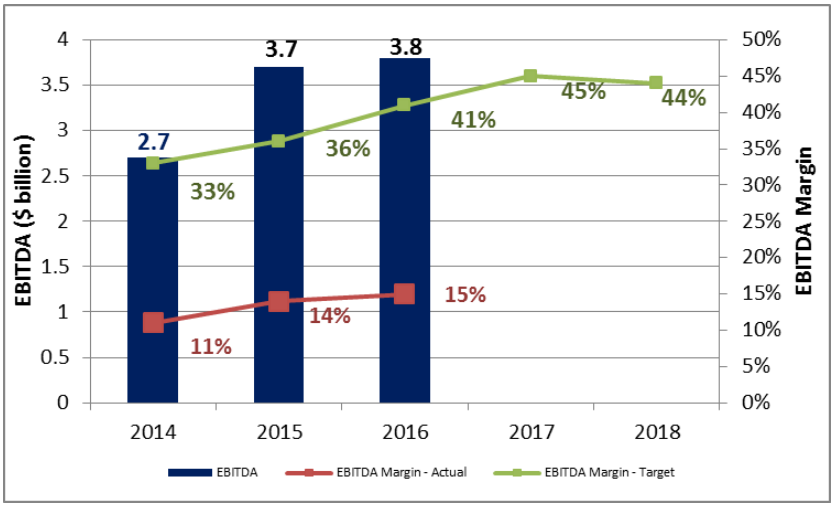
The EBITDA margin is a measurement of a company's operating profitability. A higher EBITDA margin means that the company is generating more operating cash for each dollar of revenue expended.

NWC's EBITDA margin improved from 11% in 2014 to 14% in 2015 and to 15% in 2016. Despite these improvements, NWC's EBITDA margin was below the targets during the period (see Figure 2.6).

It must be noted that net profit margin and EBITDA are measuring the same thing and OUR has provided two different sets of targets for these indicators in the 2013-2018 Regulatory Framework.

It is important to note that the revenue figures used to calculate this EBITDA margin include K-Factor revenue (as it is part of the total revenue, which is the input for the EBITDA calculation). If K-Factor revenue were not included in the calculation, the EBITDA margin would be negative for 2014 and 2016. This accords with the findings in Section 2.3, as NWC's tariff does not currently adequately cover its operating expenses, let alone its total cost of service.

Figure 2.6 – EBITDA Margin



2.4.4 Liquidity

The liquidity ratio measures the company's ability to pay its debt obligations. Here the quick ratios used are based on: (i) current assets minus inventories divided by the current liabilities (including the current portion of the long term debt); and (ii) current assets minus inventories divided by the current liabilities. Both ratios were below the targets, indicating the challenge that NWC is having in meeting its debt obligations.

While the company has been making an operating profit – with a significant fall in 2016, it is becoming increasingly difficult to generate cash flow to cover long term debt obligations. In an effort to decrease

the burden of long-term debt obligations, the Commission will be aggressively implementing measures aimed at:

- Increasing available cash
- Identifying alternative sources of funding major projects, such as the use of public private partnerships and grants.

2.4.5 Bankability

The debt service coverage ratio is a key financial performance indicator for the NWC. The debt service coverage ratio also measures the company's ability to pay its debts; a debt coverage ratio below 1 indicates insufficient operating income to cover debt payments. A higher debt service coverage ratio is therefore better, and commercial banks generally request a debt coverage ratio of at least 1.2.

NWC's debt service coverage ratio moved from 1.1 in 2014 to 1.13 in 2015 to 1.12 in 2016, which is below the OUR target of 2.5. This means that it is becoming increasingly difficult for NWC to repay its long term loan and cover its interest payment. Table 2.7 shows principal repayment and interest payments from 2014 to 2016. It is seen that total debt service increased by 39% from $2.5 billion in 2014 to $3.4 billion in 2016.

Table 2.7 Increase in Debt Service from 2014 to 2016

Component	2013/14	2014/15	2015/16
Principal Repayment	1,412,888	2,142,617	2,394,524
Interest Payment	1,064,381	1,131,176	1,046,675
Total Debt Service	**2,477,269**	**3,273,793**	**3,441,199**

2.4.6 Gearing

The gearing ratio, which is a measure of the company's financial leverage, has exceeded the targeted maximum of 55%. The company's equity continued to diminish, with the current lack of equity resulting from the continuous losses experienced over a number of years.

3 Operational Performance

3.1 Performance against Targets

The OUR established *Operational Performance Targets* for the NWC as part of the October 2013 Tariff Determination and these performance targets are used to monitor the company's operation during the tariff period from 2013 to 2018. The NWC's performance against these targets is shown in tables 3.1 and 3.2 below.

Table 3.1 – Operational Performance (A-F)

Item	Parameter	Requirement	Achievement
A	Non Revenue Water (NRW)	NRW at most 55% by end of year 3	NRW at 69%
B	Coverage	85% coverage for water & 60% sewerage by 2020	73% water coverage, 20% sewerage coverage
C	Water Quality	99% compliance with the IJAM standards	98% compliance
D	Wastewater Quality	All wastewater treatment plants 100% compliant with NEPA standards by 2014/15	Less than 10% compliant
E	Economic Development Wastewater Tariff (EDWT)	Complete general review of the conditions under which the EDWT is applied within the first three months of the Determination Notice	Review not done
F	Late Fee	NWC may, with the OUR's approval, apply a late fee in calendar year 2015	Late fee being applied since

Table 3.2 – Operational Performance (G) – NWC Proposed Operational Targets

Objective	Critical Measures	Definition	Max/ Min	2013/14		2014/15		2015/16	
				Target	Perform	Target	Perform	Target	Perform
Improve Billing	Metering Level	Accounts with Functioning Meters/Total Accounts	Min						
	Percentage of Meters Read	Number meters Read/Total Meters	Max	92%	97%	95%	97%	97%	98%
	Days of Sales Outstanding	(Net Accounts Receivables/Billed Revenue)*365	Max	50	85	50	82	50	82
Increase Staff Efficiency	Staff Efficiency	Number of Employees/Number of Connection	Max		4.3		4.1		4
	Staff Efficiency Sewage	Number of Sewage Employees/Number of Sewage Connections	Max	2.3	1.3	2.1	1.2	20	1.2
Increase Energy Efficiency	Energy Efficiency	Total MWh Consumption/System Input Volume	MWh/I	3	3.6	2.8	4.3	2.6	4.5

NRW Reduction Efforts

NWC's overall NRW level is currently estimated to be 69%, which is above the 55% (maximum) target set for the end of year three of the tariff.

One of the measures that is planned to reduce NWC's NRW is the Kingston and St. Andrew (KSA) NRW Reduction Project, which is being implemented under the Kingston Metropolitan Area Water Supply Improvement Project. This project is largely financed by a loan from the Inter-American Development Bank (IDB) and is intended to reduce NRW in KSA from its current level of 59% down to at most 30% by 2020. The water supply system in KSA accounts for more than 25% of the water produced and supplied by NWC, and therefore the success of this project will impact the NWC's NRW levels. The commencement of this NRW reduction project was delayed and only started in September 2015. An audit of the KSA water supply system was undertaken to inform the strategy and actions that are to be pursued during the implementation of the NRW reduction activities. The audit was completed in March 2016 and the strategy and action plan are being finalized to allow the implementation of the NRW reduction activities to commence by July 2016.

The KSA NRW Reduction Project includes a training component that will benefit not only persons who operate in KSA, but persons in other parts of the island. This is being done to enable NRW management and best practices to be institutionalized in NWC.

NWC is preparing to carry out NRW reduction activities in other sections of the island to be implemented in parallel with the KSA NRW Reduction Project. This includes work in areas such as Old Harbour, May Pen, Mandeville and Savannah-la-mar.

Water Supply Coverage

In 2013, NWC had just over 445,000 customers that were supplied with water, including those whose accounts were inactive. This represents about 73% of the population with piped water. At end of March 2016, the number of customers increased by 7% to 475,575 customers.

NWC provided sewerage service to just about 99,000 customers in 2013 and this has increased marginally since.

NWC has developed water supply projects to expand service coverage to at least 80% by 2020. These are discussed in section 4.

Water Quality

Water quality is measured by the percentage of test samples that is within standards specified by the Ministry of Health and set out in the Interim Jamaica Standards for Drinking Water (IJAM). In terms of chlorine residual and faecal coliform, NWC has consistently met these standards.

Wastewater Quality

The wastewater effluent discharge quality target is set as the percentage of test samples that are within standards as stipulated by the National Environment and Planning Agency (NEPA). A number of NWC's wastewater plants are underperforming and are not meeting the stipulated standards. NWC is currently

implementing wastewater improvement projects to address this problem as part of its capital works programme.

Economic Development Wastewater Tariff

In June 2012, NWC prepared a report on a survey that was conducted among manufacturers regarding the Economic Development Wastewater Tariff (EDWT) and a review of the EDWT. The report recommended than that the EDWT be discontinued.

Late Fee

NWC now applies a credit of $250 to accounts for which full payment is made on or before the due date (early payment incentive); and a late fee of $250 is applied each month on accounts for which no or part payment is made on or before the respective due date.

Since September 2015 an average 31% of active customers have benefited from the early payment incentive and late payment penalty has been levied on some 69% of customers.

NWC Proposed Operational Targets

NWC had proposed operational targets for the regulatory period of the current tariff. These are presented in Table 3.2, and shows NWC's achievement against these targets. The following should be noted.

- Improved Billing
    - NWC has exceeded the targets set for percentage meters read throughout the tariff period to date.
    - It did not achieve the target to maintain a maximum number of days of sales outstanding to below 50 days, however. It was reduced marginally from 85 days in 2014 to 82 days in 2016.
- Increase Staff Efficiency – NWC has bettered the target set for staff efficiency sewage each year of the new tariff regime.
- Energy Efficiency – Unfortunately, the average energy consumption has steadily increased from 3.6 MWh per million gallons water produced in 2013/14 to 4.5 MWh per million gallons at end of fiscal year 2015/16. This is the reverse of the target set to reduce this average energy consumption from 3 MWh/million gallon in 2013/14 to 2.6 MWh/million gallon at end fiscal year 2015/16. NWC is seeking to improve energy efficiency through projects such as the Tank and Pump Programme which is financed under the K-Factor Programme and the Energy Improvement Programme.

3.2 Quality of Service

3.2.1 Regulatory Framework

The OUR promulgated a new regulatory framework to accompany the October 2013 Tariff Determination and is being used as the basis to regulate and monitor NWC's performance during the five year period of the current tariff. It is binding on *NWC to* achieve and maintain the quality of service standards that are set out in the Regulatory Framework prescribed by the OUR, while avidly pursuing sustainable financial and operational actions in order to ensure the highest quality of service to its customers.

NWC reports regularly on the performance of the company using the indicators contained in the Regulatory Framework, providing information at the required frequency stipulated by the OUR. The quality of service standards is reported on a quarterly and on a yearly basis (with monthly breakout), and they fall within two categories, namely Guaranteed Standards and Quality of Service Performance Targets.

NWC acknowledges that it has failed to fully comply with some of the Guaranteed Standards set by the OUR for 2014, 2015 and 2016. It is also recognized that the sanctions levied on NWC for breaches of these standards have been more severe with each Tariff application.

3.2.2 Guaranteed Standards

The Guaranteed Standards are performance measures that guide the provision of utility services delivered by the National Water Commission. They are minimum service level agreements between the OUR and the NWC to ensure value to customers and are set out in the Determination Notice of October 2, 2013 as well as the Reconsideration Notice of July 24, 2014. The breach of a Guaranteed Standard results in a compensatory payment to the affected customer's account. Some breaches trigger an automatic compensation, for others the customer has to make a written claim.

Of the seventeen Guaranteed Standards, there are seven that attract automatic compensation namely *WGS5, WGS8, WGS10A, WGS11, WGS12, WGS13* and *WGS14* while the other ten standards, WGS1, *WGS2, WGS3, WGS4A, WGS4B, WGS6, WGS7, WGS9, WGS10B* and *WGS15*, require that the customer makes a claim on the NWC. The regular compensation for a breach of a standard is four (4) times the applicable service charge; while others attract a special compensation of six (6) times the applicable service charge.

