

Quarterly Update to BPU Water Systems (DW, WP & NP)

By: Jack Richardson, PE

Deputy Utility Manager – Gas, Water, Sewer (GWS)

BPU Meeting – January 19, 2022



Water Distribution Pipeline

Aquatic Center – 2021 New 8" PVC Pipe
Replacing 1955 Old 6" Cast Iron Pipe

Water Production Otowi Well 4

Crew Members Measuring Motor Shaft Length
Old Motor (1991) Failed in 2021

GWS ORGANIZATIONAL STRUCTURE

Staff in the red box are responsible for water distribution (DW) system O&M – but they are also responsible for gas distribution (GA) and wastewater collection (WC) system O&M.

Staff in the yellow box are responsible for water production (WP) & non-potable water (NP) system O&M.

Deputy Utilities Manager
Gas, Water, Sewer (GWS)

Superintendent (GWS)
(1)

Superintendent (WWTP)
(1)

Superintendent (WP) (1)

Meter Reader Supervisor (1)

Field Supervisor (1)

Shop Supervisor (1)

WWTP Supervisor (1)

Supervisor (WP) (1)

Apprentice I (0) / Trainee (2)

Senior Pipefitter (4)

Senior WWTP Operator
(2)

Water System Electrical
Tech. (2)

Meter Reading {3}

Pipefitter (1)

WWTP Operator (2)

Senior Water System
Operator (3)

**Gas Distribution
Water Distribution
Sewer Collection
GWS Total {17}**

Apprentice II (3)

Operator Apprentice II
(0)

Water System Operator
(1)

**Plus 1 Limited Term & 2
Seasonal Temp for AMI**

Apprentice I (0)

Operator Apprentice I (1)

Water System Apprentice
I / II / Trainee (1) + (V)

Trainee (5)

Trainee (2)

Senior Engineering Aide
(1)

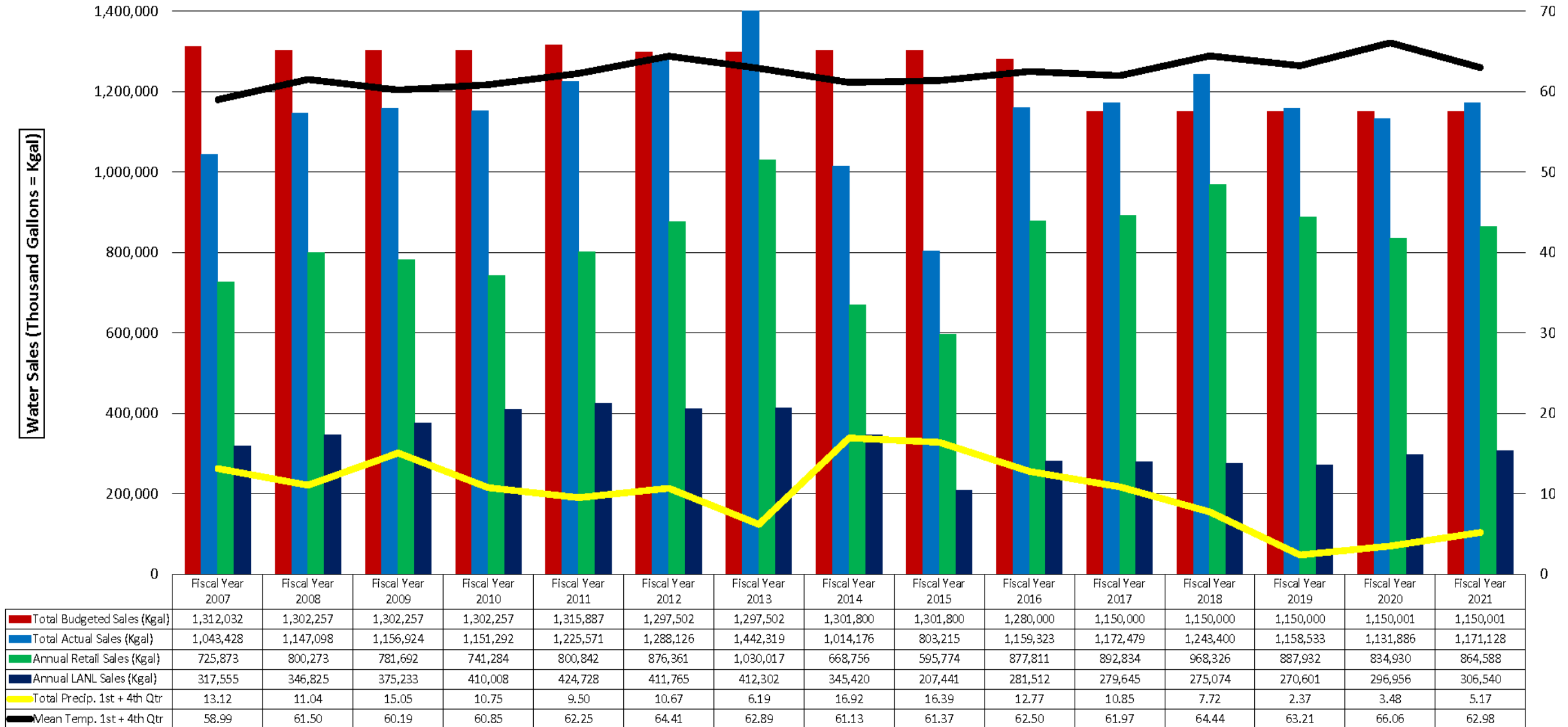
Wastewater Treatment {9}

**Water
Production
Potable and
Non-Potable
{10}**

Retail & DOE Water Sales vs. (1st + 4th Quarter) Temperature & Precipitation

3

Budgeted vs. Actual Water Sales with Precipitation & Temperature Variables



Water Distribution System Photos – DP Road Meter Cans

Left = Old (1955) Meter Can and Meter with Visible Water and Rust and Touch Read Wire
Right = New (2021) Meter Can and Meter Assembly Piping with Visible Trace Wire



DW – NEW/ONGOING ISSUES & ACHIEVEMENTS

5

- **DW** – Purchased and began installing 227 commercial water meters (\$380,000).
- **DW** – 400 +/- remaining water meters needing replacement to complete the AMI project - out of approximately 7,503 total meters = 5% remaining.
- **DW** – Significant rodent damage to touch read/AMI module wires inside meter cans. Water meter can standard detail revised to attempt to eliminate this problem.
- **DW** – Continue to add new customers with new development throughout the County.
- **DW** – Covid/AMI/Retirement impacts resulted in deferral of O&M initiatives for: PRV Stations, Water Valves & Fire Hydrants. AMI remains highest priority until completion.
- **DW** – Water Gate Valve fasteners failing at 15-20 years instead of lasting the 40-year estimated useful life. Water Valve installation design standards revised accordingly.
- **DW** – Hope to incorporate a new Sr. Office Specialist and GWS crew member into the umbrella GWS Team to support supervisors and increase direct field supervision. (SOS also will assist ED, WP & WT crews and supervisors)
- **DW** – Alamo/Capulin, DP Road & Aquatic Center water pipeline improvements completed; including a full replacement PRV station (5,530 LF).

Measures/Targets/Benchmarks for Tracking Water Distribution System O&M

6

❖ PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES

- ▶ Water Service Affordability – Based on Ave Res Monthly Bill per Median Household Income (%) – US & NM Only
- ▶ O&M Expenditures per 100 Miles of Main Pipeline (\$/ 100 Miles)
- ▶ Main Pipeline Breaks per 100 Miles of Pipeline (#/100 miles)
- ▶ Non-Revenue Water (%) {Name change from Unaccounted for Water Loss (%)}
- ▶ Total Gallons Purchased for Distribution (DW) vs Delivered to Distribution (DW) vs. DPU Distribution (DW) Projected Sales

❖ SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES

- ▶ Number of Meters Changed Out and Average Age of Meters in the DW System (# and age)
- ▶ O&M Expenditures per All Accounts (\$/ Account)
- ▶ Cost of Water per All Accounts (\$ / Account)
- ▶ CIP Expenditures per All Accounts (\$ / Account)
- ▶ Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)
- ▶ System Renewal and Replacement (CIP Expenditures for R&R/Total Present Worth of Gas System) (%)

❖ PERFORMANCE MEASURES WITH TARGETS OR BENCHMARKS

- ▶ Performance Measures with known National Standards for system comparison are in GREEN (Typically AWWA standards)
- ▶ Performance Measures with a DPU Strategic Plan or Conservation Plan Goal are in MAGENTA
- ▶ Performance Measures with both a DPU Strategic Plan or Conservation Plan Goal and a National Standard comparable goal are in CYAN
- ▶ Measures are collected monthly and compiled and reviewed annually. Annual FY performance measures data is transferred from the annual data sets to a multi-year data set for year over year / multi-year comparison.