Between October 2013 and April 2014, the NWC petitioned the Office of Utilities Regulation to reconsider certain aspects of the Determination. The areas were:

i. *WGS 2* - *Issuance of First Bill*
ii. *WGS 8* - *Repair or Replacement of Faulty Meters (Automatic Compensation)*
iii. *WGS 10B* - *Exceptional Meter Readings*

iv. *WGS 11* - *Reconnection After Payment of Overdue Amounts (Automatic Compensation)*
v. *WGS 14* - *Method of Estimation*

These appeals were denied with the exception of that relating to WGS 10B. The OUR agreed to rephrase the determination and this is contained in the OUR Reconsideration Notice that was adopted in July 2014. The new standard, WGS 10B has since been modified to ensure that the NWC alerts customers in a timely manner where an exceptionally high (60%) or low (40%) meter reading has been recorded.

3.2.3 Review of Guaranteed Standards

This section reviews NWC's adherence to the OUR Guaranteed Standards for the period October 2013 to December 2015. The assessment is segmented into three time periods namely October 2013 to March 2014, April 2014 to March 2015 and April to December 2015. The levels of compliance with the guaranteed standards are shown in Table 3.3 below.

Of the seventeen (17) Guaranteed Standards, the NWC achieved 100% compliance throughout the current period of the current tariff regime with four (4) standards: *Account Status (WGS6), Exceptional Meter Reading (WGS10B), Estimation of Consumption (WGS14)* and *Billing Adjustment*. For Delivery of Bills (WGS2) and *Changing Meters (WGS9),* 100% compliance was achieved in two of the three years considered.

The NWC has underperformed in six (6) Areas and the attendant compensation liability amounted to $16M. The six areas are:

a. *Connection to Supply (WGS1),*
b. *Complaint Investigation (WGS4)*
c. *Meter Installation (WGS7)*
d. *Meter Replacement/Repair (WGS8)*
e. *Reconnection after Wrongful Disconnection (WGS 12)*
f. *Payment of Compensation (WGS13)*

The records indicate that while ensuring that service to customers both new and existing are connected to its distribution system with functioning meters and within the given timeframes, the NWC continued to encounter difficulties. Consequently, with average compliance rates ranging from 90% - 96%, potential pay out of over $5M were incurred during the period.

The investigation of complaints accounted for 53% of total compensation costs with average performance ratio of 97% over the period. Meanwhile, the average performance ratios for reconnections after wrongful disconnection and for payment of compensation were 92% and 87% respectively. The compensation liability associated with these breaches amounted to over $10.9M.

Table 3.3: NWC Guaranteed Standards Performance

Code	Focus	Description	Measure	Level of Compliance		
				Oct - Mar 2013/14	Apr- Mar 2014/15	Apr - Dec 2015/16
WGS1	Access	Connection to supply	Maximum time of **ten (10)** working days to connect supply and install meter after establishment of contract	95.2%	94.2%	95.2%
WGS2	Delivery of Bills	Issue of first bill	Maximum time of forty (40) working days after connection of supply and installation of meter	100%	99.9%	100%
WGS3	Appointments	Keeping Appointments	NWC must make and keep an appointment at customers request and must notify customer within reasonable time prior to appointed time, if the appointment will not be kept.	99.5%	99.4%	99.7%
WGS4A	Complaints	Acknowledgement	Maximum of five (5) working days to acknowledge customer written complaints after receipt.	98.9%	98.6%	99.2%
WGS4B	Complaints	Investigation	Maximum time thirty (30) working days from the date receipt of the complaint to complete investigation and respond or provide an update	98.7%	96.8%	96.8%
WGS5	Disconnection	Wrongful Disconnection	Where the NWC disconnects a supply that has no overdue amount or is currently under investigation by the OUR or the NWC and only the disputed amount is in arrears	99.9%	99.9%	99.9%

Code	Focus	Description	Measure	Level of Compliance		
				Oct - Mar 2013/14	Apr- Mar 2014/15	Apr - Dec 2015/16
WGS6	Account Status	Issue of account status	Meter to be read on same day customer is moving, if on a weekday (within two (2) workings days of move if on a weekend) providing five (5) workings days' notice of move is given. Maximum time of fifteen (15) working days to provide final bill after move and forty-five (45) days to refund excess amounts on account.	100%	100%	100%
WGS7	Water Meters	Meter Installation	Maximum of thirty working days to install meter on customer's request	99.6%	92.7%	95.8%
WGS8	Water Meters	Repair or replacement of faulty meters	Maximum of twenty working days to verify, repair or replace meter after defect is identified or reported.	99.0%	79.0%	93.7%
WGS9	Water Meters	Changing Meters	NWC must provide customers with details of the date of the change, the reading on the old meter on the day and serial number of the new meter	100%	99.3%	100%
WGS10A	Water Meters	Meter Reading	Should NOT be more than two consecutive estimated bills where the company has access to the meter	99.9%	99.9%	99.9%
WGS10B	Water Meters	Exceptional Meter Reading	Where the NWC obtains a meter reading that falls within its exceptions criteria (60% high and 40% low), same is to be verified, the customer alerted upon verification and the reading applied to the customer's account within one (1) billing period.	100%	100%	100%

Code	Focus	Description	Measure	Level of Compliance		
				Oct - Mar 2013/14	Apr- Mar 2014/15	Apr - Dec 2015/16
WGS11	Reconnection	Reconnection after payment of overdue amount	Maximum of twenty-four hours to restore supply	99.7%	99.8%	99.8%
WGS12	Reconnection	Reconnection after wrongful disconnection	NWC must reconnect a supply it inadvertently disconnected within eight (8) hours of being notified of the error.	91.1%	93.8%	90.0%
WGS13	Compensation	Payment of compensation	Maximum of thirty (30) working days to process and apply credit to customers' account.	96.9%	95.5%	87.5%
WGS14	Estimation of Consumption	Method of Estimation	An estimated bill should be based on the average of the last three (3) actual readings.	100%	100%	100%
WGS15	Billing Adjustment	Timeliness of adjustment to customers' account	Where necessary, customer must be billed for adjustment within three (3) months (i) identification of error, or (ii) subsequent to replacement of faulty meter	100%	100%	100%

3.2.4 Compensation for Breaches

Since the implementation of the tariff in 2013, the NWC recorded 6,822 breaches over fourteen (14) of the seventeen (17) standards with potential pay out amounting to $20.5M. Automatic compensation amounts to $6.6M. Breaches and potential payouts are summarized in table 3.4 below.

In the tariff year 2013/14, 2,159 breaches occurred with potential pay out for the year amounting to $6M, for which automatic compensations accounted for a total of $2M.

Some 2,685 breaches occurred during 2014/15, while potential pay-out amounted to $8.3M and automatic compensation amounted to $2.7M

For the April-December 2015 year to date, total breaches amounted to 1,978 with the potential pay-out of $6.1M and with automatic compensation accounting for $1.9M. Table 3.4 provides a summary of the number breaches of the Guaranteed Standards and potential pay-out.

Table 3.4 – Breaches of Guaranteed Standards

Financial Year To Date 2013/14 - 2015/16 (December 2015)						
	2013 – 2014		2014 - 2015		2015-16	
Standards	**Number of Breaches**	**Potential Payout**	**Number of Breaches**	**Potential Payout**	**Number of Breaches**	**Potential Payout**
WGS1	285	779,862.60	304	921,946.88	286	867,357.92
WGS2	2	5,472.72	2	6,065.44	1	3,032.72
WGS3	6	16,418.16	5	15,163.60	3	9,098.16
WGS4A	15	41,045.40	12	36,392.64	6	18,196.32
WGS4B	1,180	3,228,904.80	1,479	4,485,392.88	1,057	3,205,585.04
WGS5	45	184,704.30	50	227,454.00	29	131,923.32
WGS6	0	-	0	-	0	-
WGS7	11	30,099.96	45	136,472.40	50	151,636.00
WGS8	75	205,227.00	419	1,270,709.68	211	639,903.92
WGS9	0	-	10	30,327.20	1	3,032.72
WGS10A	451	1,234,098.36	297	900,717.84	278	843,096.16
WGS10B	0	-	1	3,032.72	0	-
WGS11	82	336,572.28	57	259,297.56	51	232,003.08
WGS12	4	16,418.16	3	13,647.24	3	13,647.24
WGS13	3	8,209.08	1	3,032.72	2	6,065.44
WGS14	0	-	0	-	0	-
WGS15	0	-	0	-	0	-
Total Compensation	**2,159**	**6,087,032.82**	**2,685**	**8,309,652.80**	**1,978**	**6,124,578.04**
Automatic Compensation		**1,985,229.18**		**2,674,859.04**		**1,866,639.16**

3.3 Issues Requiring Policy Development

The OUR indicated in its October 2013 Determination that they have identified deficiencies in certain areas of NWC's service delivery that are more appropriately addressed through the development of policies. Under the guidance of the OUR, NWC was required to develop and implement the policies outlined below. Updates on these are presented below.

3.3.1 Water Trucking

The OUR stipulated that NWC must within three (3) months of the October 2013 Determination, develop a policy that governs the trucking of water to its customers in areas affected by water lock offs. The NWC has developed a policy that governs the Trucking of Water to Customers (BP 2004) and is presented in appendix 1 .The policy does not distinguish between rural and urban areas, but instead addresses the NWC's Service Areas.

3.3.2 Disconnection/Reconnection Policy

A disconnection policy was to have been developed and submitted to the OUR within the first month of the Determination review and approval.

The NWC has developed a policy that governs the disconnecting of accounts for non-payment and it is set out NWC's Business Policy BP5001. A policy for reconnection of disconnected supplies was also prepared and is set out in BP 5002. These policies are presented in appendix 1.

3.3.3 Meter Tampering/Illegal Connection Allegations/Damaged Meters

The OUR stipulated that NWC must within three (3) months of the Determination develop procedures for evidence gathering (for example, photographs) in relation to its investigation of meter tampering and illegal connection allegations.

The NWC has developed a policy that governs illegal connections and is set out in BP 5005 (see appendix 1). The policy outlines the procedures that are to be followed where persons illegally connect to NWC's network. The policy addresses the NWC's right to report the matter to the police and have charges brought against the perpetrator. It does not directly address the issue of photographs in evidence gathering.

3.4 Review of K-Factor Programme

The implementation of the K-Factor Programme which became effective May 1, 2008, was continued in the current OUR Tariff Determination Period (2013 -2018). The funds generated have been used to finance projects aimed at expanding sewer collection network, rehabilitating selected waste water treatment plants and reducing non-revenue water levels.

In 2013, a K-Factor Unit (KFU) headed by a Vice President was set up to administer the K-Factor Programme and manage the K-Factor funds. This was done in an effort to more effectively develop and execute K-Factor projects to better meet the objectives of the programme. The Unit included project managers to develop and oversee the implementation of K-Factor projects; economists to conduct economic analyses of potential K-Factor projects, as well as to conduct post project assessments; and financial analysts to manage and report on the K-Factor funds. The Unit was disbanded in mid-2014 and the responsibilities of the KFU transferred to the then Planning and Special Projects Department. The K-Factor Programme is now overseen by the Investment and Performance Management Department.

From the suite of one hundred and thirty one (131) projects that were approved by the OUR as at July 2013, sixty-two (62) have been completed, thirty seven (37) projects are currently being implemented and thirty-two (32) are yet to be implemented.

Since October 2013, ten of the thirty seven (37) projects were completed and these are shown below in table 3.5. Total expenditure since October 2013 for completed projects amounted to $5.3B.

Table 3.5 – X-Factor Projects Completed Since October 2013

No.	Parish	Project Name	Estimated Cost ($M)	Type	Status	Expenditure ($M)
1	St. Elizabeth	Burnt Savanna/Knoxwood Water Supply Mains Replacement and Upgrading	60	Potable Water	completed	60
2	Trelawny	Georgia to Silversands	50	Potable Water	completed	44
3	Trelawny	Clarks Town to Georgia mains replacement	230	Potable Water	completed	163
4	Islandwide	Jamaica Water Supply Improvement Project (All components, including Lucea Pipeline) - Cat B	7,845	Potable Water	completed	3,936
5	St. Elizabeth	Santa Cruz Water Supply Phase 1B	75	Potable Water	completed	20
6	Westmoreland	Whitehouse Pipeline Replacement	208	Potable water	completed	208
7	Portland	Port Antonio Water Supply Sewage and Drainage	475	Potable & Waste Water	completed	358
8	KSA	Harbour View Sewage Treatment Replacement - Ph1	500	Waste water	completed	500
9	St. Thomas	Yallahs Wastewater Stabilization Ponds	46	Waste water	completed	45
10	KSA	Duhaney Park Sewage Force Main (Gravity Sewer Pipeline Repair Component)	33	Waste water	completed	18
		TOTAL	**9,522**			**5,351**

Table 3.6 and 3.7 provide information on K-Factor project that are now being implemented.

Table 3.6 – K-Factor Projects Currently Being Implemented – Potable Water Supply

No.	Parish	Project Name	Approval Date	Estimated Cost ($M)	Type	Status	Expenditure ($M)
1	Hanover	Cascade/Claremont/Jericho W/S	Apr-13	295	Potable Water	On-going	72
2	St. Ann	Browns Town and Greater Browns Town (Minnards) Pipeline Replacement (St Ann)	Sep-12	750	Potable Water	On-going	1
3	St. Elizabeth	Bruce field to Banbury Hill	Jan-10	30	Potable Water	On-going	1
4	Hanover	Chichester Shettlewood Water Supply – Hanover	Sep-11	19	Potable Water	On-going	15
5	Island wide	Consumer Metering Installation	Apr-10	825	Potable Water	On-going	267
6	St. Mary	Derry Hazard Water Supply	Apr-11	3	Potable Water	On-going	1
7	Westmoreland	Eastern Westmoreland Water Supply Upgrading	May-13	81	Potable Water	On-going	77
8	KSA	Hope High Level - St Andrew	Sep-11	10	Potable Water	On-going	9
9	St. Elizabeth	Hounslow Water Supply and Upgrade (Extension to Fort Charles)	Apr-10	168	Potable Water	On-going	68
10	Clarendon	Mason River/Kellits/Sandy River Water Supply Scheme	May-13	197	Potable Water	On-going	40
11	Manchester	Melrose Mews –Manchester	Sep-11	10	Potable Water	On-going	9
12	St. Catherine	Mount Royal Estate Housing Development -St Catherine	Sep-11	10	Potable Water	On-going	9
13	Westmoreland	Non-Pariel Water Supply Mains Replacement and Upgrading	May-13	129	Potable Water	On-going	85
14	St. Elizabeth	Parklee/Mountainside	Sep-11	10	Potable Water	On-going	9
15	St. Elizabeth	Phoenix Park Housing Development – St Elizabeth,	Sep-11	10	Potable Water	On-going	9
16	Island wide	Production Metering - Phase 1	Apr-10	130	Potable Water	On-going	24
17	St. Thomas	Prospect Pen – St Thomas,	Sep-11	10	Potable Water	On-going	9
18	St. Ann	Seville Water Supply – Tank Replacement	Nov-10	18	Potable Water	On-going	15
19	Trelawny	Sherwood Content – Trelawny,	Sep-11	9	Potable Water	On-going	7
20	Island wide	Tanks and Pump Rehabilitation for Operational Efficiency	Mar-13	880	Potable Water	On-going	325
21	St. Mary	Agualta Vale Supply Mains Replacement & Upgrading	Jul-13	843	Potable Water	On-going	69
22	St. Elizabeth	Essex Valley Water Supply Phase 2 (Nain to Junction)	Jul-13	445	Potable Water	On-going	131
23	Hanover	Western Hanover Water Supply	Jun-13	700	Potable Water	On-going	91
		Sub-Total (Potable Water)		***5,583***			***1,344***

Table 3.7 – K-Factor Projects Currently Being Implemented – Wastewater

No.	Parish	Project Name	Approval Date	Estimated Cost ($M)	Type	Status	Expenditure ($M)
24	KSA	Barbican Road/Cedar Valley/Standpipe Lane/Ravina/College Green [Extension]	Apr-10	42	Wastewater	On-going	33
25	KSA	Sector "F" Sewer Rehabilitation (Majestic Gardens, Seaview Gdn, Riverton)	Oct-12	1,382	Wastewater	On-going	1,159
26	KSA	Sewerage of Seymour Lands/Trafalgar Park/New Kingston - The construction of Fair	Apr-10	37	Wastewater	On-going	4
27	St. Catherine	Portmore Sewerage Reconfiguration Project	Oct-13	2,791	Wastewater	On-going	1,532
28	KSA	Dillsbury/Millsborough Avenue Sewer Extension Project - KSA	Mar-14	10	Wastewater	On-going	10
29	KSA	Papine-Mona Sewerage Project	Dec-13	147	Wastewater	On-going	1
30	St. Mary	Boscobel (CReW)	May-08		Wastewater	On-going	
31	KSA	Elliston Flats (CReW)	May-08		Wastewater	On-going	
32	KSA	Acadia (CReW)	May-08		Wastewater	On-going	
33	KSA	Hughenden (CReW)	May-08		Wastewater	On-going	
34	KSA	Bay Farm Villa (CReW)	May-08	3,468	Wastewater	On-going	443
35	St. Catherine	De La Vega City Housing (CReW)	May-08		Wastewater	On-going	
36	St. Catherine	Blackwood Gardens (CReW)	May-08		Wastewater	On-going	
37	Clarendon	Lionel Town Housing Scheme (CReW)	May-08		Wastewater	On-going	
		Sub-Total (Wastewater)		***7,876***			***3,182***
		TOTAL (Potable Water & Wastewater)		**13,459**			**4,526**

Projects with an estimated value of $13.5B are now being implemented, with some $4.5B already spent since October 2013. Wastewater projects account for 59% of the total estimated cost for on-going projects ($7.9B), which leaves 41% for potable water supply projects ($5.6B). Wastewater projects account for 70% of total expenditure so far ($3.2B), while potable water projects accounted for the remaining 30% ($1.3B).

Most of the water supply projects involve pipeline replacement and upgrading projects, with the objective been to significantly reduce water losses from aged infrastructure. In addition, there is the Tank and Pump Programme, where systems are targeted to improve water supply management, increase energy efficiency and reduce water losses. Under the Tank and Pump Programme, water storage tanks that will be replace because of their condition or inappropriate location for efficient operations; inefficient pumps will be replaced with more energy efficient ones as well as those that are ill-placed for optimal water supply operations

The major wastewater project that is being implemented is the Portmore Reconfiguration Project which is scheduled to be completed before December 2016. On completion, five wastewater treatment plants that are now underperforming in Portmore and are discharging effluent below the stipulated discharge

standard of the National Environment and Planning Authority (NEPA), will be decommissioned and sewage flows to these plants will be diverted through pumping facilities to the Soapberry Wastewater Treatment Plant for proper treatment.

Most of the remaining projects are part of the Caribbean Regional Fund for Wastewater Management (CReW); K-Factor funds are being used along with funds from the Global Environmental Facility (GEF) in an innovative financing mechanism to fund wastewater projects. Under CReW, the Boscobel and Elletson Flats wastewater plants are being replaced with new ones (now under construction); and trunk sewers will be constructed to receive wastewater flows from the Acadia, Bay Farm Villa and Hughenden wastewater treatment plants and to transfer them to the Soapberry Wastewater Treatment, allowing these plants to be decommissioned from service; the De La Vega City, Lionel Town and Blackwood Garden wastewater plants will be refurbished to improve treatment performance.

It must be noted that the projected K-Factor cash flow will not be sufficient to sustain up-coming or new projects; hence, the upcoming projects will be deferred until funding becomes available.

As at March 31, 2016, the K-Factor bank accounts are as follow:

- JMD Account – JMD$ 320,096,922.43
- USD Account - US$ 4,420.55
- $990M outstanding for the re-imbursement of amounts that were withdrawn for supervision services

3.5 Review of Capital Investment Programme

Table 3.8 provide a summary of the projects under the NWC's capital works programme since the start of the new tariff regime. Over the last 2 years NWC has expended some $23.5B on water supply and sewerage projects, $19.8B on water supply projects and $3.7B on sewerage projects. Financing of these projects came through loans from the Inter-American Development Project (IDB), commercial banks and K-Factor funding.

Table 3.8 Water Supply Projects Undertaken During New Tariff Regime

	PROJECTS	ESTIMATED PROJECT VALUE ($M)	APPROX EXPENDITURE SINCE NEW TARIFF ($M)
1	**K-Factor Water Supply Project - Completed**	8,943	4,788
2	**K-Factor Water Supply Project - Ongoing**	5,583	1,344
3	**K-Factor Sewerage Project - Completed**	579	562
4	**K-Factor Sewerage Project -Ongoing**	7,876	3,182
5	**Jamaica Water Supply Project** *(Non K-Factor Component)*	5,795	4,636
6	**KMA Water Supply Improvement Project** *(Non K-Factor Component)*	10,413	8,540
7	**In-house Capital/Rural Water Supply Programme**	2,860	442
	TOTAL	***42,048***	***23,494***

The Jamaica Water Supply Improvement Project (JWSIP) Category B and the Kingston Metropolitan Area Water Supply Improvement Project (KMA WSP) were the two major projects executed during the period.

The JWSIP was financed by a commercial loan of US$115M and included the replacement of a large section of the Rio Cobre transmission main that serves Kingston and St. Andrew and south-east St. Catherine, which has resulted in the reduction of water losses from the pipeline estimated at about 1 million gallons per day (mgd); NRW reduction works in the Stony Hill area of St. Andrew that have resulted in significantly improved service to customers in that area; the expansion of the Martha Brae Water Treatment Plant in Trelawny from 6 mgd to 10 mgd, thereby increasing the availability and reliability of the water supply on the north coast; and procurement and installation of consumer meters, to minimize the NRW.

The main objective of the KMA WSP is to improve water supply systems for Kingston and St. Andrew (KSA) and in other areas such as Greater Spanish Town and Port Antonio. It is largely being financed by a US$133M loan from the Inter-American Development Bank. Some of the works undertaken involved:

- the construction of an Artificial Recharge Facility near Spanish Town, which would ensure that the water supply from wells in that area is sustained; this was done at a cost of $1.2 billion
- the rehabilitation of twenty six water supply facilities in Kingston and St. Andrew i.e. pumping equipment and water storage tanks, as well as installing monitoring and control devices; this has improve service reliability and operational efficiencies; this was done at a cost of $2 billion
- construction of pipelines in Port Antonio to replace the aged water supply infrastructure in that town; section of the town's drainage were improved and sewerage facilities have been provided, at a cost of $2.4billion.

The NRW reduction activities for the KSA are the remaining component of the KMA WSP and will continue over the next 4 years. On completion, it is expected that the NRW level in the KSA will be reduced from its current level of 58% to at most 30%. The activities will include institutionalizing the prudent management of NRW in NWC's operations.

NWC has been implementing water supply improvement projects using its own funds as well as that from the K-Factor. Some of the projects are:

- **Cascade/Claremont /Jericho W/S *(Eastern Hanover)*** – Cost of $275M, involves installation of 18km of transmission and distribution pipelines, the construction and equipping of two pumping stations and two reservoirs. It is about 50% completed and plans are to complete this by the end of the financial year.
- **Dornoch W/S (Northern Trelawny) -** Cost of $95M, involves the replacement of 8 km of 225 mm pipeline from Samuel Prospect to Baron Hill**.** Procurement of contractor to carry out the required works is progressing
- **Essex Valley Water Supply Phase 2 - Nain to Junction (St. Elizabeth) -** Cost of $570M, work includes construction of 14 km of 300 mm pipeline from Nain to Junction, supply and installation of pumping equipment for the Long Hill Well Station along with associated civil works, distribution networks for Myersville and other communities and a new re-lift station at Nain. Work is about 70% complete.
- **Goldmine Water Supply (St. Catherine)** - Cost of $70M, rehabilitation of the water treatment plant and Cocoa Walk Storage Tank. About 70% complete.
- **Hounslow to Parottee W/S Phae1 (St. Elizabeth) –** Cost of $75M, installation of 4.6 km of 400mm pipeline from Hounslow Well to Newell Square to replace aged cross-country pipeline. Process to procure contractor progressing.
- **Iterboreale - Highgate W/S (St. Mary)** Develop new sources of supply and install transmission facilities to serve Highgate / Richmond & environs. Procurement in Progress
- **Mason River/Kellits/Bullhead/Sandy River (Clarendon) –** Cost of $205M, installation of 27km of transmission/distribution pipes and storage tanks. Work is progressing, now about 40% complete
- **Non-Pariel/Orange Hill/Retirement(Westmoreland) -** Cost of $450M, installation of 32km of transmission/distribution pipelines, two (2) pumping stations and two (2) storage reservoirs. Work is progressing, now about 30% complete
- **Operational Efficiency Improvement (Tank & Pump)** - Supply and installation / refurbishing of a total of two hundred and eighty-eight (288) tanks and two hundred and ninety-eight (298) pumps located islandwide. Work has been separated into discrete phases with the first phase focused on sixty-eight (68) tanks and seventy-one (71) pump sets

4 Performance Projections with No Regulatory Adjustments

4.1 Financial Projections

As shown in Section 2, NWC has faced very serious financial challenges during this tariff regime and projection is that the situation will deteriorate even further if certain of the current tariff arrangements remain unchanged. As seen in Tables 4.1 and 4.2 below, without any adjustments to the current tariff arrangement, NWC will have difficulties in generating sufficient cash to cover operating and maintenance expenses as well as servicing its debt obligations. This will be so despite NWC's efforts to stabilize the situation by minimizing operating cost, improving operational efficiency in areas such as energy usage and NRW reduction and also striving to increase its revenue and collections.