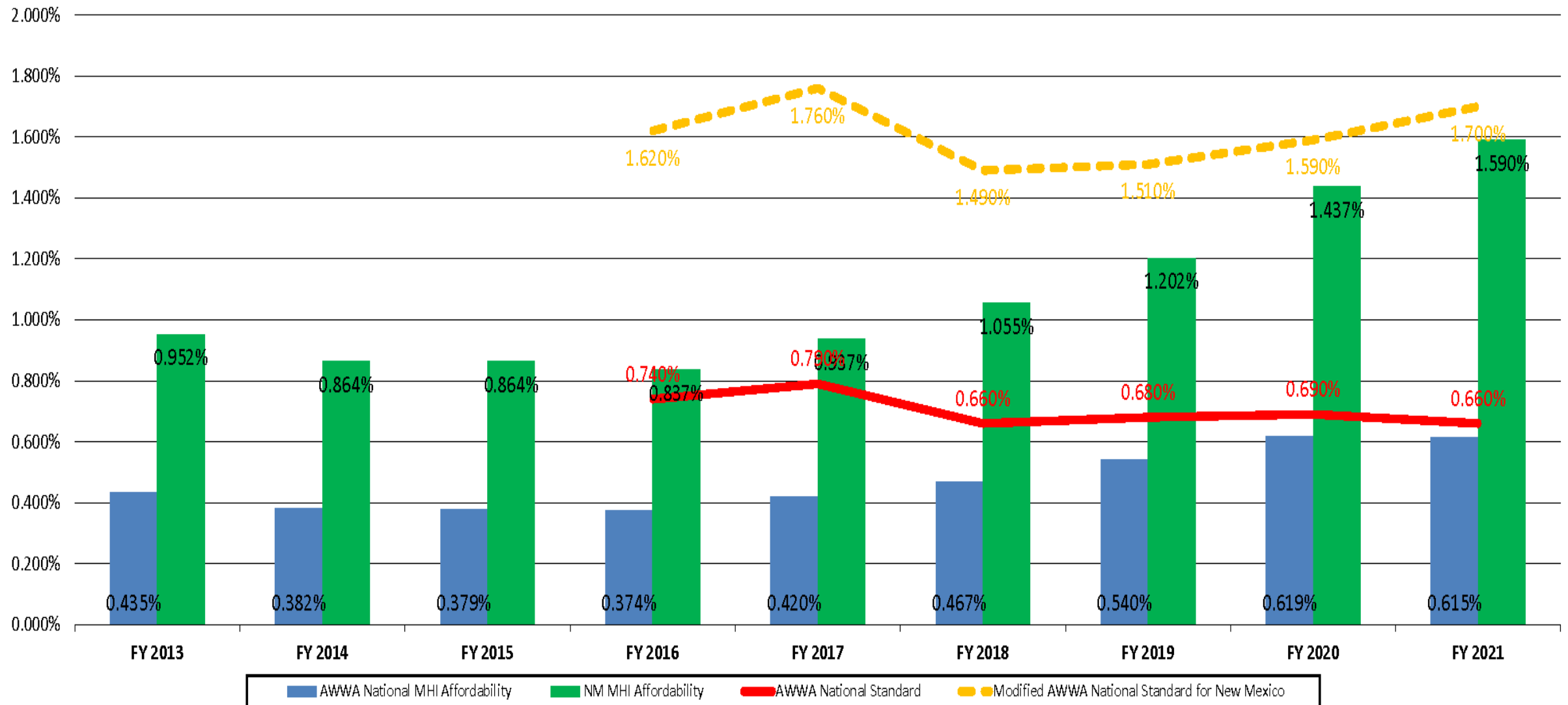
DW – DASHBOARD ANALYSES

- Summary of Primary Performance Measures for Water Distribution.
 - **DW-1: Water Service Affordability** – Values remain below both National and New Mexico standards. New Mexico values rising because New Mexico MHI did not increase between FY16 and FY21. Los Alamos County rates will continue to coincide with national and comparable state rates generally increasing for the foreseeable future.
 - **DW-2: O&M Expenditures per 100 Miles Main Pipeline** - 9-year trend continues slightly downward. Significantly above national standard factors include system complexity versus small system size & relative age of the system.
 - **DW-3: Breaks per 100 Miles Main Pipeline** - 9-year trend continues downward toward the national standard. {NOTE: At 122 miles of main – FY21 national standard of 8.70 equates to 10.6 breaks for DPU system}
 - **DW-4: Non-Revenue Water (%)** - Trend static near EPA national standard. FY14 & FY20 assumed to be data outliers. Completion of AMI, and total replacement of all meters, is anticipated improve the trend line toward the DPU Conservation Goal of 50% of national standard and eliminate outlier data points. {NOTE: Name change from Unaccounted for Water Loss %}
 - **DW-5: Gallons Purchased vs Gallons Delivered vs Projected Sales** - Projected sales remain in line with actual sales.

Water Distribution – Primary Key Organizational Performance Measure

8

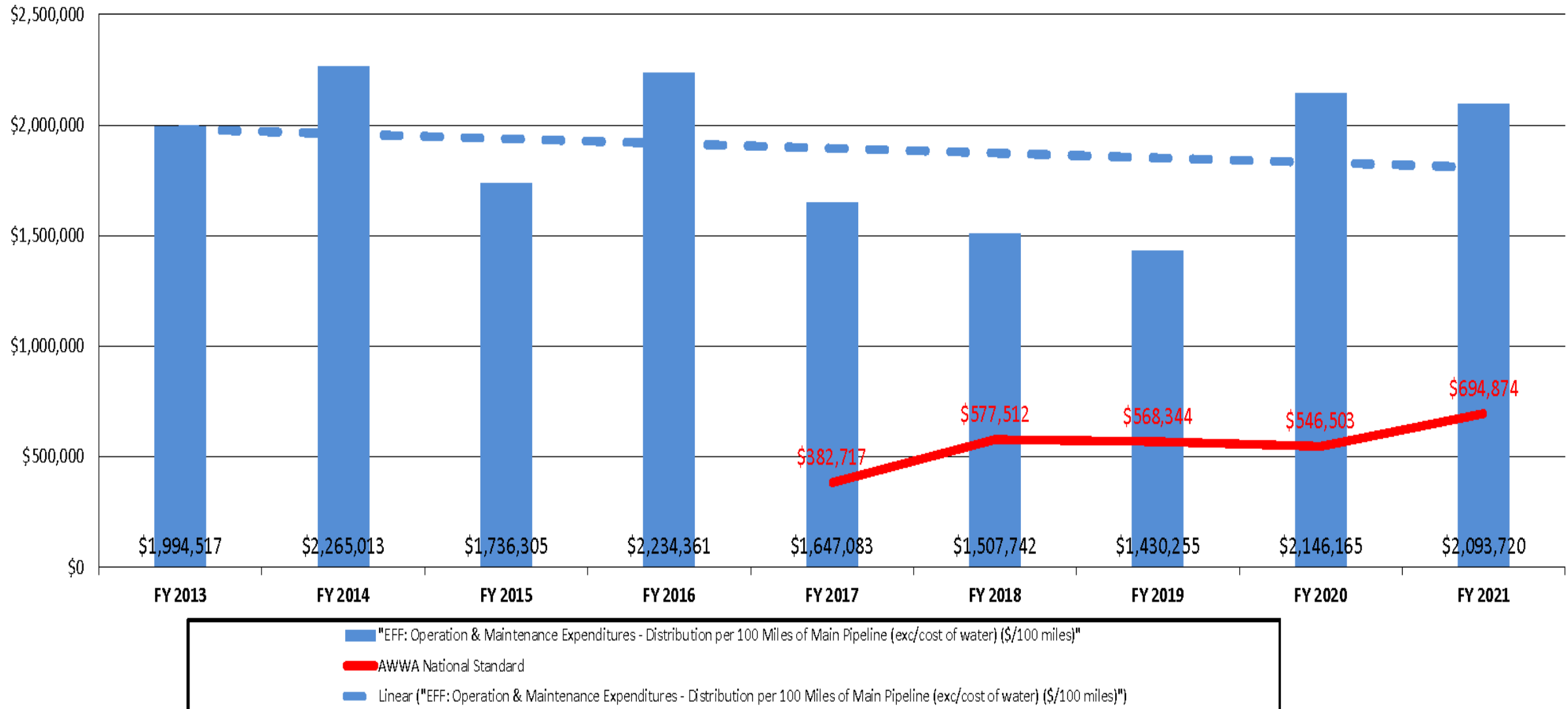
DW-1 / WATER SERVICE AFFORDABILITY - AVERAGE RESIDENTIAL ANNUAL WATER BILL AS A PERCENTAGE OF MEDIAN HOUSEHOLD INCOME (%) / SG 2.0 & SO 2.1



Water Distribution – Primary Key Organizational Performance Measure

9

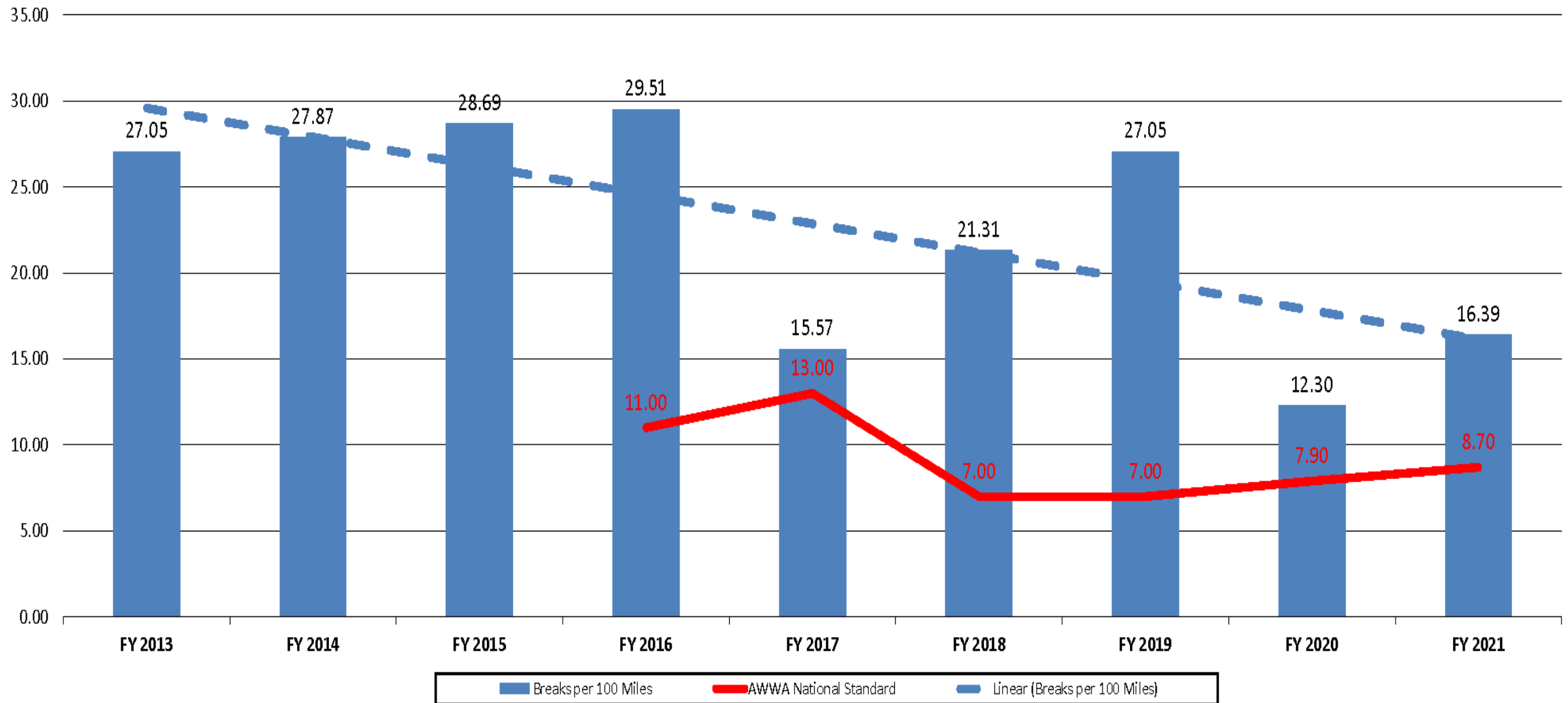
DW-2 / OPERATION & MAINTENANCE EXPENDITURES (EXC/ COST OF WATER) PER 100 MILES OF MAIN PIPELINE - DISTRIBUTION (\$/100 MILES) / SG 1.0 & SO 1.1