NWC is required to make sufficient revenue to cover all operating expenses excluding:

- K-Factor
- changes in working capital
- debt servicing for non K-factor projects

The projections shown in Table 3.1 indicate that it will be very challenging for NWC to do so. In fact, it can be seen that the entity is projected to incur losses of $5.3B, $5.5B and $3.6B in financial years 2017, 2018 and 2019 respectively. It should be noted that the operating expenses include provision for bad debt (Administration). EBITDA is $4.0B in financial year 2017, representing a margin of 16%; in financial years 2018 and 2019, EBITDA is $4.6B (16%) and $6.3B (21%) respectively.

During the same three year period, based on the schedule in the 2013 Determination, the X-Factor amounts are expected to be $3.1B, $4.2B and $4.7B.

The balance sheet shows that with the accumulated deficit over the years, NWC's negative equity position will further deteriorate. This certainly could put NWC in a difficult position to obtain financing for its capital works programme.

Table 4.1. Financial Statement Projections to March 2019 – Profit and Loss

	2017	2018	2019
OPERATING REVENUE			
Water	16,061,793	18,040,690	20,385,022
Sewage	4,297,478	4,657,911	5,071,116
Service charge	3,904,743	4,449,238	5,083,403
PAM	388,561	434,742	489,056
X-Factor	(3,130,877)	(4,192,552)	(4,716,347)
K-Factor	2,862,386	3,110,874	3,499,529
JWSIP	-	-	-
Other	478,102	503,441	536,165
Total operating revenue	24,862,185	27,004,344	30,347,944
OPERATING EXPENSES			
Salaries, wages and related costs	6,221,795	6,944,076	7,959,299
Repairs and maintenance	4,108,546	4,271,122	4,398,373
Administration	3,926,541	4,075,232	3,650,965
Electricity	5,519,169	6,205,721	6,751,195
Telephone	151,292	174,467	201,099
Fuel and lubrications	286,531	330,423	380,860
Purchases - water	602,880	642,670	685,087
Soapberry costs			
JWSIP	-	-	-
Total operating expenses	20,816,753	22,643,711	24,026,877
EBITDA	4,045,432	4,360,633	6,321,067
Depreciation and Amortization	7,311,360	7,599,751	7,825,461
EBIT	(3,265,928)	(3,239,119)	(1,504,394)
MISCELLANEOUS INCOME:			
Foreign exchange gain			
Interest income	102,791	131,133	235,071
Project management fees			
Loss on sale of investment			
Impairment of investment			
Gain on disposal of property, plant & equipment			
Amortization of capital grants	619,320	619,320	619,320
Other income			
Total other income	722,111	750,453	854,391
OTHER EXPENDITURE:			
Bank charges and interest			
Loan interest	1,328,567	1,405,760	1,357,266
Lease interest			
Impairment of fixed assets			
Foreign exchange loss, net	1,453,797	1,638,169	1,578,807
Total other expenditure	2,782,364	3,043,929	2,936,074
EBT	(5,326,181)	(5,532,595)	(3,586,077)
Tax			
Net Profit/(Loss)	(5,326,181)	(5,532,595)	(3,586,077)

Table 4.2 Financial Statement Projections to March 2019 – Balance Sheet

	2017	2018	2019
Current Assets			
Cash and cash equivalents	3,946,624	7,367,127	11,900,350
Short-term investments	368,827	368,827	368,827
Consumers' accounts receivable	5,619,322	6,103,512	6,859,273
Other accounts receivable and prepaid expenses	1,049,737	1,049,737	1,049,737
Inventories	1,806,196	1,891,046	1,964,068
Total Current Assets	12,790,706	16,780,249	22,142,256
Current Liabilities			
Bank overdrafts and loans	80,282	80,282	80,282
Current maturities of long-term loans	3,537,822	4,325,333	4,320,891
Current portion of obligations under finance leases	-	-	-
Deposits and retentions	395,995	395,995	395,995
Trade accounts payable	5,475,091	5,955,606	6,319,398
Other accounts payable	1,948,427	1,948,427	1,948,427
Taxation payable	2,126,278	2,126,278	2,126,278
Total Current Liabilities	13,563,895	14,831,921	15,191,271
NET CURRENT LIABILITIES	(773,189)	1,948,328	6,950,985
Non-Current Assets			
Investments	73,617	73,617	73,617
Intangible assets	206,490	206,490	206,490
Property, plant and equipment	46,851,392	42,378,727	36,181,525
Deferred taxation (asset)	9,345,763	9,345,763	9,345,763
Total Non-Current Assets	56,477,261	52,004,597	45,807,394
WORKING CAPITAL AND NON-CURRENT ASSETS	55,704,072	53,952,925	52,758,379
Shareholders' Equity			
Capital reserves	19,358,464	19,358,464	19,358,464
Accumulated deficits	(35,206,781)	(38,610,221)	(39,962,860)
Total Equity	(15,848,317)	(19,251,757)	(20,604,396)
Non-Current Liabilities			
Long-term loans	39,147,600	38,168,246	35,426,162
Obligations under finance leases	-	-	-
K-Factor fund	36,063	2,325,473	5,183,002
Deferred income	6,448,225	5,828,905	5,209,585
Deferred Tax Liability	-	-	-
Employee benefit obligations	25,920,501	26,882,058	27,544,026
Total Non-Current Liabilities	71,552,389	73,204,682	73,362,775
NON-CURRENT LIABILITIES AND EQUITY	55,704,072	53,952,925	52,758,379

NWC has proposed a set of regulatory adjustments in section 6 that could alleviate the current financial stress that the organization is now experiencing.

4.2 Operational Projections

4.2.1 Expected Performance against Targets

Tables 4.3 and 4.4 provide expected performance by NWC for the remaining period of the current tariff regime.

Operational Performance (A-D)

Table 4.3 – Projections of Operational Performance (A-D)

Item	Parameter	Requirement	2017	2018	2019
A	Non-Revenue Water (NRW)	NRW Level	70%	68%	65%
B	Coverage	Coverage for Water Supply	75%	76%	78%
		Coverage for Sewerage	15%	16%	18%
C	Water Quality	99% compliance with the IJAM standards	99%	99%	99%
D	Wastewater Quality	All wastewater treatment plants 100% compliant with NEPA standards by 2014/15	20%	35%	60%

NRW Reduction

At the current level of 70% of water produced, NWC will not be able to reduce NRW levels to 65% of production by the end of year 3 as targeted in the 2013-2018 Regulatory Framework. It is projected that NRW is now at 70% and will be reduced to 65% by end 2019.

The current NRW reduction efforts in KSA will not begin to bear significant fruit until the end year 4 of the tariff when one year of the implementation of the NRW reduction activities would have been completed. The completion of K-Factor related NRW reduction projects will also contribute to the reduction of overall NRW levels.

Coverage

The extent to which water supply coverage is increased will depend on the extent to which NWC is able to finance its capital works programme. Much focus has been on consolidating the existing water supply and sewerage operations through a number of rehabilitation projects aimed at reducing water losses, improving service reliability, increasing energy efficiency and addressing underperforming wastewater treatment plants to produce effluent discharges that meeting the regulatory standards.

Plans for service expansions for water supply and sewerage are discussed further in section 5.6 which outlines Capital Investment Programme.

Water Quality

Extensive rehabilitation work has been done to increase the robustness of NWC's water treatment facilities and thereby enabling NWC to consistently produce water of high quality from most of its water treatment facilities. Continued improvement work will put NWC in a position to achieve the targeted 99% level by the end of this tariff regime.

Wastewater Quality

Section 3.4 presented information on the works that NWC has been undertaking to improve compliance with the NEPA effluent discharge standards. These include replacement of poor performing facilities; extending trunk conveyance network to allow sewage flows to be diverted from poor performing plants to plants that are capable of accept and treat these additional flows; and rehabilitation of existing facilities to become capable of adequately treating wastewater flows that they receive. The projection that 60% of the 74 NWC wastewater treatment plants will be in regulatory compliance by 2018 is based on the expected completion of these improvement works.

Approximately 50% of the volume of wastewater flows received by NWC is treated by four wastewater treatment facilities and the effluent discharges from these facilities are substantially in compliance with NEPA standards. These are the Soapberry, Ocho Rios, Montego Bay and Negril wastewater treatment plants.

NWC Proposed Operational Targets (G)

NWC is taking steps to improve billing, increase staff efficiency and increase energy efficiency through measures that are outlined below.

Table 4.4 – Projections of Operational Performance (G)

Objective	Critical Measures	Definition	Max/ Min	2016/17	2017/18	2018/19
				Target	Target	Target
Improve Billing	Metering Level	Accounts with Functioning Meters/Total Accounts	Min			
	Percentage of Meters Read	Number meters Read/Total Meters	Max	97%	98%	98%
	Days of Sales Outstanding	(Net Accounts Receivables/Billed Revenue)*365	Max	78	72	68
Increase Staff Efficiency	Staff Efficiency	Number of Employees/Number of Connection	Max	4.0	3.8	3.8
	Staff Efficiency Sewage	Number of Sewage Employees/Number of Sewage Connections	Max	1.2	1.2	1.1
Increase Energy Efficiency	Energy Efficiency	Total MWh Consumption/System Input Volume	MWh/mg	4.3	3.8	3.5

Improved Billing

NWC will consolidate its efforts to ensure that functioning meters are available to its customers. The company has started to use automatic meter reading systems to facilitate the ease and timeliness of reading meters. It will continue its metering programme aimed at increasing the number of customer connections that have functioning meters.

It has been a challenge to reduce the number of days of sales outstanding which currently stands at 82 days. Innovative programmes such as the debt forgiveness initiatives *Cruncher 180 and Cruncher Christmas Brawta* was aimed at getting inactive customers becoming active paying customers, as well as the implementation of the Early Payment Incentive policy have shown positive results. NWC will be striving to reduce its outstanding days of sales to at most 68 days by end 2018/19.

Increase Staff Efficiency

NWC will be finalizing its organizational restructuring to streamline its business processes. There is no expectation of any significant reduction in staffing levels due to this restructuring. The staff efficiency will be largely impacted by the increases in the number of water supply and sewerage connections that is expected to be derived from the NWC's expansion of these services into new areas over the next 2-3 years.

Increase Energy Efficiency

Work to replace inefficient pumping equipment, as part of an overhaul of NWC's asset management programme, and the reconfiguration of selected water supply systems – particularly under the K-Factor financed Tank and Pump Programme, is expected to reduce average energy consumption to under 3.5 MWh/million gallons water produced.

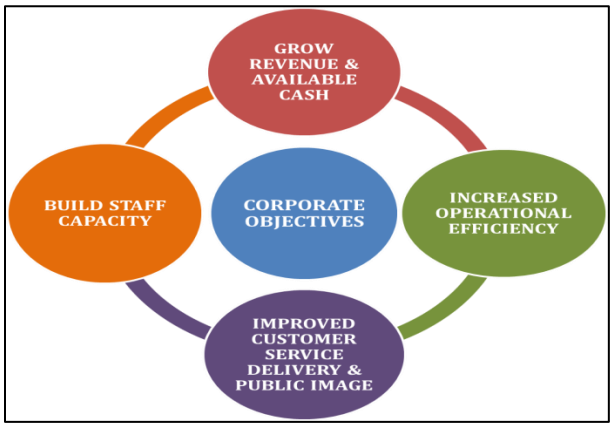
5 NWC's Plans for Improvement

5.1 NWC Corporate Objectives

In recent years NWC has had a number stops and starts at addressing the fundamental issues that it faces in becoming a well performing utility. The company recognizes and accepts this and understands that there may be a level of skepticism in its stated intention to take actions to become a well performing utility. However, we must look forward and ensure that the experience of past years is used wisely in guiding the steps that we take from here on to realize our vision of becoming the best performing utility in the Caribbean.

NWC has anchored its plans to become a well performing utility based on the four Strategic Objectives represented by Figure 5.1 below:

Figure 5.1 NWC Corporate Objective 2017 to 2020



- **Revenue Growth and Available Cash** – mainly through NRW reduction activities, increasing the customer base, improved collections, expansion of water supply and sewerage infrastructure and re-financing debt denominated in currencies of other countries;

- **Increased Operational Efficiency** – NRW reduction, energy improvement measures, improved maintenance practices and equipment replacement strategy, timely meter replacement;

- **Improved Customer Service Delivery and Public Image –** increased reliability of supply through improvement in water supply and sewerage infrastructure, increased customer education, enhance call Centre operations, improved monitoring of responses to customer issues and customer perceptions of NWC
- **Build Staff Capacity –** complete Human Resource Development Plan to support the organization, strengthen the performance management system to better align with corporate objectives, upgrade information technology and its use to support the NWC's operations

5.2 Grow Revenue and Increase Available Cash

5.2.1 Key Activities

Revenue growth will be accomplished during the period by focusing on the following key areas:

- Non-Revenue Water Reduction
- Increasing the Customer Base
- Expansion of the Service Infrastructure

5.2.2 Non-Revenue Water Reduction

NRW is one of the major challenges threatening the viability of the NWC, whether through the disparity between consumers served and customers billed or losses through the water distribution systems. In addition to the Kingston and St. Andrew (KSA) NRW Reduction Project discussed in section, NWC is seeking financial support from multi-lateral agencies to finance various NRW reduction activities outside of KSA. This will include the use of performance based arrangements where private entities will be invited to invest in reducing NRW in designated communities and sharing the benefits with NWC over time.

5.2.3 Increasing the Customer Base

An integral part of growing the Customer Base will be the converting of consumers of water into customers. There are persons who are benefiting from NWC's water supply services by connecting to the network illegally. NWC is aware that illegal connections exist and has taken aggressive steps to deal with those that have been identified. Through the use of geo-referencing of services and GIS technology, NWC will be better able to identify illegal connections and is committed to ensuring that they are identified and relevant activities taken to ensure that they are accounted for on our customer information system, billed and monitored for payments.

It is planned to increase the customer base by extending water supply and sewerage services to new customers, as outlined below and in section 5.6 on the capital works programme.

5.2.4 Refinancing of Loans Denominated in Foreign Currencies

At March 2016 loans denominated in foreign currencies accounted for approximately 90% of NWC's total loans. The table below shows a breakdown of NWC foreign exchange losses for the financial years ending 2014, 2015 and 2016. NWC has experienced significant foreign exchange losses over the last three years as a result of the depreciation of the Jamaican dollar during the period. In 2013/14 the loss was $1.93B, in 2014/15 it was $1.31B and in 2015/16 it was $2.43B, totaling $5.67B over the three years.

Given this situation and the continued high foreign exchange risk to which NWC is exposed, NWC is taking steps to refinance some of these loans to reduce this risk. Further information on this plan is provided in appendix 3.

5.2.5 Expansion of the Service Infrastructure

Revenue growth will also be achieved through the expansion of the service infrastructure both water and sewerage. This expansion will be achieved organically in that operating capability will be acquired through mixture of modalities - internally led plant and distribution systems expansion as well as through the involvement of private investments. Also, the acquisition or takeover of independent plants and systems will be evaluated on a positive economic feasibility basis and the attaining of the highest environmental standards.

5.3 Increase Operational Efficiency

5.3.1 NRW Reduction

NWC will be focusing on NRW reduction across the island, as discussed above. It is intended to have NRW management institutionalized in NWC through training, work practices, policies and established systems.

5.3.2 Rehabilitation of Facilities

NWC has rehabilitated a number of its water supply and sewerage facilities in recent years and this has brought about improvements in its operations. There are still many facilities that require extensive rehabilitation to improve operations and the efficiency of these operations.

Key actions that are planned to address the deficiencies identified include:

- Comprehensive audit of water supply and sewerage facilities to identify requirements for improvements.
- Implementation of a Maintenance Management System to
- Expansion of the Predictive Maintenance Programme
- Developing and implementing a Pump Replacement Programme aimed at reducing electricity consumption
- Documentation and implementation of Maintenance Operational Manuals
- Purchasing of specialized tools and equipment to support the maintenance of the various unique type of equipment used in NWC's operations.

NWC has strengthened its Energy Unit and will be updating its Energy Management Plan which outlined measures to reduce energy consumption and improve energy efficiency.

5.3.3 Energy Improvement Programme

NWC uses in excess of 190,000 MWh of energy annually, costing the entity over $6B which averages about 30% of its operating cost. The use of energy is therefore a critical factor that must be carefully monitored and managed and opportunities sought to minimize its use while maintaining the required level of service.

NWC is updating its Energy Strategy and Action Plan and will use this to guide the development of a programme of activities directly focused on improving energy efficiencies across the organization and increasing the use of renewal energy systems to support NWC's operations. It is planned to spend some $6.5B over the next 3 years on a number investment actions which will include:

- Replacement of some inefficient pumping equipment.
- Establishing SCADA for selected facilities and systems.
- Rightsizing of pumping equipment.
- Bench marking of energy consuming equipment.
- Establishing renewable energy systems to provide energy for some of NWC facilities

NWC is now collaborating with the United States Trade Development Agency (USTDA) to conduct energy efficiency audits, renewable energy feasibility studies, and off-balance sheet financing mechanisms for use by NWC. This will start with the evaluation of renewable energy and energy efficiency opportunities at the ten-highest energy consuming NWC facilities.

5.4 Improved Customer Service and Public Image

5.4.1 Improved Service Reliability

A key ingredient of Customer Service Delivery is potable the quality of the water supply - reliability of supply and water pressure. Responsiveness to address disruptions in water supply and issues with sewerage are also important facets of customer service delivery. As outlined in other sections, efforts to strengthen the water supply infrastructure and increasing operational efficiency in these areas will be pursued.

5.4.2 Improved Customer Engagement

Systems to improve responsiveness to customer concerns will be undertaken and will be linked to enhancing the quality of the Call Centre Operations and increasing the repairs of visible leaks.

NWC has been instituting measures to increase the convenience of accessing the company to resolve issues that they have with the company, to obtain information and to make payments. Efforts will be made to further increase the convenience of existing arrangements and to institute new ones.

Customer education on general aspects of NWC's areas of operation to improve understanding of the service will also be undertaken; this will include educating customers on matters surrounding their bills such as meter reading, impact of small leaks, etc.

NWC will also be embarking on a programme of increased Stakeholder Engagement, which will include regular community meetings, the conducting of customer surveys to gauge customer perceptions of NWC.

5.4.3 Compliance with Regulatory Standards

Section 3.2.3 presented information on NWC's compliance with the OUR stipulated Guaranteed Standards. It was pointed out that of the seventeen Guaranteed Standards; NWC achieved 100%

compliance with four of them throughout the period since the new tariff regime. It was seen that another seven (7) achieved more than 95% compliance throughout the period.

NWC intends to improve its level of compliance with the Guaranteed Standards. This will be done by enhanced system of monitoring and holding of persons accountable to carry out the tasks required to achieve the respective targets.

5.5 Build Staff Capacity to Support the Business

5.5.1 Organizational Structure

The finalization and implementation of the new organization structure is a priority and it is anticipated that the complete structure will be implemented by December 2016.NWC's new organization structure was established to re-align the organization in keeping with its strategic priorities.

The organization now has four main areas of focus headed by five Vice-Presidents and these areas are:

i. Planning and Infrastructure - Engineering & Capital Projects Division -
ii. Operations and Service-Delivery - Customer Services and Operations Divisions•
iii. Organisational Support - Financial Management Division•
iv. Organizational Support - Corporate Services & Human Resources Division•

Under this new structure the Engineering and Capital Projects and Financial Management, Corporate Services and Human Resources Divisions will be centralised; while the Customer Services and Operational Divisions will be decentralized and administered in six (6) regions.

A division of Investment and Performance Monitoring headed by a Vice President has been also been established to provide support to the President.

5.5.2 Performance Management

Special emphasis will be placed on developing a culture within the organisation that is performance driven customer centric. In this respect, a Performance Management System will be implemented throughout the organization from the highest to the lowest levels of employees. Specific objectives will be set by breaking down the Corporate Objectives and Targets into individual targets for each employee.

An Educational Programme will accompany this process to ensure that each employee understands the overall mission and objectives of the company, the role they will play in achieving these objectives and the benefits to them if the objectives are achieved.

5.5.3 Human Resource Development Plan

It is recognized that visionary and effective leadership will be required to lead NWC in the coming years through the stressful challenges that it faces. A motivated staff with high morale is critical to successfully deal with these challenges. An important first step will be the development of a comprehensive Human

Resource Development Plan to support the new organisation and this should be in place by financial year 2018.

The Human Resource Development Plan will include a detailed training plan, based on identified needs and aligned with the strategic direction of NWC. It is intended that implementation of the plan will result in the development of NWC's technical capabilities, including those related to planning, engineering and programming, NRW management, customer service delivery, together with the strengthening of NWC's managerial and operational skills.

Revising, developing and implementing the policies and procedures that is in accordance with the strategic direction of NWC. Priority will be given to those policies and procedures that are impacted by regulatory requirements as well as those that are identified as critical to the attainment of the Corporate Objectives.

A detailed Succession Plan for key/critical positions identified across the company will be prepared and implemented.

5.5.4 ICT Support

Information Communication Technology (ICT) will be one of the major driving forces in attaining improved efficiencies, increase customer satisfaction, and improved staff capacity. These are key to NWC achieving its Corporate and strategic Objectives. NWC is aware how rapidly technology is changing and the extent to which digital technology has been disrupting the utilities sector; the use of new digital technologies can radically influence improved performance.

NWC intends to use innovative means to modernize its ICT infrastructure and rapidly transform the way NWC does business with the use of modern ICT. This will include outsourcing aspects of its ICT to accelerate its modernization and pursue areas where improved efficiencies and other benefits can be realized. It is also planned to seek partnerships with ICT service providers in areas where benefits can be realized.

NWC is now taking steps to implement an Enterprise Resource Planning (ERP) System aimed at integrating the major areas of NWC's operations; this will be done on a phased basis beginning FY 2017/18, and completed by March 2020. In addition to the customer information system (CIS), Geographic Information System (GIS) and Financial Information System (FIS), the integrated ICT system will include modules to support management of inventory, procurement, preventative maintenance and human resources. An executive information module will ensure that senior managers can access and analyze key data on their desktops.

5.6 NWC Capital Investment Programme

5.6.1 General

NWC has prepared its capital investment programme aligned to the Vision 2030 and Government's policy objective of making potable water accessible by all Jamaicans and ensuring that sewage generated in major urban centers is treated to meet tertiary quality standards in order to protect the natural environment. It is broadly divided into the long term (through to 2030) and the medium term (up to 2020).

The projects in this programme target the improvement/rehabilitation of existing facilities and the extending of water supply and sewerage networks island wide, viz:-

- Improved operational efficiencies (energy, NRW levels, etc) optimal utilization of production volumes and increased supply reliability;
- Expansion of service to areas currently underserved and deemed to be also economically viable;
- Improved process technology at the various facilities and systems to enable them to consistently meet objectives as well as regulatory standards;
- Improved financial viability via increased billing/revenue collection and optimization of O&M expenditure
- Facilitation and providing infrastructure support for developmental projects;
- Mitigating the impact of drought/low rainfall conditions, including watershed protection.

These projects will be financed through a mix of financing options – through traditional sources such as the multi-laterals and bi-lateral agencies, public private partnership arrangements, commercial banks and the use internal resources. Importantly the NWC has recognized the current fiscal constraints and as such have been exploring innovative approaches that will lessen the need for central government guarantees.

NWC's medium term capital programme through to 2019, includes the completion of projects that are now being implemented and new ones that will commence within the next 12 months or so. Focus is made here on these projects and the main ones are presented in tables 5.1 and 5.2. It is estimated that NWC will require just over $55B for its medium term capital programme. This would involve expenditures of $9.2B, $19B and $26.5B in FYs 2017, 2018 and 2019.