Water Distribution – Primary Key Organizational Performance Measure

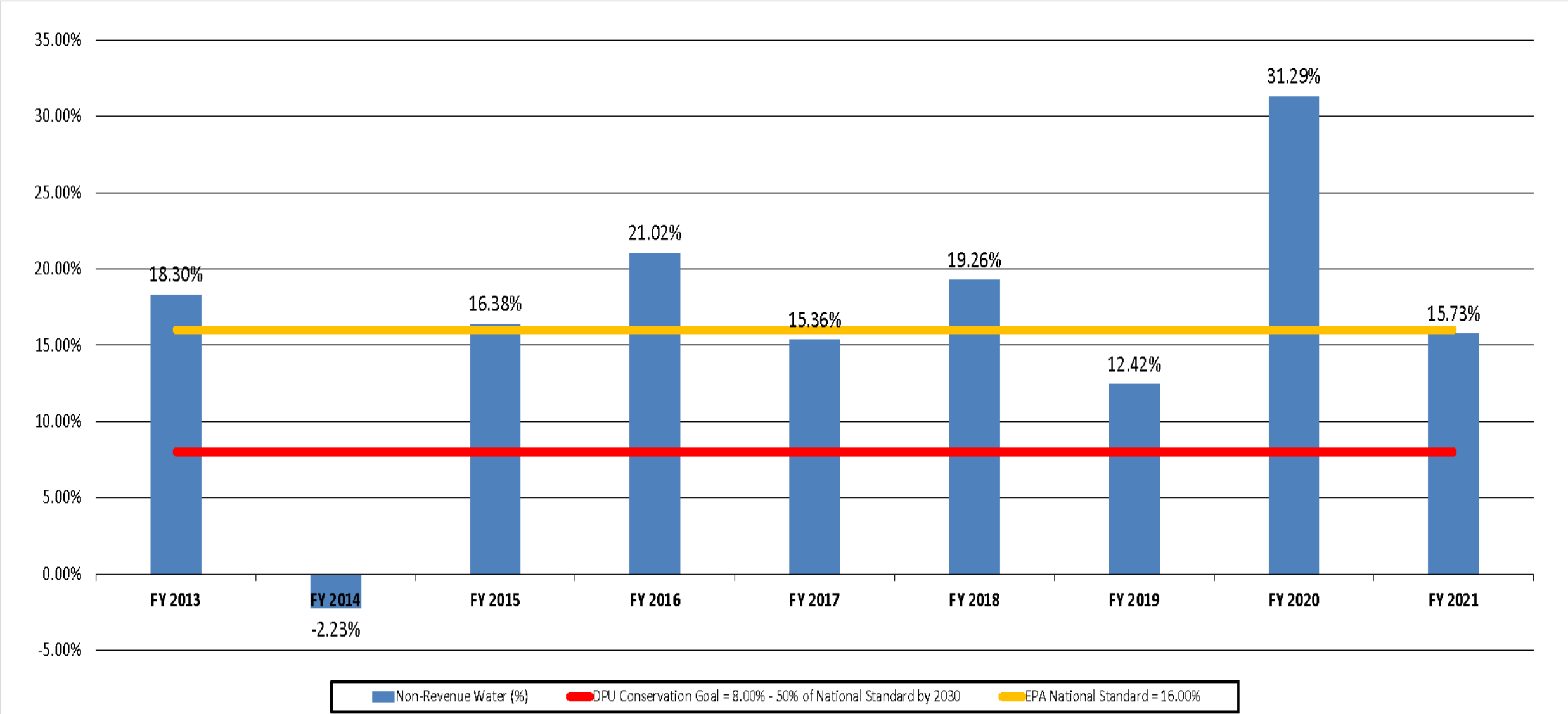
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DW-3 / WATER DISTRIBUTION MAIN BREAKS PER 100 MILES MAIN PIPELINE (BREAKS/100 MILES) / SG 1.0 & SO 1.1



Water Distribution – Primary Key Organizational Performance Measure

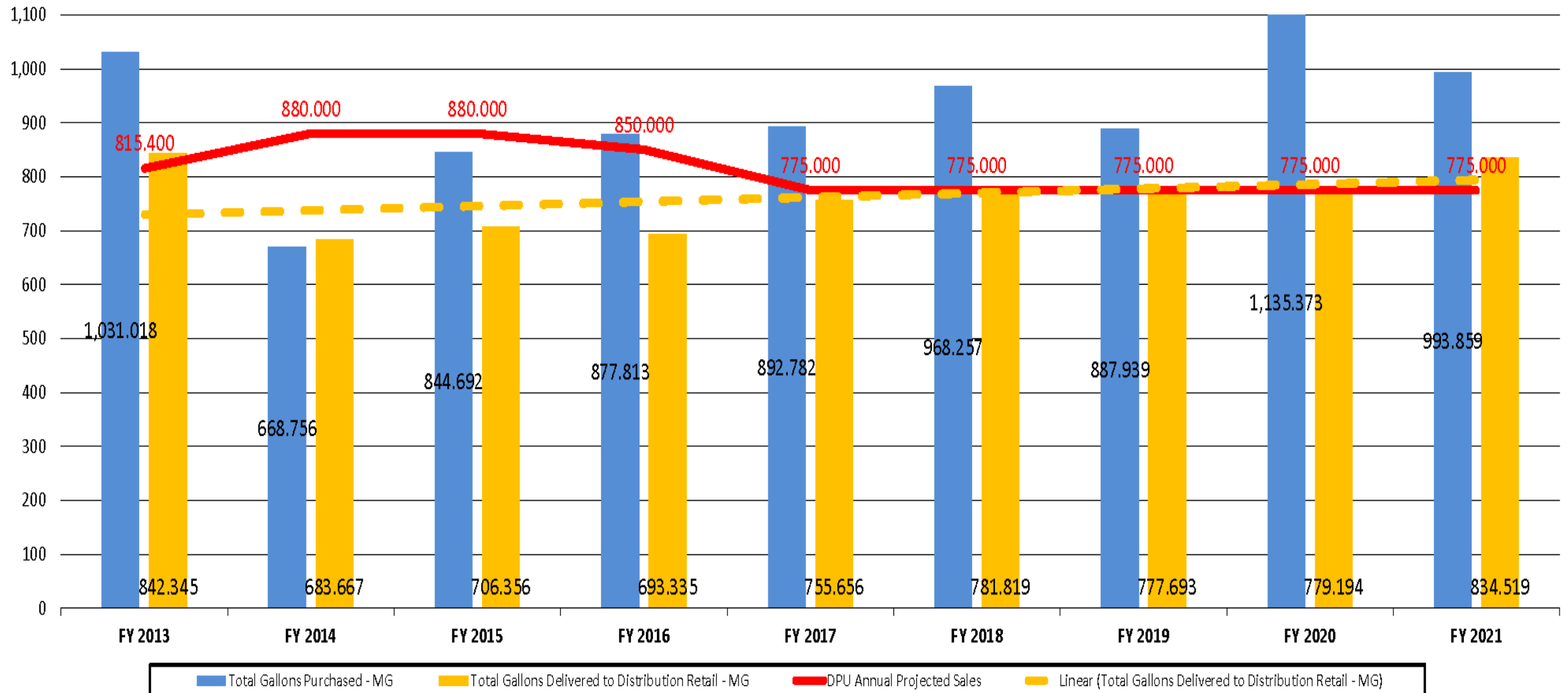
DW-4 / NON-REVENUE WATER (%) / SG 5.0 & SO 5.2



Water Distribution – Primary Key Organizational Performance Measure

12

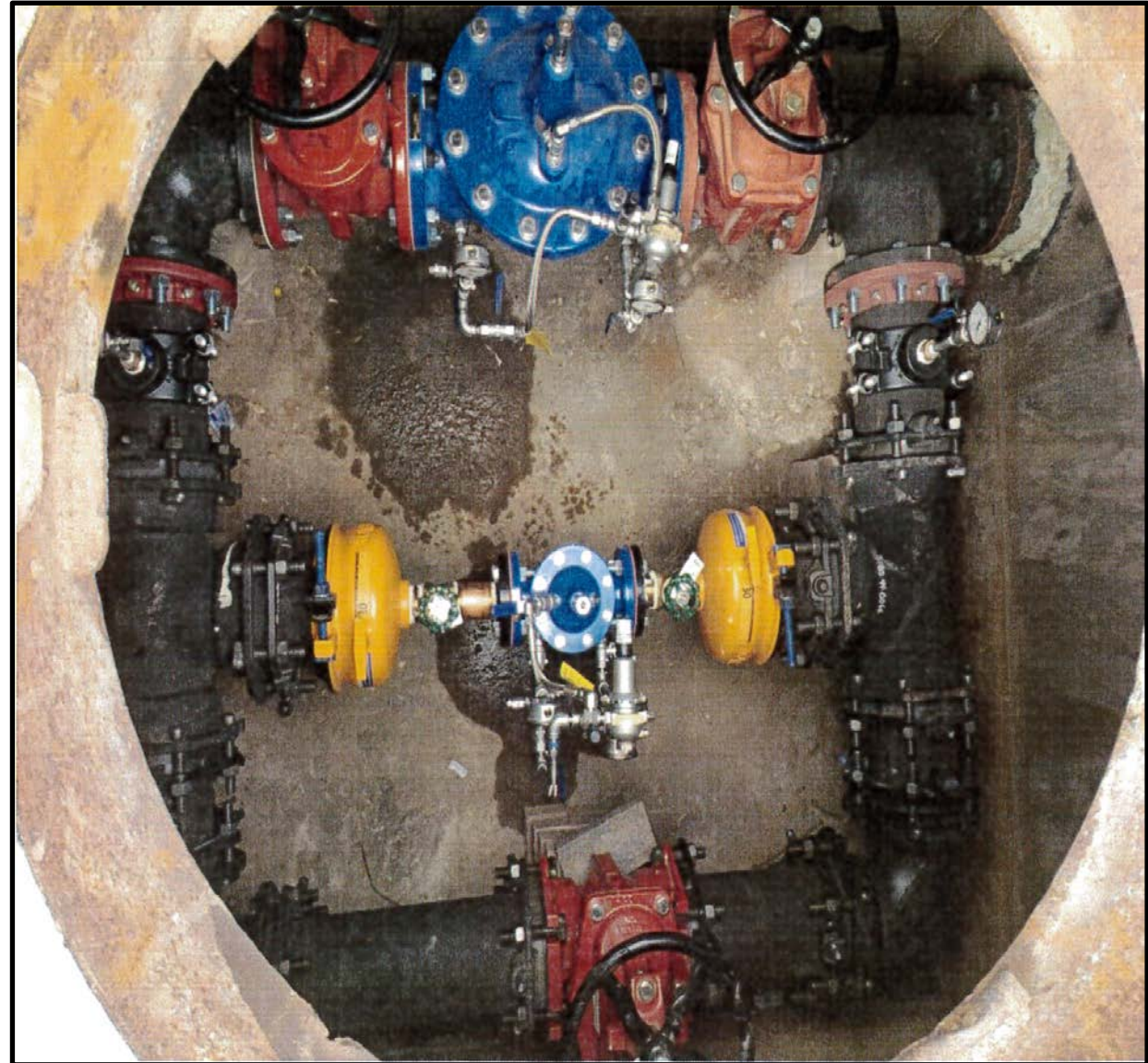
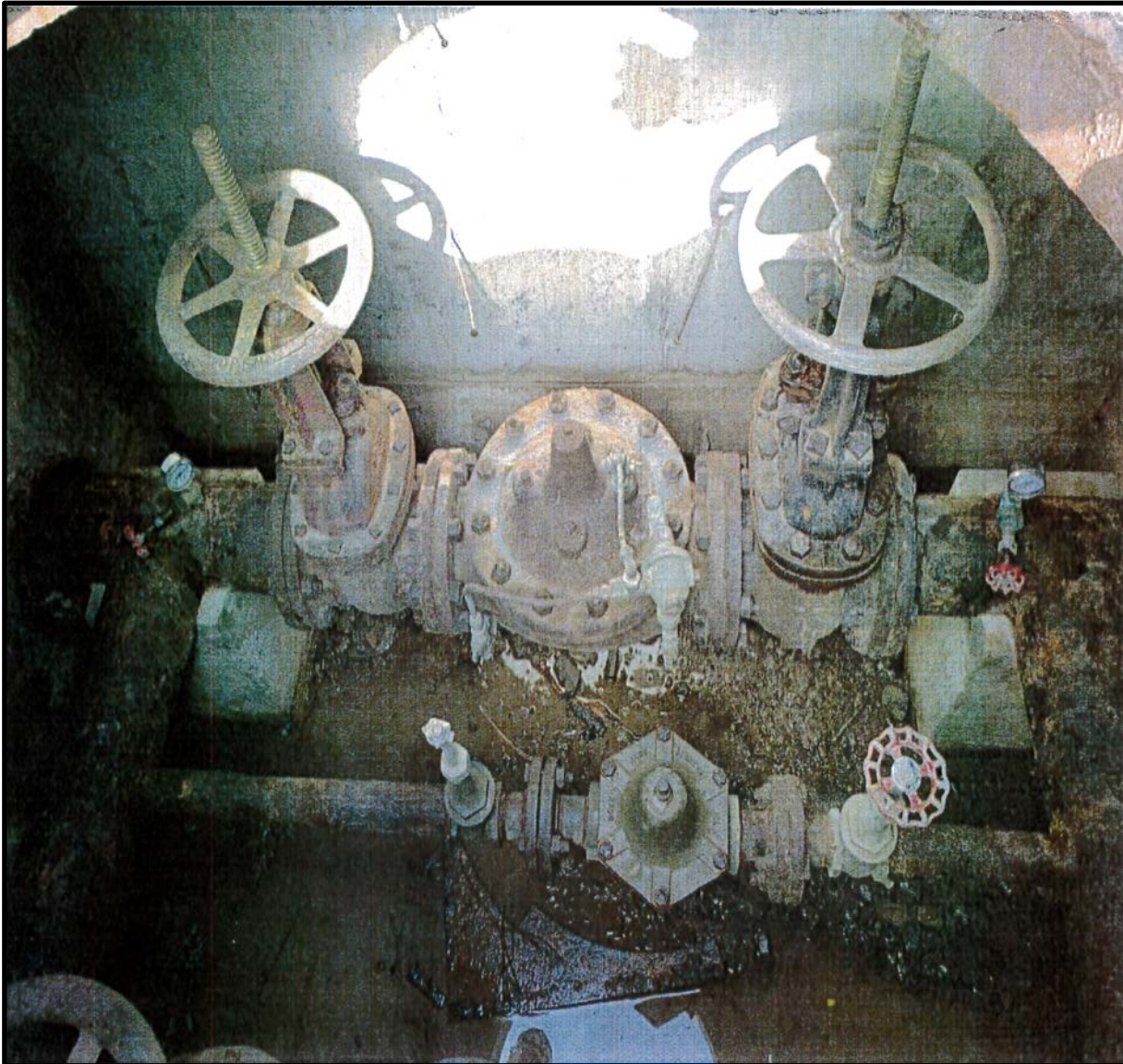
DW-5 / GALLONS PURCHASED FOR DISTRIBUTION VERSUS DELIVERED TO DISTRIBUTION - MILLION GALLONS (MG) / SG 1.0 & SO 1.1



Water Distribution System Photos – Barranca Tank Area Feed PRV Station R&R {O&M Budget Project}

Left = Old (1960) Failed 8" X 2" PRV Station Valves & Piping

Right = New (2021) 8" X 2" with Bypass PRV Station Valves & Piping in Existing Vault with New Lid



Water Distribution System – Overall System Condition – GIS Report – FY 2021

14

WATER DISTRIBUTION SYSTEM - OVERALL SYSTEM CONDITION - END OF FY 2021 REPORT									
ASSET CLASS	COUNT	AGE FACTOR	OPERATIONAL CONDITION	CAPACITY CONDITION	RISK FACTOR	CONDITION & RISK ASSESSMENT		REPLACEMENT COST	{CONDITION & RISK ASSESSMENT} * {REPLACEMENT COST}
Main Water Pipelines	6,420	0.99	2.61	2.07	1.99	2.83		\$37,481,084.45	106,071,468.99
Drain Water Pipelines	1	0.52	2.00	2.00	1.00	3.00		\$1,910.69	5,732.08
Delivery Water Pipelines	8,093	1.11	2.74	2.00	2.00	3.14		\$2,496,238.41	7,838,188.59
Main Water Valves	2,304	0.91	2.50	2.00	1.99	2.83		\$5,137,695.00	14,539,676.85
Delivery Water Valves	7,159	1.10	2.71	2.00	2.00	3.12		\$1,575,205.50	4,914,641.16
Water Meters	7,503	0.40	2.67	2.00	2.00	2.25		\$1,592,717.00	3,583,613.25
Water Fire Hydrants	1,073	1.00	2.72	2.00	2.99	3.26		\$5,365,000.00	17,489,900.00
Water Pressure Reducing Station	61	0.84	2.97	2.00	3.00	3.14		\$2,702,000.00	8,484,280.00
SUMS	32,614							\$56,351,851.04	162,927,500.92
DW SYSTEM OVERALL SYSTEM CONDITION ASSESSMENT =					2.89	FAIR			

DW Sub-System Summary – January 2022 Water Distribution Physical Condition Assessment

15

- The current physical condition of the water distribution sub-system overall is FAIR.
- This current condition assessment is based on the End of FY 2021 GIS Report for asset management condition & risk assessment score = 2.89. A new Primary Key Organizational Performance Measure will be developed to track and trend this value year over year starting next year once more than one value is available.
- Past two years the physical condition was rated fair to good – although using a non-numeric more subjective assessment methodology.
- Known portions in poor condition: PRV station condition and deteriorated pipelines that have been in the ground for 50 to 60 years. Profit Transfer and Economic Development funding is accelerating the re-start of DW CIP pipeline R&R projects.
- Greatest weakness = PRV Station valve & pipe condition due to age and excessive rust. GWS crews have developed a PRV Station R&R program which, after AMI meter change outs are completed and additional staff is approved and received, will regain momentum.
- Meter change out program continues to concentrate on AMI start up; including larger commercial and residential meters – 95% complete.

GIS Condition Report Reference Notes / Value & Assessment Formulas – 1 / 2

16

Risk Term	Numeric Condition Value	Descriptive Value/Formula	Description
AGE		Current_Year - Year_Installed	
AGE FACTOR: PERCENT OF EXPECTED LIFE	0.01 to 1 (can be greater than 1 if age exceeds estimated life span)	Age / Estimated_Life_Span	For calculating Present Worth Value. The Age Factor is used to multiply times the current replacement value to calculate the Present Worth Value of that asset. For assets installed in the current year, set the minimum Age factor at 0.01 (instead of 0).
OPERATIONAL / STRUCTURAL CONDITION	1	Excellent	Excellent physical condition. Likely to perform adequately without major work for estimated life span. No failures. No corrosion, minor cracking, joint displacement, sediment. No visible roots. Only normal routine maintenance required
	2	Good	Good physical condition. Minimal short term failure risk but potential for deterioration within the estimated life span. Few failures. Minor wear, corrosion, cracking, joint displacement, sediment. Fine hair roots visible. Minor maintenance (if any) required.
	3	Fair	Functionally sound physical condition. Showing some wear with minor failures and some diminished efficiency. Deterioration evident. Failure unlikely within the next few years but further deterioration likely with some replacement before estimated life span is met. Minor components or isolated sections need replacement or repair but asset still functions safely at an adequate level of service. Increased operating expenses may be required. Moderate cracking and/or joint displacement. Sediment causing minor blockage. Medium level of root intrusion. Moderate maintenance work required but asset is still servicable.
	4	Poor	Functional asset but requires a high level of maintenance to remain at a working level of service. Asset barely servicable. Likely to experience a noticeable deterioration in performance in the short term. Noticeable increased operating costs. Significant corrosion. Extensive cracking and/or joint displacement. Major sediment blockage. Significant root intrusion. No immediate risk to health or safety but significant maintenance or minor renewal/upgrade work required within a few years to ensure asset remains safe.
	5	Failed	Failed or failure imminent. Asset essentially unservicable. Effective life has been exceeded and excessive maintenance costs incurred. High risk of breakdown with serious impact on performance. No life expectancy remains. Health and safety hazards exist or asset cannot be operated or serviced without risk to personnel. Major corrosion, cracking and/or joint displacement to the point of pipeline failure. Sediment almost totally blocking pipeline. Root intrusion has been neglected or is almost totally blocking pipeline. Major maintenance work or renewal/upgrade required urgently.
RISK FACTOR	1	Virtually None	Routine monitoring. No action required.
	2	Low	Monitor and manage as appropriate. Actioned by routine procedures.
	3	Medium	Actively manage. Planned action required.
	4	High	Proactively manage. Prioritised action required.
	5	Extreme	Eliminate, avoid, implement specific action plans and procedures to manage and monitor. Immediate action required
CAPACITY CONDITION	1	Excellent	Meets all demand requirements.
	2	Good	Infrequent peak demand problems but no detectable adverse impacts to customers. No known manhole surcharging.
	3	Fair	Occasional peak demand problems with minor detectable adverse impacts to customers. Minor manhole surcharging.
	4	Poor	Frequent peak demand or occasional average demand problems with obvious detectable adverse impacts to customers. Routine manhole surcharging but not overflowing.
	5	Failed	Routine average demand problems with constant or serious impacts to customers. Occasional manhole surcharging to overflow.
TIME SINCE CONDITION ASSESSMENT	1	Excellent	0 - 5 years
	2	Good	6 - 10 years
	3	Fair	11 - 15 years
	4	Poor	16 - 20 years
	5	Failed	21 + years
CONDITION ASSESSMENT METHODOLOGY	1	Excellent	Actual recent physical/ visual inspection in the last 0-3 years.
	2	Good	Actual physical/ visual inspection in the last 4-7 years.
	3	Fair	Assumption based on actual adjacent asset inspection.
	4	Poor	Assumption based on age and general historic knowledge of the specific component or system.
	5	Failed	Assumption based on age only.