Included in the list of projects are those that are being considered for possible public private partnership. These are the Content Water Treatment Plant, Rio Bueno Water Treatment Plant, Greater Spanish Town/Old Harbour/May Pen Sewerage and North Central Sewerage, with an estimated combined investment cost of about $20B. Excluding these from NWC's direct financing requirement would translate to NWC expenditure requirements of $8.4B, $14.9B and $17.8B in FYs 2017, 2018 and 2019.

Table 5.1 – NWC's Capital Works Programme – 2016/17 to 2018/19 – WATER SUPPLY

No.	Project Name	Project Description	Project Cost ($M)	Implementation		Funding Source	FY 2016/17	FY 2017/18	FY 2018/19
				Start	End				
1	Black River Water Supply Rehabilitation & Upgrading Project	Construction of some 6.0 kilometres of 250mm nominal diameter ductile iron pipeline/Construction of 4.0 km of 150 mm DI pipeline	456	Oct-16	01-Sep-18	K-Factor/In-house	114	160	182
2	Cascade / Claremont / Jericho Water Supply	Construction of some 21 km of 50mm/100mm/200mm pipeline; supply & install pumping facilities; construct storage tank	295	Jul-15	Jan-17	K-Factor	223		
3	Christiana/ Spalding Water Supply Scheme	Construction of the Limit to Mizpah Distribution Pipeline Network	30	Jul-16	Oct-16	In-house	30		
4	Dornoch & Greater Dornoch Water Supply Rehabilitation & Upgrading Project	Construction of 8.10km of 225mm PVC transmission main & 3.0 km of 2" PVC distribution pipeline from Baron Hill Reservoir to Samuel Prospect.	94	Aug-16	May-17	K-Factor	94		
5	Essex Valley Water Supply – S.E. St. Elizabeth	Installation of 40 km of 50mm/100mm/200mm/300mm pipeline; supply of well pump & water storage tank	445	Aug-14	Sep-17	K-Factor/In-house	234	211	
6	Goldmine Water Supply	Rehabilitation of the Goldmine Treatment Plant and Upgrading of the Cocoa Ridge Relift Station	67	Sep-15	Jul-16	In-house	41	26	
7	Hermitage Dam Rehabilitation	Sustainability study for the restoration of the Hermitage Dam, Environmental analysis of the catchment area as well as climate change and risk analysis	95	Aug-16	Aug-17	CDB/In-house	89	6	
8	Hounslow to Parrottee Water Supply	Construction of 4.6km of 400mm DI pipeline and 1.5km of 2" P.V.C distribution pipeline	168	Jul-16	Oct-17	K-Factor	63	105	80
9	Iter Boreale / Agualta Vale / Highgate Water Supply	Construct 400mm DI pipeline from new well to Iter Boreale treatment plant/Drilling and Development of a well at Iter Boreale	843	Jul-16	Nov-16	In-house	42	126	337
10	Mason River / Swift River / Kellits Water Supply	Construction of approx. 4.0km of 200mm ND PVC Transmission pipeline, 9.0km of 100mm ND PVC Distribution pipeline and 2.0km of 50mm ND PVC Distribution pipeline to upgrade Kellits Water Supply	197	Jun-16	Jan-17	K-Factor	103	94	
11	Non-Pariel W/S Project	Installation of 34 km 100mm/150mm/200mm/250mm pipelines	316	Mar-16	Mar-17	K-Factor	314	2	
12	Patton Park, Richard Hall and Mount Dawson Water Supply Rehabilitation & Upgrading Project – Phase 1B	Installation/rehabilitation of 2.7 km of 25mm/75mm pipelines in sections from Waterloo to Richard Hall & PRVs	28	Dec-15	Oct-16	In-house	22	6	
13	Roaring River/Greater Savanna-la-Mar Water Supply Rehabilitation & Upgrading Project (Phase 1)	Replacement of 1 km of 400mm dia PVC transmission from Dunbar's Corner to Mannings School	1,650	May-16	Mar-17	K-Factor	50	495	660
14	Santa Cruz Water Supply - Phase 1B, North East	Construction of 4.4km of 250mm nominal diameter ductile iron pipeline (Main Street to Coke Drive/ Lovely Point)	38	Jan-15	Nov-2015	K-Factor	8	30	
15	Soursop Turn to Chapelton Pipeline Replacement	Installation of 12km of 100mm/150mm/250mm PVC distribution & transmission main from Sour Sop Turn to Chapelton	215	Sep-15	Aug-16	In-house	115	100	
16	Supply and Erect Galvanized Bolted Steel Tanks Islandwide	Supply, erection and commissioning inclusive of suitable base and associated pipe work for eight (8) galvanized bolted steel tanks	101	Dec-11	Mar-17	K-Factor	75	26	
17	Tank & Pump Programme	Construction of water storage tanks (new or replacement) and replacement of pumping facility to improve operational efficiency	880	Oct-14	Dec-18	K-Factor	383	348	99
18	Rural Water Limited	Design, Project Management and Construction Supervision	175	Jun-12	Jun-17	K-Factor	130	45	
19	Special Procurement of Pipes, Fittings & Apurtenances	Finance, Storage and Supply of Pipes, Fittings and Appurtenances for K-factor Projects and Routine Repair	570	Aug-16	Aug-17	K-Factor/In-house	300	270	
20	Linstead Water Supply	Installation of 3.2km of 150mm DI Pipeline (York Street Booster to York Street Square);Development of Wallens Well & installation of pipeline from Wallens to Cheesefield	140	Jul-16	Dec-16	In-house	140	0	
21	NWA/NWC Coordination	Mandela Highway, Marcus Garvey Drive, Constant Spring Road, Hagley Park Road and Barbican Road in conjunction with NWA's MIDP road programme as well as Kingston Entrance Way (Windward Road) Improvement Project	2,800	May-16	Dec-17	In-house	700	700	700
22	Six Miles to Glenmore Road Transmission Main Replacement	Installation of 11 km transmission main from Six Miles to Glenmore Road	2,509	Apr-17	Mar-19	K-Factor	0	1,255	1,255
23	Six Miles to Dunrobin Ave/Constant Spring Road Transmission	Installation of 3.3 km transmission main from Six Miles to Constant Spring Rd/Dunrobin Rd	538	Aug-17	Jul-18	K-Factor	0	431	108
24	Stanton Terrace to Marescaux Rd. Transmission Main Replacement	Installation of 2.8 km transmission main from Stanton Terrace to Marescaux Rd.	468	Jun-17	May-18	K-Factor	0	421	47
25	Constant Spring Road/Dunrobin Ave. to Manor Park Transmission Main Replacement	Installation of 4km transmission main from Constant Spring Road/Dunrobin Ave. to Manor Park	676	Jun-17	Dec-18	K-Factor	0	473	203
26	Runaway Bay to Mammee Bay Transmission Installation	Installation of 22.5 km of trunk sewers from Runaway Bay to Mammee Bay	2,860	Jan-18	Jun-20	K-Factor	0	286	1,144
27	KSA NRW Reduction Programme	NRW reduction activities in KSA, including refurbishing of water supply infrastructure, upgraded water supply management systems, improved pressure management, measures to better institutionalize NRW management	5,850	Sep-15	Aug-20	IDB/K-Factor	1,053	1,053	1,053
28	Old Harbour/May Pen/Mandeville Water Supply Project	NRW reduction activities in the towns of Old Harbour, May Pen & Mandeville water supply systems - including refurbishing of water supply infrastructure, upgraded water supply management systems, improved pressure management	7,800	Sep-17	Jun-20	K-Factor		2,340	3,120
29	St. Elizabeth Water Supply Improvement Project	Rehabilitation of the water supply infrastructure in selected sections of Westmoreland to reduce NRW levels and improve service reliability	2,600	Sep-17	Jun-20	K-Factor		520	780
30	Greater Browns Town Water Supply	Rehabilitation of the water supply infrastructure in Greater Browns Town	750	Oct-17	Sep-18	K-Factor		300	450
31	Western Hanover Water Supply	Upgrading of water supply infrastructure in Prospect, Grange and Rock Spring	700	Jan-18	Dec-20	K-Factor		175	350
32	Mount Pleasant Water Supply	Upgrading of water supply infrastructure in Mt Pleasant and its environs	260	Jan-18	Dec-20	K-Factor		65	130
33	Rio Bueno Water Treatment Plant	Construction of 15 mgd WTP using the Rio Bueno River to serve the northern coastal corridor from Rio Bueno to Mammee Bay	5,850	Jan-18	Jun-20			585	2,340
34	Content WTP	Construction of 15mgd WTP using the Rio Cobre River to augment the water supply to Greater Spanish Town, Portmore & KSA	6,500	Jan-17	Dec-18		813	3,250	4,875
		Sub-Total Water Supply	***46,964***				***5,134***	***13,904***	***17,913***

Table 5.2 – NWC's Capital Works Programme – 2016/17 to 2018/19 – SEWERAGE & ENERGY

No.	Project Name	Project Description	Project Cost ($M)	Implementation		Funding Source	FY 2016/17	FY 2017/18	FY 2018/19
35	CreW Project	(a) Construction of 2 replacement WWTPs at Boscobel (400 m3 /d) & Elletson Flats (200 m3 / d); (b) rehabilitation of existing Waste Stabilization Pond Systems, viz:- Lionel Town, Blackwood Gardens & De la Vega City WWTP; (c) rehabilitation of existing Mechanical Plants, viz:- Longville Park, Paisley Pen, Eltham Park, Ensom City, Red Hills Pen, Shrewsbury WWTPs; (d) Installation of trunk sewers to allow diversion of flows from 3No. WWTPs (Acadia, Bay Farm Villas & Hughenden WWTPs)	3,468	Dec-15	Dec-17	K-Factor	1,454	1,007	1,007
36	Dillsbury / Millsborough Sewer Expansion	Design of 450m of sewers main and laterals	45	Mar-14	Mar-17	K-Factor	30	15	
37	Duhaney Park Replacement Sewage Force Main, St. Andrew	Replacement of the existing 375mm corroded steel pipes with 900m of 375/400mm nominal diameter pressure PVC pipes and appurtenances.	60	Nov-16	Jan-17	K-Factor	60	0	
38	Eltham Park WWTP	Rehabilitation, expansion and upgrading of the Eltham Park WWTP	120	Oct-16	Mar-17		120	0	
39	Sector "F" Sewer Rehabilitation (Majestic Gardens, Seaview Gardens and Riverton	Rehabilitation and upgrade of existing sewerage systems in Majesty Gardens, Seaview Garden and riverton Meadows	1,382	Dec-14	Sep-16	K-Factor	155		
40	Fairway/ Seymour Avenue/ Retreat Avenues Collector Sewer	Construction of 1.2 km of 250 mm & 0.3 km of 200 mm sewers, manholes & laterals	24			K-Factor	0	24	
41	Kingston Sewerage Improvements	Replacement of collapsed and severly blocked sewers in Downtown Kingston	19	Dec-15	Mar-17	K-Factor	14	5	
42	Kingston Water & Sanitation Project	Construction of a new wastewater pump station on an existing site with a capacity of11.6 mgpd	3,055	Jun-13	Dec-16	K-Factor	153		
43	Papine / Hope (UTECH) to Mona Road Sewer	Construction 1.5 m of 300 & 250 mm sewer from UTECH through Mona Heights to Mona Road	52	Mar-16	Jan-17	K-Factor	47	5	
44	Sewer Extension in Hope Pasture/Mona Heights & Havendale	Construction of trunk and collector sewers to extend sewerage service in KSA	7,800	Jan-18	Dec-20	K-Factor		650	2,600
45	Downtown Town Kingston Sewerage	Replacement and upgrading of major sections of the sewerage infrastructure in downtown Kingston	3,500	Jan-18	Dec-20			292	1,167
46	Port Antonio Water, Sewerage and Drainage Project - Stage 2	Construction of a 1.0 ML/day WWTP at Anchovy Portland to NEPA tertiary treatment standards, E&M works to three (3) pumping stations and install 2.5Km trunk force main from PS #1 to Anchovy WWTP	1,040	Sep-16	Mar-18	K-Factor/IDB	390	650	
47	Portmore Sewerage Project	Construction of transmission mains / pumping stations redirect all the sewage flows thatto the Soapberry WWTP; Decommissioning of 5 No. WTPs	2,791	Apr-14	Sep-16	K-Factor	1,096		
48	Greater Spanish Town/Old Harbour/May Pen Sewerage	Reconfiguration & establishing of sewerage infrastructure & WWTPs for Greater Spanish Town, Old Harbour & May Pen	3,000	Jan-18	Mar-20			300	600
49	North Central Sewerage	Construction of trunk and collector sewers for sections of the northern coastal corridor from Martha to Mammee Bay	4,000	Apr-18	Mar-20				800
50	Tawes Pen WwTP	Construction of approximately 2.5 km of trunk sewer	250	Dec-16	Dec-17	K-Factor	100	150	
51	Constant Spring Road/DunrobinAve. to Manor Park Trunk Sewers	Installation of 4km of trunk sewers from Constant Spring Road/Dunrobin Ave. to Manor Park	858	Jun-17	Dec-18	K-Factor	0	429	429
52	National Works Agency/National Water Commission Road Works & Pipeline Replacement Coordination	Replacement / upgrading of water and sewage pipelines along Mandela Highway, Marcus Garvey Drive, Constant Spring Road, Hagley Park Road and Barbican Road in conjunction with NWA's MIDP road programme as well as Kingston Entrance Way (Windward Road) Improvement Project	700	May-16	Dec-17	K-Factor	420	280	
		Sub-Total Sewerage	***32,164***				***4,038***	***3,807***	***6,603***
53	Energy Improvement Programme	Activities directly focused on improving energy efficiencies across the organization and increasing the use of renewal energy systems to support NWC's operations	6,500	Apr-17	Mar-20			1,300	1,950
		Sub-Total Energy	***6,500***					***1,300***	***1,950***
		TOTAL : Water Supply & Sewerage	**85,628**				**9,173**	**19,011**	**26,466**