GIS Condition Report Reference Notes / Value & Assessment Formulas – 2 / 2

17

CONDITION & RISK SCORE (C&RS)		$\frac{((\text{OPERATIONAL_STRUCTURAL_CONDITION} \times 50) + (\text{CAPACITY_CONDITION} \times 20) + ((\text{AGE_FACTOR} \times 5) \times 15) + (\text{RISK_FACTOR} \times 15))}{100}$	<p>1. Calculating the "Condition & Risk Score" or "C&RS" value uses a weighted system where Operational & Structural Condition is weighted 35% and Capacity Condition is weighted 15% and Age Factor is weighted 25% and Risk Factor is weighted 25%. This splits the weighting evenly between the two condition categories and the age and risk categories 50-50.</p> <p>2. The Operational & Structural Condition category has more weight than the Capacity Condition because the Capacity Condition really only comes into play when the Capacity Condition is Poor or Failed during the life of any asset. And the Capacity Condition value generally would not change during the life of an asset unless conditions in the field change rather dramatically for some reason such as a new subdivision is added.</p> <p>3. The Age and Risk Factor are weighted the same because it feels like they have equal weight in the outcome. The older the asset and or the higher the inherent risk of an asset failure then the higher the score should be.</p> <p>4. The Age Factor is multiplied by 5 to bring that value between the (1 thru 5) scoring range of the other categories. Except in the instances when the asset life has exceeded the expected life and then the Age Factor will be greater than 1.0. In this case the Age Factor will begin to grow in importance to condition and risk as it continues to age beyond the expected life and as the calculated age factor grows ever higher than the (1.0 x 5) value.</p> <p>5. For the typical asset's "Condition & Risk Score" value, the value range will be the same as the individual categories: 1 thru 5.</p>
CONDITION & RISK ASSESSMENT (C&RA)	OPERATIONAL / STRUCTURAL CONDITION = 5	Failed	The Condition & Risk Assessment (C&RA) is a combination of the various condition assessments and is used to prioritize which assets need the quickest attention.
	CAPACITY CONDITION = 5	Failed	
	RISK FACTOR = 5	Failed	
	C&RS > 4.5	Failed	
	3.5 < C&RS <= 4.5	Poor	
	2.5 < C&RS <= 3.5	Fair	
	1.5 < C&RS <= 2.5	Good	
	C&RS <= 1.5	Excellent	
AGE FACTOR: Score Colors	0.01 <= AGE FACTOR <= 0.25	Excellent	0 <= AGE <= 10 (for Pipelines or any assets with Useful Life = 40 years)
	0.25 < AGE FACTOR <= 1	Good	10 < AGE <= 40 (for Pipelines or any assets with Useful Life = 40 years)
	1 < AGE FACTOR <= 1.5	Fair	40 < AGE <= 60 (for Pipelines or any assets with Useful Life = 40 years)
	1.5 < AGE FACTOR <= 2	Poor	60 < AGE <= 80 (for Pipelines or any assets with Useful Life = 40 years)
	2 < AGE FACTOR	Failed	80 < AGE (for Pipelines or any assets with Useful Life = 40 years)
Various "Average" Attributes in Summary Report			"Average" numbers in the summary reports are the averages of each individual asset's value for that category. Each individual asset for pipelines being each individual pipeline segment within the GIS gas system for the appropriate category (for example: high pressure main gas pipelines). For singular assets such as gas valves, each individual asset is each individual valve within the GIS gas system for the appropriate category (for example: high pressure key gas valves).
Fully Depreciated Assets			Fully Depreciated Assets are denoted "F.D." inside attribute for depreciated value of current fiscal year
REPLACEMENT COST			Replacement costs for most asset types were retrieved from RS Means. For asset types with no RS Means data, we used install costs from the most recent assets in financial data.
Overall System		$\frac{\text{SUM}(\text{CONDITION \& RISK ASSESSMENT} * \text{REPLACEMENT COST})}{\text{SUM}(\text{REPLACEMENT COST})}$	The Overall System score is given by taking the sum of CONDITION & RISK ASSESSMENT * REPLACEMENT COST for each asset class and dividing by the sum of REPLACEMENT COST for each asset class. We used replacement costs as the weights because they are a good measure of the relative importance of various assets.

Water Production System Photos – Future CIP Projects

Left = Old (1950) Failed 16" Altitude Valve – Sycamore Tank {FY23/FY25 Tank Piping Upgrade Projects}

Right = Old (1955) WP 14" Transmission Pipeline Coupling {FY25 Townsite 14" Pipeline R&R Project(s)}



WP – NEW/ONGOING ISSUES & ACHIEVEMENTS

19

- **WP** – Tsankowi Chlorination & Pipeline and OW2/OW4 projects started construction.
- **WP** – OW4 motor failed. Ordering a new motor meant additional coordination during the design of the OW4 MCC replacement project with engineers and contractors.
- **WP** – WP AMT (Asset Management Team) agreed upon a standardization of equipment for Well Stations and for Booster Stations. This necessitated additional coordination during the equipment submittal/acquisition process of the OW2/OW4 project.
- **WP** – Despite OW4 failing and unavailable during the last high irrigation season, WP crews maintained water supply to all systems. Helpfully, PW4 was finally completed and placed on-line for continuous service during the later half of the high irrigation season.
- **WP** – Covid/AMI/Retirement impacts resulted in deferral of O&M initiatives for: PRV Stations, Water Valves & Fire Hydrants. AMI remains highest priority until completion. Isolated WP small service water meters were located and upgraded.
- **WP** – Chromium plume estimated impacts on the aquifer may be more severe than originally thought. NMED and LANL staff are reviewing this issue.
- **WP** – NM 4 Road/Pipeline and Camp May/Ski Hill Pipeline projects continue to require flexibility in scheduling based on factors outside the control of DPU.

❖ PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES

- ▶ Percent Number of Days in Full Compliance (%)
- ▶ O&M Expenditures per Million Gallons Produced (\$/MG)
- ▶ Main Pipeline Breaks per 100 Miles of Pipeline (#/100 miles)
- ▶ Energy Consumption per Million Gallons Potable Water Produced (kWh/MG)
- ▶ Gallons per Capita Daily Water Produced (GPCD)
- ▶ Total Gallons Produced vs DPU Projected Sales

❖ SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES

- ▶ Energy Consumption per Million Gallons Produced (kWhr/MG)
- ▶ Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)
- ▶ System Renewal and Replacement (CIP Expenditures for R&R/Total Present Worth of Gas System) (%)

❖ PERFORMANCE MEASURES WITH TARGETS OR BENCHMARKS

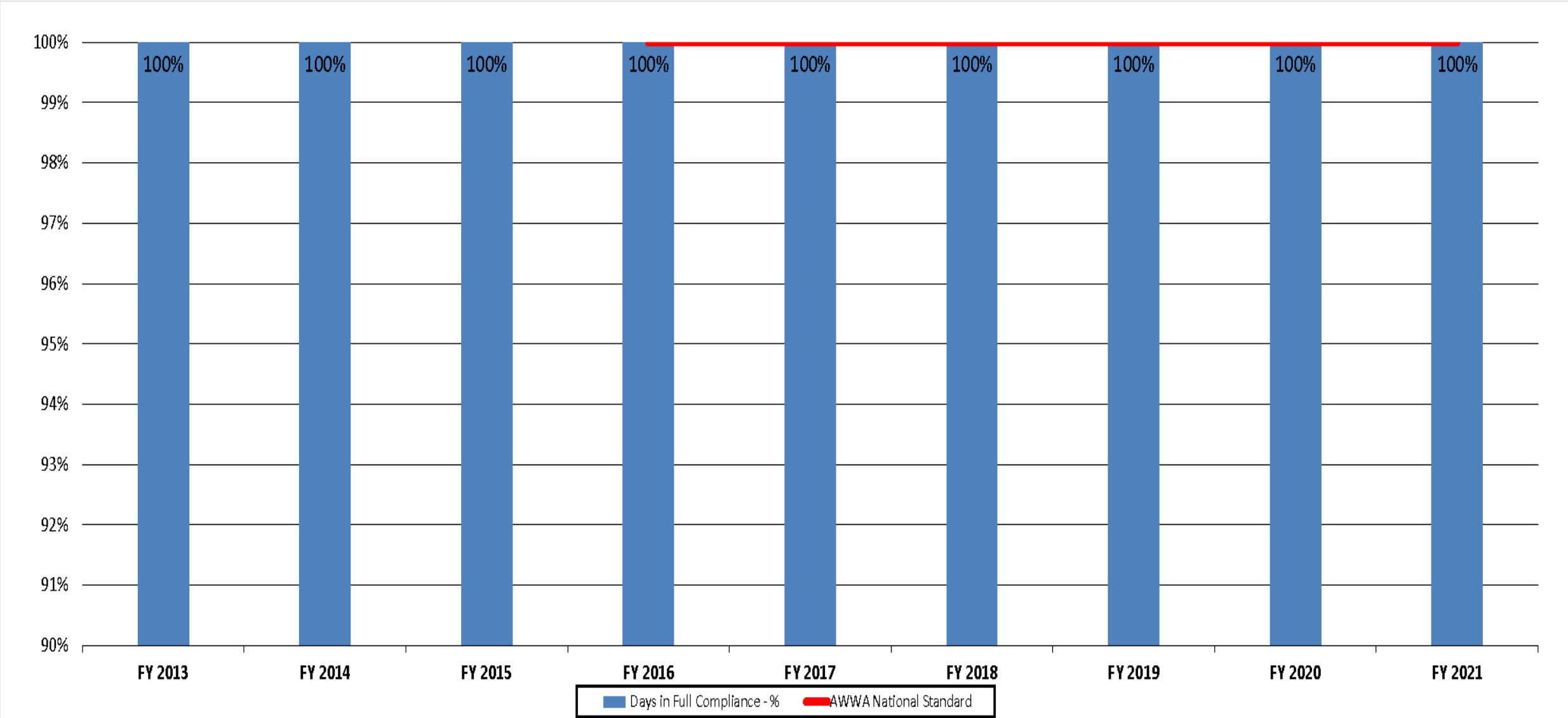
- ▶ Performance Measures with known National Standards for system comparison are in GREEN (Typically AWWA standards)
- ▶ Performance Measures with a DPU Strategic Plan or Conservation Plan Goal are in MAGENTA
- ▶ Performance Measures with both a DPU Strategic Plan or Conservation Plan Goal and a National Standard comparable goal are in CYAN
- ▶ Measures are collected monthly and compiled and reviewed annually. Annual FY performance measures data is transferred from the annual data sets to a multi-year data set for year over year / multi-year comparison.