It should be noted that NWC has an 85% shareholding in the Central Wastewater Treatment Company (CWTC), the entity owns the Soapberry Wastewater Treatment Plant (SWTP). NWC plans to divest a portion or all of its shares in CWTC to allow the private sector to expand the SWTP to provide increased sewage generation and collection in KSA and the planned major development of the Caymanas Special Economic Zone (CSEZ) in St. Catherine. This expansion is required by 2020.

5.6.2 Roaring River/Greater Savanna-la-Mar WS

The Roaring River/Greater Savanna-la-mar is mainly served by the Roaring River Water Treatment Plant. The pipe network in the town of Savanna-la-mar is old and leaky and despite efforts over the years to comprehensively replace this infrastructure, this has not occurred.

Under the *Roaring River/Greater Savanna-la-Mar Water Supply Rehabilitation & Upgrading Project (Phase 1)*, NWC plans to spend $1.7B to replace the town's pipe network as well as sections of its transmission main to reduce water loss and improve service reliability. It will be a major part of the NRW reduction efforts in Westmoreland. The replacement of about 1 km of the 400mm diameter transmission from Dunbar's Corner to Mannings School is scheduled commence during the 2016/17 financial year.

5.6.3 Tank & Pump Programme

NWC developed a programme to improve operational efficiency and optimize water supply operations by developing the *Tank and Pump Programme*. It involves the replacement of inefficient pumps and the reconfiguration of the water supply network to reduce operational cost and increase operational efficiency. Water storage tanks will either be replaced or tanks constructed at new sites where it is deemed necessary to improve operational efficiencies.

Following an audit of selected water supply facilities and design of improvement works, the project is now being implemented.

5.6.4 NWA/NWC Coordination

The National Works Agency (NWA) will be carrying out extensive road refurbishing work over the coming years under its Major Infrastructure Development Programme (MDIP). This has led NWC to be coordinating with NWA the concurrent replacement of water pipelines, sewer mains as well as the installation of new ones where this is anticipated for service expansion. NWC has made provisions in its Capital Works Programme for the pipeline and sewer works over the next 3 years.

In FY 2016/17 and part of FY 2017/18, work is scheduled to take place along Mandela Highway, Marcus Garvey Drive, Hagley Park Road and Barbican Road as well as the planned Kingston Entrance Way Improvement Project (along Windward Road).

5.6.5 Transmission Main Replacement

As part of NWC's NRW reduction efforts and measures to improve /expand water in sections of KSA and on the north coast, NWC is preparing designs for major transmission upgrades as follows:

- *Six Miles to Glenmore Road Transmission* - the replacement of some 11 kilometres of 400mm asbestos cement pipeline that is leaking badly and which frequently breaks resulting in major supply disruptions in the commercial districts along Spanish Town Road and to areas such a Downtown Kingston and Harbour View.

- *Six Miles to Dunrobin Ave/Constant Spring Road* – the completion and activation of a 600mm ductile iron pipeline along the Washington Boulevard and strengthen the water transfer capacity from the Rio Cobre Water Supply System and the proposed Content Water Treatment Plant into areas in KSA such as Molynes Road, Constant Spring and New Kingston.

- *Stanton Terrace to Marescaux Road* – replacement of over 3 kilometers of very old 600mm steel pipeline that now transfers water from the Mona Water Treatment Plant to NWC's Marescaux Road complex. This will reduce water losses and cost to maintain this very old pipeline.

- *Constant Spring Road/Dunrobin Avenue to Manor Park* - replacement of pipelines along the 4 kilometre corridor from Manor Park (just below the Constant Spring Water Treatment Plant) to the intersection of Constant Spring and Dunrobin Avenue. This will be done to reconfigure/replace the pipeline maze that now exists along this route and reduce water losses from these old pipelines. This will be done either ahead or concurrently with the NWA's planned road improvement work along this corridor (under MDIP).

- *Constant Spring Road/Dunrobin Avenue to Manor Park Trunk Sewer* – the installation of trunk sewer to extend sewerage coverage in KSA. This will be done ahead or concurrently with the NWA's planned road improvement work along this corridor (under MDIP).

- *Runaway Bay to Mammee Bay*- installation of 22 kilometres of transmission main to increase the water transmission capacity along a section of the north coast, from Rio Bueno to Mammee Bay. This work is to be synchronized with the proposed Rio Bueno Water Treatment Plant to ensure that they are both completed at or about the same time.

NWC is financing the engineering designs for these works under the loan provided by the Inter-American Development Bank (IDB) for the Kingston Metropolitan Area (KMA) Water Supply Improvement Project. It is intended to approach the IDB to provide financing for the pipeline and sewer installation works described above under a new loan facility. Exploratory discussions have taken place with the IDB on this matter.

5.6.6 KSA NRW Reduction Project

The KMA Water Supply Improvement Project is largely financed by a US$133M loan from the IDB, with the objective of improving water supply systems for KSA and in other areas such as Greater Spanish Town and Port Antonio. The *KSA NRW Reduction Project* is a component of the KMA Water Supply.

Some US$55M remains to be spent from the KMA Water Supply Improvement Project and this will be mainly focused on the non-revenue water (NRW) reduction activity in KSA which will be implemented over the next 4 years. This activity is expected to not only reduce losses due to leaks, under-billing and water theft during this period, but will provide technology to support the management of the water supply network as well as improve the work practices of NWC in maintaining the network. Over time,

the results of this effort will contribute to increasing the amount of water available for distribution to customers and therefore improving the reliability of service.

There is a co-management arrangement to implement this project which will see NWC and the contractor working together over the period of the works. Knowledge transfer from experts in the areas of water supply management and NRW reduction, to NWC staff will be a part of this interaction. Jamaicans will be integrally involved in the NRW reduction activities– not just NWC staff, but the opportunity will be provided for other skilled Jamaicans such as engineers, plumbers, technicians, to be contracted to support the NRW reduction efforts.

5.6.7 Rio Bueno Water Supply Project

The north coast is targeted for major resort developments over the next five to seven years. NWC need to have water supply and sewerage infrastructure in place to support these developments. Without adequate water supply and sewerage infrastructure, these developments will be severely hampered.

NWC plans to fast track the provision of water production capacity and supporting water supply infrastructure. A 15 mgd water treatment plant that uses the Rio Bueno River as the source is to be provided through a public private partnership arrangement. The private sector will be invited to finance, design, construct, operate and maintain the water treatment plant under a water purchase arrangement with NWC.

Jamaican private sector entities will be encouraged to participate in this venture when the procurement process starts. NWC is working with the Development Bank of Jamaica (DBJ) to conduct feasibility studies and to assessments of transaction options. It is intended to have this new plant to be in place before mid-2020.

5.6.8 Content Water Supply

KSA is particularly vulnerable to shortfalls in the water production capacity, which in turn seriously impacts on this major urban area. We learnt first-hand of this vulnerability in 2015 with the severe water restrictions that was experienced.

NWC's water supply master plan for the KMA water supply identified various options to meet the projected water requirement in the area. These included the works undertaken under the Jamaica Water Supply Improvement Project (JWSIP) that was completed recently. It included the rehabilitation/upgrading of water production facilities – the Constant Spring and Stony Hill Water Treatment Plants; pipeline replacements – the Rio Cobre pipeline; and other activities to reduce the level of non-revenue water (NRW).

The construction of a 15 mgd water treatment plant adjacent to the National Irrigation Dam near Content in St. Catherine, using water from the Rio Cobre River as its raw water source, was initially included in the JWSIP, but was removed in order to implement work to address some water supply

issues in the west. The need for this new water treatment plant has not gone away and it is intended to fast track its implementation.

The NWC has prepared a plan to provide this 15 mgd water production capacity through a public private partnership arrangement. The plant is to be financed, designed, constructed, operated and maintained by a private sector grouping, which will then enter in a water purchase arrangement with NWC. The intention is to have this new water treatment plant in place and supplying water by end 2018.

5.6.9 CReW

The Caribbean Regional Fund for Wastewater Management (CReW) is a project aimed at establishing financing mechanisms for cost-effective and sustainable financing of wastewater management in the wider Caribbean region; facilitating policy discussions and strengthening legislative frameworks; and facilitating regional dialogue and knowledge exchange with the key stakeholders in the wider Caribbean. This is financed and supported by the Global Environmental Fund (GEF) and the IDB.

National has been an important part of the CReW and is implementing projects valued at some US$12M to significantly improve the performance of some of NWC's sewerage and wastewater treatment systems.

A new plant is now under construction at Boscobel in St. Mary and the Elletson Flats Wastewater Plant is been extensively rehabilitated to ensure that it discharges treated wastewater at an acceptable level. The CReW will also address wastewater problems caused by:

- Lionel Town, Blackwood Gardens & De la Vega City WWTP – these waste stabilization type plants will be rehabilitated to improve performance and the quality of the effluent discharges;
- Longville Park, Paisley Pen, Eltham Park, Ensom City, Red Hills Pen, Shrewsbury WWTPs - these mechanical plants will be rehabilitated to improve performance of the quality of effluent discharges; and
- Acadia, Bay Farm Villas & Hughenden WWTPs in KSA by installing trunk sewers to allow the diversion of sewage flows from these plants and transfer to the Soapberry Wastewater Treatment Plant.

5.6.10 Sewer Extension in Hope Pasture/Mona Heights & Havendale

About 30% of the population in KSA is connected to NWC sewerage, while the remainder is connected to other types of systems, mainly on-site sewage disposal systems such as septic tanks/soak-away pits. Soak-away pits are confirmed as major sources of serious groundwater contamination in sections of KSA. NWC has prepared preliminary plans to extend the sewer network in KSA to increase coverage to at least 70% of the population. The 1992 Kingston Harbour Rehabilitation Study by SENTAR Consultants, the 2003 KBR Kingston Water and Sanitation study and the 2008 Kingston Sewerage Development Plan by Nippon Koei are key reports to guide the finalization of KSA sewer extension plans in sections of KSA.

NWC has plans to install a major sewer trunk from Papine in the east, westerly along Old Hope Road to its intersection with Munroe Road where it will be connected to an existing NWC trunk sewer. This new trunk sewer will drain the UTECH/Hope area, Hope Pastures and a section of Mona Heights. Collector sewers are to be installed along the streets in these areas to connect and drain properties located there. Similarly, trunk sewers and collector sewers are planned for areas such as Havendale, Meadowbrook and Barbican, largely in keeping with the 2008 JICA report on the KMA Sewerage.