WP – DASHBOARD ANALYSES

- Summary of Primary Performance Measures for Water Production.
 - **WP-1: Drinking Water Compliance** – Outstanding long term historic compliance record continues.
 - **WP-2: O&M Expenditures per MG Produced** - 9-year trend continues to compare well with national standard.
 - **WP-3: Breaks per 100 Miles Main Pipeline** – 5-year trend is up & down compared to national standard. {NOTE: Difficult to meet national standard with only 45 miles of main in the WP system. More than 4 breaks exceeds the FY21 national standard of 8.70 breaks per 100 miles of main}
 - **WP-4: Gallons per Capita per Day (GPCD)** - GPCD Goals revised between FY16 & FY17 and again between FY20 & FY21. Long term trend is static and above both DPU conservation goal and national standard.
 - **WP-5: Potable Water Produced** – Recent actual sales starting to trend up. Perhaps due to “high season” temperatures trending up and precipitation trending down. May make it more challenging toward meeting the DPU conservation goal and national standard for GPCD in the coming 8 years.

Water Production – Primary Key Organizational Performance Measure

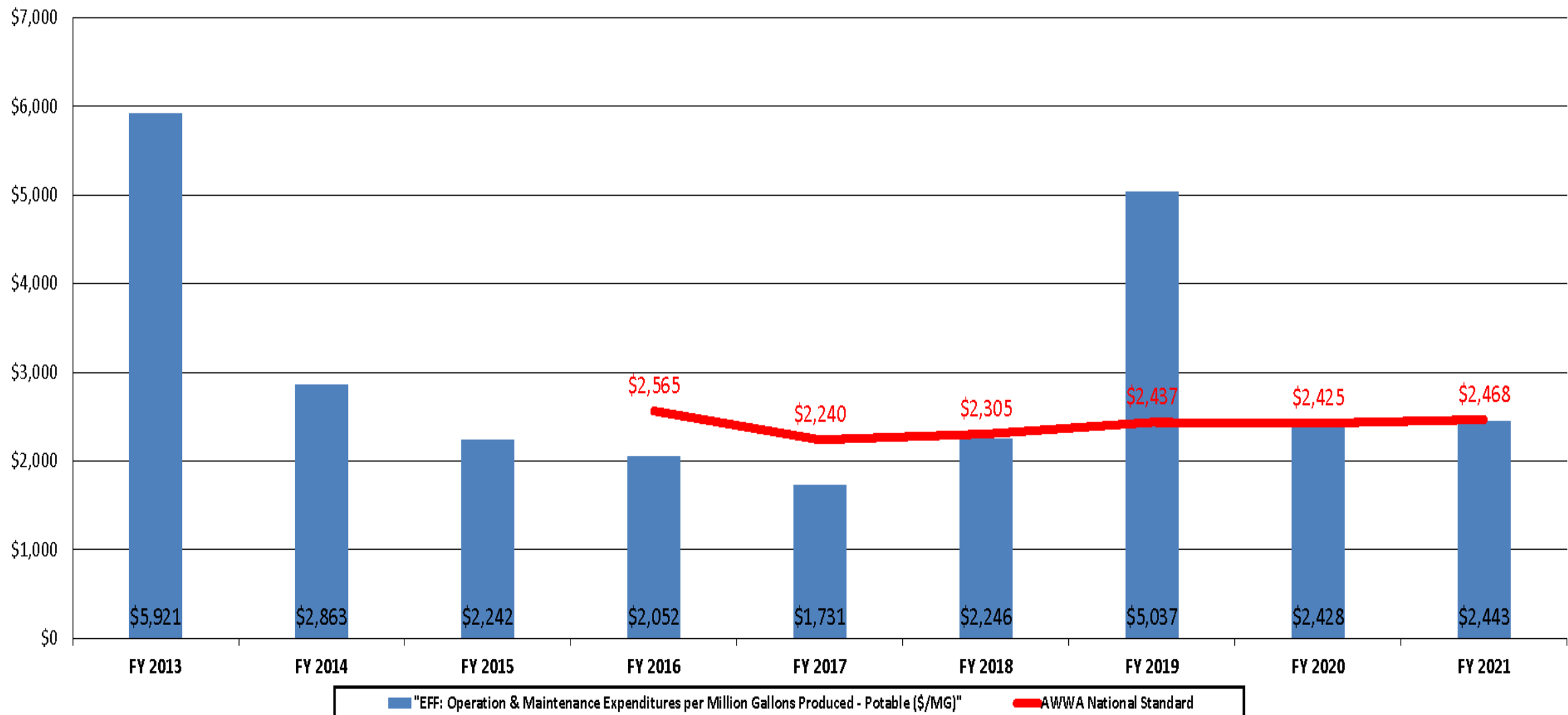
WP-1 / DRINKING WATER COMPLIANCE - NUMBER OF DAYS IN FULL COMPLIANCE AS A PERCENTAGE OF NUMBER OF DAYS IN COMPLIANCE PERIOD (%) / SG 1.0 & SO 1.1



Water Production – Primary Key Organizational Performance Measure

23

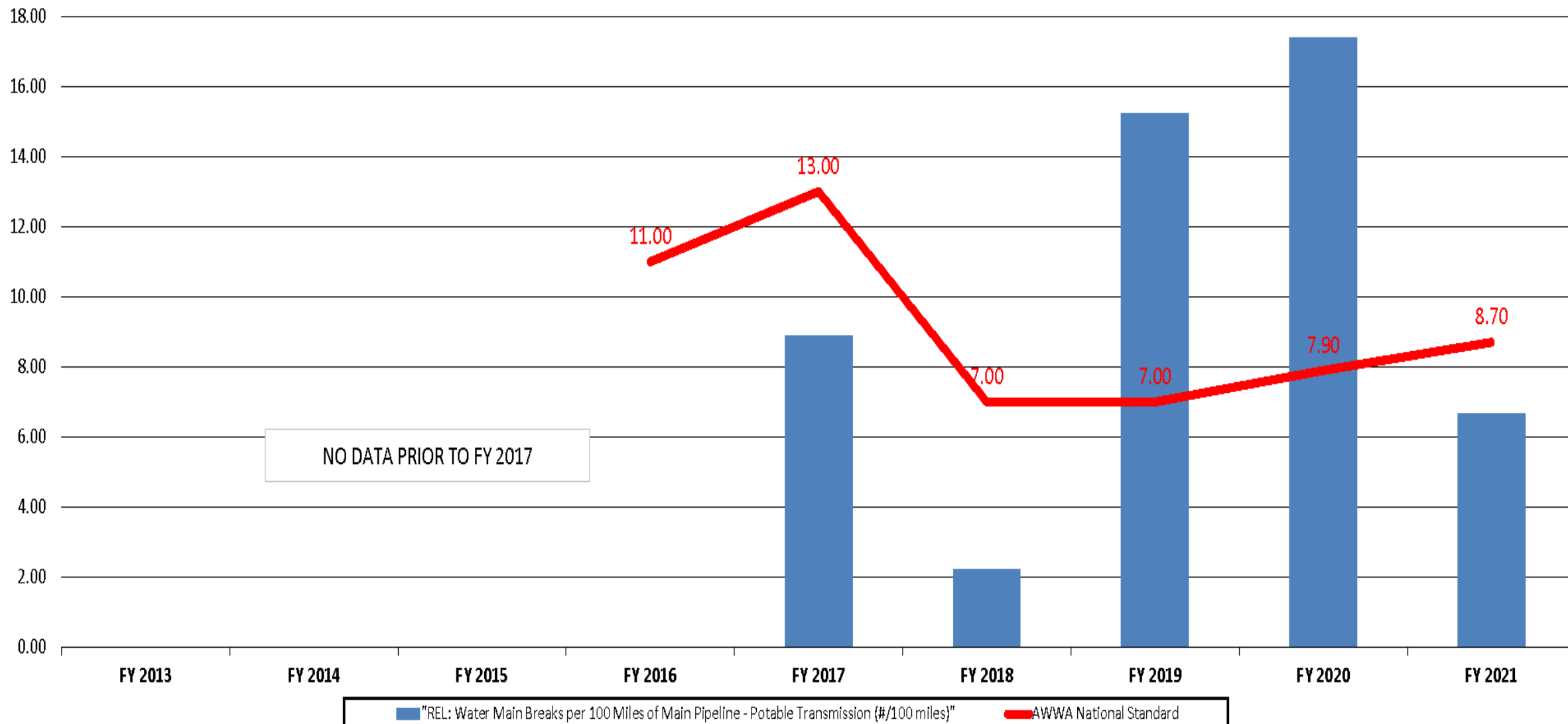
WP-2 / O&M EXPENDITURES PER MILLION GALLONS PRODUCED (\$/MG) / SG 2.0 & SO 2.1