5.6.11 Downtown Town Kingston Sewerage

The oldest sewers in Jamaica are located in the downtown section of Kingston, with some having been constructed over 100 years ago. They include the major trunk sewers that comprise the Downtown Kingston Sewer Network which are broadly described as the:

- High Level Trunk Sewer (North Street to Spanish Town Rd) - conveys flows in sewer pipes of up to 42 inches in diameter (1,070mm) along North Street towards the Greenwich Transfer Station.
- Mid-Level Trunk Sewer (Laws Street to Darling Street) - varies between 12 inches and 24 inches (300 and 600 mm) in diameter, is designed to intercept excess flows from the High Level Trunk Sewer. It is currently blocked with silt and garbage.
- Low Level Trunk - runs along Harbour Street and collects the sewage flows in areas near the Kingston Harbour coastline.

These trunk sewers, located in the lower section of the KSA sewer network, are critical in the conveyance of sewage collected in KSA and will determine the extent to which the KSA sewerage can be extended. Many sections of the sewer network experience frequent surcharges and sewage overflows onto the streets because of the current state of the sewerage infrastructure in the downtown area.

Detailed diagnostic surveys are required to be conducted of the entire Downtown Kingston Sewer Network to identify deficiencies in this infrastructure. It will include inspections of strategic manholes throughout this network and will include the use of CCTV cameras to assess the internal condition of key trunk and collector sewers.

The proposed works include the complete rehabilitation/replacement of sections of the High Level Trunk Sewer, complete replacement/upgrading of the Mid-level Trunk Sewer and replacement of large sections of the street sewers in Downtown Kingston.

5.6.12 Port Antonio Water, Sewerage and Drainage Project - Stage 2

Stage 1 of the Port Antonio Water Supply, Sewerage and Drainage Project was completed over a year ago, with the rehabilitation of the water supply network and the installation of trunk and street sewers in the town of Port Antonio. This has contributed to the reduction of NRW in the town and the provision of a sewer network that would help to reduce the adverse environmental impacts that are now caused by the use of onsite wastewater systems. No connections of properties to the new sewer network is

possible until a suitable wastewater treatment plant is established to receive and adequately treating the wastewater that is collected in the Port Antonio sewer network.

The establishment of this wastewater plant will be undertaken in Stage 2 of the Project, which had been unfortunately delayed because of various issues. The Anchovy Wastewater Treatment Plant will be expanded and pumping facilities and force-mains will be constructed as part of the works which is expected to commence before the end of 2016 and completed by March 2018.

5.6.13 North Central Sewerage

In order to support the expected resort and residential developments along the northern coastal corridor between Rio Bueno and Mammee Bay, it will be necessary to establish adequate sewerage infrastructure and wastewater treatment and disposal facilities. This is proposed to be done under the North Central Sewerage Project.

NWC propose to structure a public private partnership arrangement to implement this project.

5.6.14 Greater Spanish Town/Old Harbour/May Pen Sewerage

Greater Spanish Town has some six relatively small wastewater treatment plant scattered across the area, each associated with a housing development. Greater Spanish Town comprises the town of Spanish Town and neighbouring suburbs. Spanish Town and some adjacent communities do not now have access to sewerage services.

As the number of residential developments in Greater Spanish Town moves near saturation point, developments are spreading westwards to Old Harbour and May Pen. In areas within and about the Old Harbour and May Pen areas, a number of residential communities have developed in recent years with each having its own wastewater treatment plant. This situation has led to less than optimum configuration and operations of these wastewater systems, and presents a gap in the provision of adequate sewerage service for these areas.

It is planned to address these sub-optimal arrangements for sewerage by constructing a central wastewater treatment plant for each of these three towns and to re-configure the existing sewer conveyance facilities to transfer existing sewage flows to the central wastewater treatment facility. Provision will be made to accommodate the environs of each of these towns and thereby facilitate further and more orderly development of these areas.

NWC proposes to undertake this under a public private partnership arrangement.

5.6.15 Revised K-Factor Programme

As outlined in the previous section, the K-Factor Programme is currently not sustainable if measures are not put in place to curtail the unrealistic expectations. The NWC is taking steps to address the 'Direct Spending' approach currently being used to finance K-Factor projects. Going forward, the NWC will revise its operation of the K-Factor programme so that the present financial commitments can meet the schedule of its on-going projects and upcoming projects.

Table 5.3: K-Factor Flow of Funds

	2016/17	2017/18	2018/19
Water	16,061,793	18,040,690	20,385,022
Sewerage	4,297,478	4,657,911	5,071,116
Service Charge	3,904,743	4,449,238	5,083,403
PAM	388,561	434,742	489,056
X-Factor	(3,130,877)	(4,192,552)	(4,716,347)
K-Factor	2,862,386	3,110,874	3,499,529
Other Revenue	478,102	503,441	536,165
Total Revenue	**24,862,185**	**27,004,344**	**30,347,944**
Deemed K-Factor	2,633,395	2,862,004	3,219,567
Debt Servicing	1,886,186	4,780,715	6,490,617
Direct Project Spend	3,529,150	2,518,739	4,359,865
Total Inflow	**2,633,395**	**2,862,004**	**3,219,567**
Total Outflow	**5,415,336**	**7,299,454**	**10,850,482**
Surplus/(Shortfall)	**(2,781,941)**	**(4,437,450)**	**(7,630,915)**
Accumulation	**(2,781,941)**	**(7,219,391)**	**(14,850,306)**

As is seen in Table 5.3, the projected cash-flow to finance K-Factor projects is insufficient to sustain the K-Factor programme. At the current rate of expending on the project versus K-Factor inflows, it is projected that this would result in an accumulated shortfall of $14.9 billion by 2018/19. This is clearly not a tenable situation and must be addressed at this stage.

6 Proposed Regulatory Adjustments

6.1 Tariff Adjustments

Since the October 2013 Tariff Determination, it has been challenging for the NWC to perform under this new tariff regime, largely due to:

- The crippling drought of 2014, which further intensified during 2015.
- Increased operating cost as a direct result of efforts to address some of the problems engendered by the continuing drought conditions.
- The general sluggishness of the Jamaican economy which has impacted disposable income and forced increasing number of customers into delinquency.
- Application of GCT on NWC's electricity bill.
- Insufficiency of available cash to support the day to day operations

In order to help relief NWC's current dire financial situation, the OUR is being requested to:

- Reduce the X-Factor to zero for the remainder of the tariff period.
- Reduce the deemed revenue to 87% of billing for the remainder of the tariff period.
- Allow a special increase in PAM to assist in redressing the financial losses experienced by NWC as a result of the extreme drought and other events that have affected NWC's cost.
- Increase the K-Factor to at least 20% and allow the K-Factor to finance NWC's Capital Works Programme

NWC in September 2015 had written to the OUR specifically requested items (1) and (2) above, and entered into discussions with the OUR on these matters. It was subsequently agreed that these requests would be considered during the mid-tariff review. We have included information that we had provided to support these two requests in appendix 2 of this document. The main points are presented below.

NWC's request for consideration for items (3) and (4) are also discussed below.

6.2 Revision of the X-Factor

NWC is requesting that the X-Factor be reduced to zero for the remainder of the tariff period.

In NWC's 2013 Tariff Application, it was proposed that the X-Factor schedule be in line with the efficiencies that the NWC had achieved and could realistically achieve by implementing its capital expenditure programme over the period 2013-2018. We had proposed that the X-factor be set to zero for the first three years of the tariff period and be set to 2.3% in 2017.

The K-Factor and X-Factor schedules that were approved by the OUR are presented below:

Table 6.1: X-Factor and K-Factor schedule

Tariff Year Ending	September 2014	September 2015	September 2016	September 2017	September 2018
K-Factor	14%	14%	14%	14%	14%
X-Factor		-5.5%	-9.7%	-12.7%	- 15.2%

The X-Factor is currently at -5.5% and this translates into an annualized deduction of $1.25B from revenue, while an increase to -9.7% will result in an annualized deduction of $2.45B – ***an increase of $1.2B***. NWC cannot afford this deduction from its operational revenue. NWC is proposing that the X-Factor be reset to zero for the remainder of this tariff regime to provide some "breathing space" for NWC to finance its operations.

NWC is very aware of the need to make efforts to maximize collection, particularly given its cash flow challenges. However these have been made very difficult given the economic environment in which we have been operating. Up to August 2015, the average collection rate during this tariff regime was 86%. With the deemed K-factor inflow calculated on the basis of 92% of the K-Factor billing, it means that cash that would normally have been available for day to day operations has to be diverted to the K-factor fund. The amount diverted in this way is now just over $144M per year.

6.3 K-Factor

It is proposed that the K-Factor be increased to at least 20% and that the K-Factor funds be allowed to finance NWC's Capital Works Programme

NWC estimates that it will require a capital investment of some $55B to the end of FY 2019 to implement its capital works programme. Measures are being taken to implement some of these projects through public private partnership (PPP) arrangements. Expenditure to 2019 on projects that are not being considered for PPP is estimated to total $30B. These include K-Factor eligible projects and other projects that will improve the reliability of existing water supply systems and extend service to new areas and which are not K-Factor eligible.

It is the intention of NWC to package a number of the planned projects and seek loan financing rather than use funds from its operations. Certainly, K-Factor eligible projects will be approached in this way and the deemed K-Factor cash flows used to service such loans.

It is estimated that, with loan financing for its non-PPP projects, NWC will require an additional $5B to service loans for these projects. NWC proposes that the K-Factor percentage be increased from the current 14% to a higher level that would allow NWC to service additional loans acquired to finance its non-PPP capital works projects. NWC estimate that an adjustment of the K-factor to at least 20% would be required.

6.4 Revisions to the Financial and Operational Targets

NWC proposes that the OUR revise the financial and operational targets for the remainder of this tariff regime. These proposed revisions are based on the reality of NWC's current position and capacity, as outlined in section 2, and the plans that were outlined in sections 3 and 4.

(a) Financial Targets

The NWC is proposing the following financial targets to replace those set out in the Regulatory Framework.

Table 6.2: Financial Targets

Objective	Critical Measures	Definition	2016/17	2017/18
			Target	Target
Profitability	Profit Margin	Net Profit (Loss)/ Revenues	-3%	-5%
	Profit Margin	Operating profit(loss)/Revenues	16%	16%
Liquidity	Current Ratio	Current Assets / Current Liability	0.78	0.65
	Quick Ratio	(Current Assets - Inventory) / Current Liability	0.70	0.57
Bankability	Debt Service Coverage Ratio	EBITDA / Debt Repayment + Interests	0.99	0.79
Gearing	Debt Ratio	Total Adjusted Liabilities / (Total Adjusted Liability + Equity)	80%	85%

(b) Operational Targets

The expected operational performance of NWC for the remainder of the tariff regime was discussed in sub-section 3.2 and projections were presented. These projections are presented here in table 5.2 and 5.3 as proposed operational targets for the remainder of the tariff period.

Table 6.3 – Operational Targets (A-D)

Item	Parameter	Requirement	2017	2018	2019
A	Non-Revenue Water (NRW)	NRW Level	70%	68%	65%
B	Coverage	Coverage for Water Supply	75%	76%	78%
		Coverage for Sewerage	15%	16%	18%
C	Water Quality	99% compliance with the IJAM standards	99%	99%	99%
D	Wastewater Quality	All wastewater treatment plants 100% compliant with NEPA standards by 2014/15	20%	35%	60%

Table 6.4 – Operational Targets (E)

Objective	Critical Measures	Definition	Max/ Min	2016/17	2017/18	2018/19
				Target	Target	Target
Improve Billing	Metering Level	Accounts with Functioning Meters/Total Accounts	Min			
	Percentage of Meters Read	Number meters Read/Total Meters	Max	97%	98%	98%
	Days of Sales Outstanding	(Net Accounts Receivables/Billed Revenue)*365	Max	78	72	68
Increase Staff Efficiency	Staff Efficiency	Number of Employees/Number of Connection	Max	4.0	3.8	3.8
	Staff Efficiency Sewage	Number of Sewage Employees/Number of Sewage Connections	Max	1.2	1.2	1.1
Increase Energy Efficiency	Energy Efficiency	Total MWh Consumption/System Input Volume	MWh/ig	4.3	3.8	3.5

7 APPENDIX 1

Extract from

NWC's COMMERCIAL OPERATIONS POLICY MANUAL

- BP 2004 - Trucking of Water to Customers
- BP 5001 - Disconnecting Accounts for Non-payment
- BP 5002 - Reconnecting Supplies Disconnected for Non-payment
- BP 5005 - Illegal Connections

8 APPENDIX 2

NWC's SUMISSIONS FOR FINANCIAL RELIEF

9 APPENDIX 3

ADDITIONAL DATA REQUEST

- Foreign exchange loss
- Updated collection ratio