Water Production – Primary Key Organizational Performance Measure

24

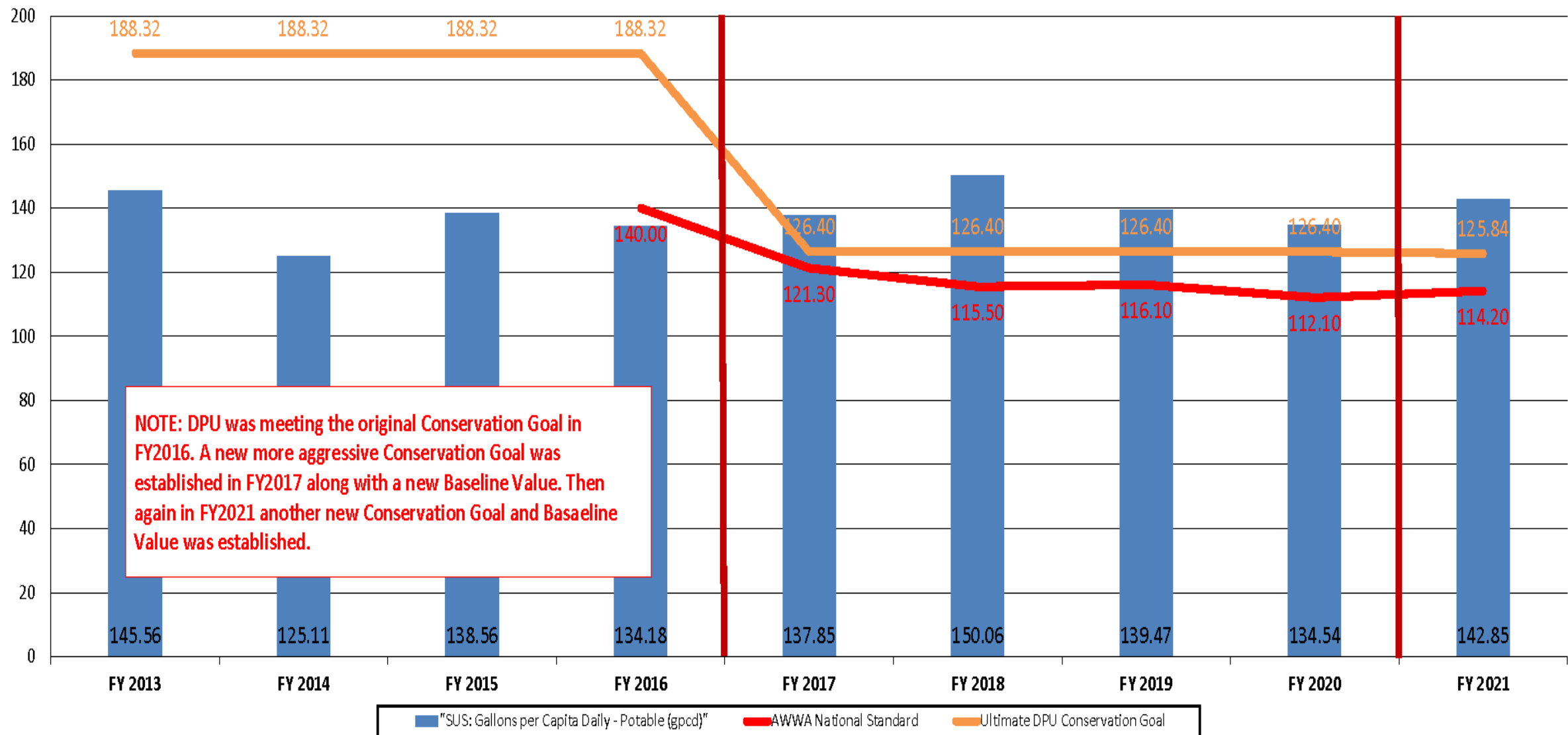
WP-3 / WATER TRANSMISSION MAIN BREAKS PER 100 MILES MAIN PIPELINE (BREAKS/100 MILES)



Water Production – Primary Key Organizational Performance Measure

25

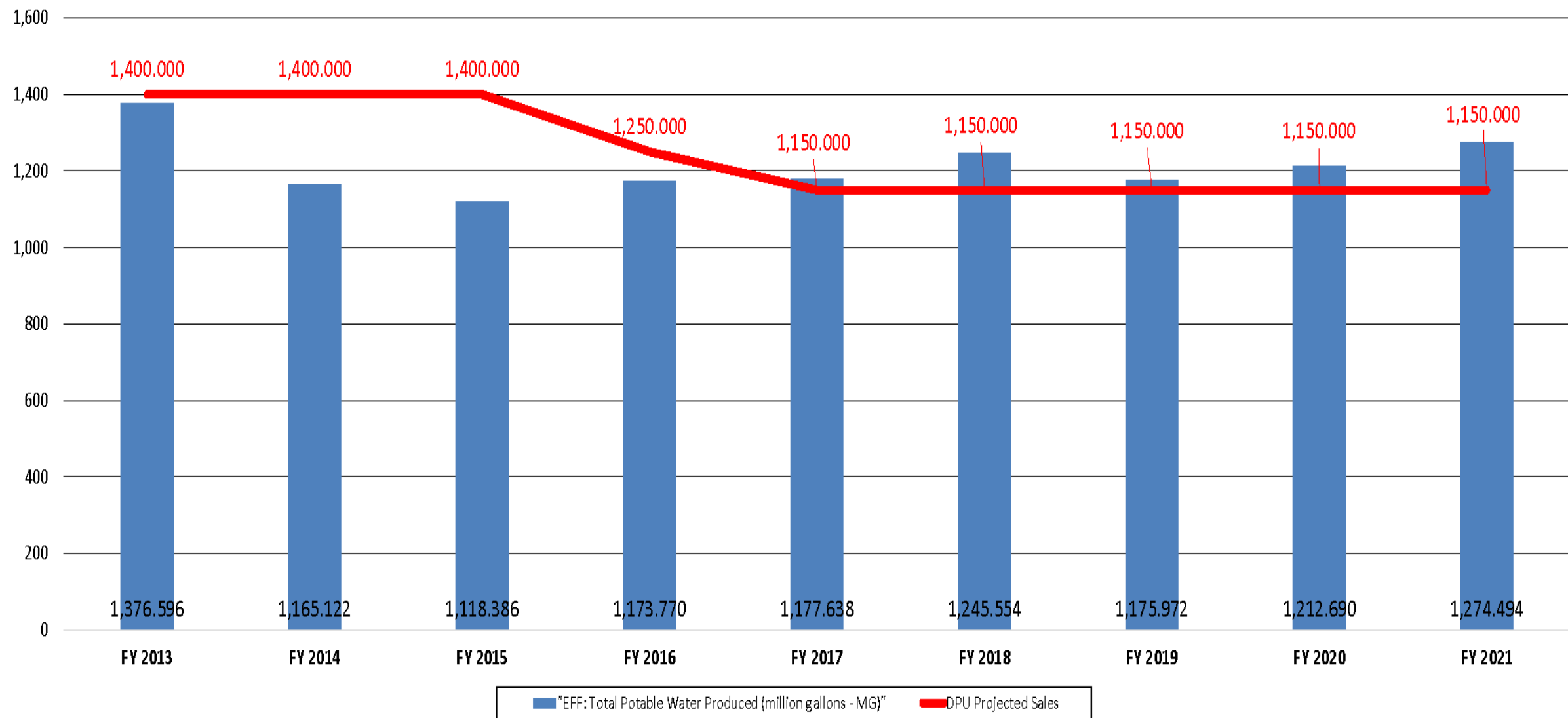
WP-4 / GALLONS PER CAPITA PER DAY (GPCD) / SG 5.0 & SO 5.3



Water Production – Primary Key Organizational Performance Measure

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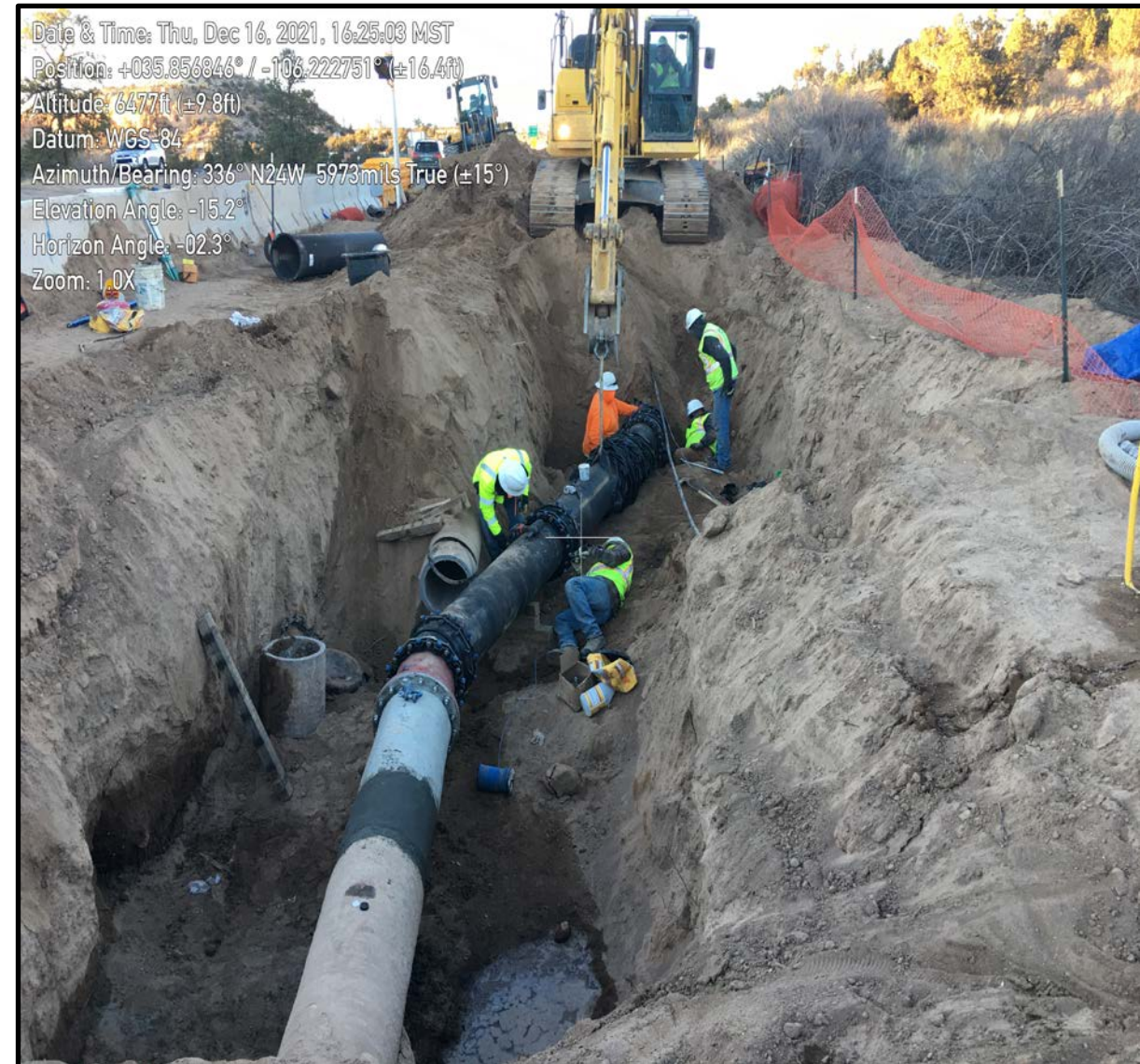
WP-5 / POTABLE WATER PRODUCED - MILLION GALLONS (MG) / SG 1.0 & SO 1.1



Water Production System Photos – Recent CIP Projects

Left = Old (1966) 16" Concrete Cylinder Pipe Slip-lined with PVC/Kevlar Pipe Liner {DOE Land}

Right = Old (1955) WP 16" Connection Old Concrete Cylinder Pipe to New Ductile Iron Pipe {Tsankowi/NM502 Intersection}



Date & Time: Thu, Dec 16, 2021, 16:25:03 MST
Position: +035.856846° / -106.222751° (±16.4ft)
Altitude: 6477ft (±9.8ft)
Datum: WGS-84
Azimuth/Bearing: 336° N24W 5973mils True (±15°)
Elevation Angle: -15.2°
Horizon Angle: -02.3°
Zoom: 1.0X

Water Production System – Overall System Condition – GIS Report – FY 2021

28

WATER PRODUCTION SYSTEM - OVERALL SYSTEM CONDITION - END OF FY 2021 REPORT									
ASSET CLASS	COUNT	AGE FACTOR	OPERATIONAL CONDITION	CAPACITY CONDITION	RISK FACTOR	CONDITION & RISK ASSESSMENT		REPLACEMENT COST	{CONDITION & RISK ASSESSMENT} * {REPLACEMENT COST}
Main Water Pipelines	914	1.07	2.33	1.21	2.00	2.82		\$39,586,174.70	111,633,012.66
Drain Water Pipelines	190	1.15	2.23	2.13	2.00	3.06		\$551,364.39	1,687,175.04
Delivery Water Pipelines	32	1.25	2.50	2.00	2.00	3.00		\$0.00	0.00
Main Water Valves	446	1.00	2.54	1.44	1.99	2.76		\$3,661,885.00	10,106,802.60
Delivery Water Valves	3	0.28	2.00	2.00	2.00	1.86		\$856.00	1,592.16
Water Meters	36	2.29	2.57	2.00	2.00	2.74		\$282,128.00	773,030.72
Water Booster Stations	17	1.42	2.88	1.18	2.18	3.47		\$4,165,000.00	14,452,550.00
Water Tanks Reservoirs Ponds	25	1.33	2.20	2.48	2.36	3.39		\$25,265,102.50	85,648,697.48
Water Wells	12	0.91	2.36	2.00	2.82	2.97		\$40,700,000.00	120,879,000.00
SCADA	41	2.26	2.00	2.00	2.27	4.39		\$451,000.00	1,979,890.00
SUMS	1,716							\$114,663,510.59	347,161,750.66
WP SYSTEM OVERALL SYSTEM CONDITION ASSESSMENT =					3.03	FAIR			

WP Sub-System Summary – January 2022 Water Distribution Physical Condition Assessment

29

- The current physical condition of the water distribution sub-system overall is FAIR.
- This current condition assessment is based on the End of FY 2021 GIS Report for asset management condition & risk assessment score = 3.03. A new Primary Key Organizational Performance Measure will be developed to track and trend this value year over year starting next year once more than one value is available.
- Past two years the physical condition was rated fair to good – although using a non-numeric more subjective assessment methodology.
- Known portions in poor condition: storage tanks needing R&R, GW1A well failure and aged pipelines that have been in the ground for 50 to 60 years. Current 10-year CIP Plan rehabilitates the top 11 priority tanks, constructs a new tank, gets wells OW1, OW2 and GW1B on-line and R&R's 4 high priority pipelines.
- Greatest weakness = the age of the well and booster station pumps, control valves and control systems. Adding OW2 & OW1 wells on-line for the first time in FY22, and getting GW1B on-line in FY23, will help to reinforce against this weakness. Current 10-year CIPO Plan has scheduled in FY23 & FY32 significant projects to modernize the highest priority well and/or booster station electric power & control systems and control valves.

Non-Potable System Photos – Current CIP Project

Left = Old (1982) Overlook Park Irrigation Pump Station {Manual Control by Parks}

Right = New (under construction) Overlook Park NP Booster Station {Auto Control Pressure System by DPU}



NP – NEW/ONGOING ISSUES & ACHIEVEMENTS

31

- **NP** – New Overlook Park Booster Station construction is nearing completion. Scheduled start-up in time for 2022 irrigation season.
- **NP** – White Rock wwtp design incorporates potential re-use of existing tankage for expanded storage volumes in White Rock. Allowing for potential system expansion projects to begin in White Rock.
- **NP** – Bayo Booster Tank 2 project was split into two phases due to unforeseen cost increases. Phase 1 has been awarded for FY22/FY23 construction. Phase 2 project funding is being requested for FY23/FY24 construction.
- **NP** – Reservoir Road pipeline & electric conduit washouts continue to be a concern. An NMED River Stewardship Program grant was applied for and awarded to restore the LA Canyon watershed in order to eliminate this continuing washout/damage problem. Design & permitting scheduled in FY23 and construction in FY24.
- **NP** – Covid & Retirement impacts resulted in decreased productivity on certain O&M activities: PRV Stations, Confined Space R&R, Valve Exercise and R&R, etc.

❖ PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES

- ▶ O&M Expenditures per Million Gallons Produced & Distributed (\$/MG)
- ▶ Main Pipeline Breaks per 100 Miles of Pipeline (#/100 miles)
- ▶ Gallons per Capita Daily Water Produced (GPCD)
- ▶ Total Gallons Produced & Distributed vs DPU Projected Sales

❖ SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES

- ▶ Percent Gallons to Reuse vs Gallons Treated (%) – White Rock WWTP & LA WWTP
- ▶ Energy Consumption per Million Gallons Produced & Distributed (kWhr/MG)
- ▶ Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)
- ▶ System Renewal and Replacement (CIP Expenditures for R&R/Total Present Worth of Gas System) (%)

❖ PERFORMANCE MEASURES WITH TARGETS OR BENCHMARKS

- ▶ National Standard Performance Measures for Potable systems accepted as viable for NP system comparison (AWWA)
- ▶ Performance Measures with a DPU Strategic Plan or Conservation Plan Goal are in Magenta
- ▶ Performance Measures with both a DPU Strategic Plan or Conservation Plan Goal and a National Standard comparable goal are in CYAN
- ▶ Measures are collected monthly and compiled and reviewed annually. Annual FY performance measures data is transferred from the annual data sets to a multi-year data set for year over year / multi-year comparison.

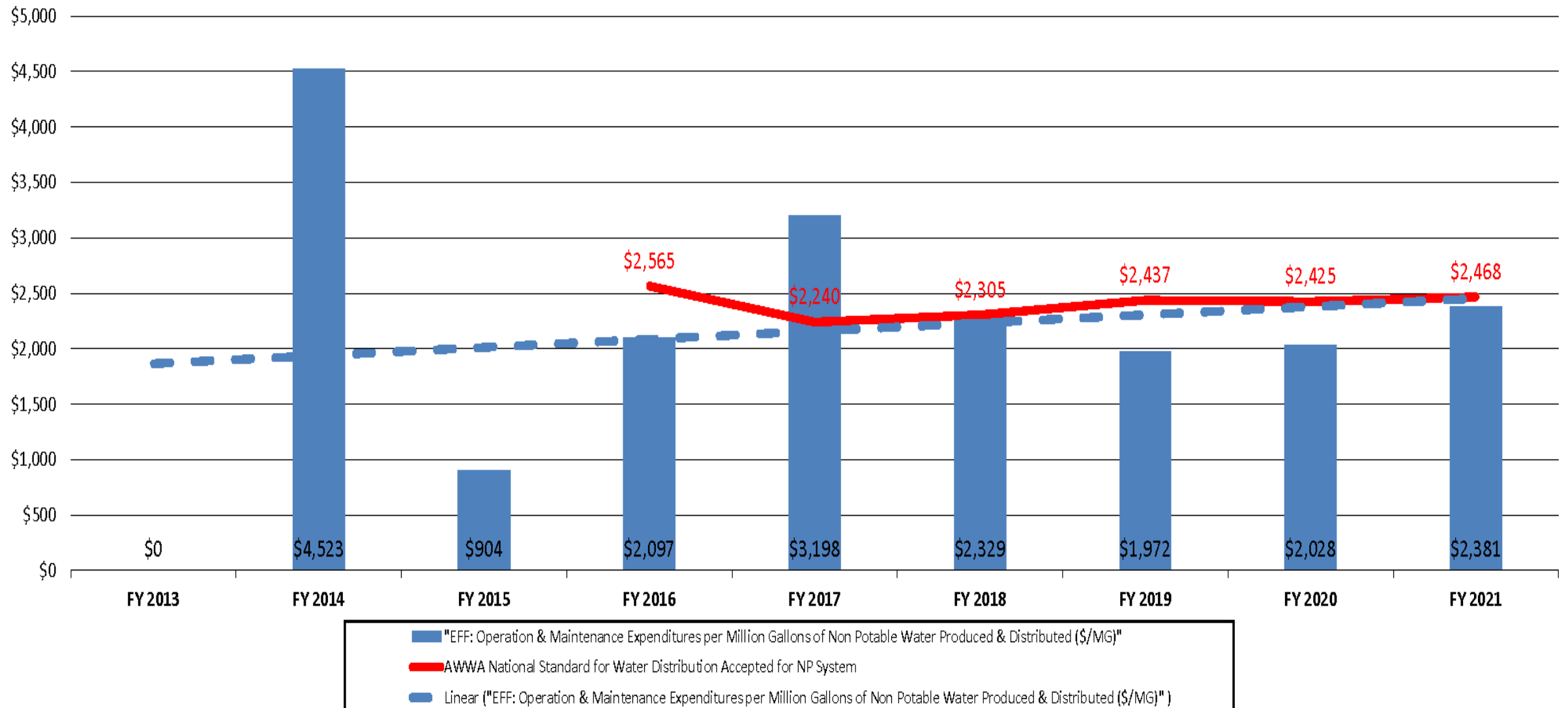
NP – DASHBOARD ANALYSES

- Summary of Primary Performance Measures for NP System.
 - **NP-1: O&M Expenditures per MG** – 8-year trend shows a good comparison to national standard for potable water distribution systems. {NOTE: No cost of water or water production costs included}
 - **NP-2: Breaks per 100 Miles Main Pipeline** – Difficult to trend because of FY17 & FY18 multiple breaks. After FY17 & FY18 Pipeline R&R - last 3-Year's trend shows a good comparison to national standard for potable water distribution systems. {NOTE: With only 14 miles of main – more than one break will exceed the national standard}
 - **NP-3: Gallons per Capita per Day (GPCD)** – 9-year trend continues upward – which for effluent reuse is good.
 - **NP-4: NP Water Produced** - Projected sales compare well to actual sales. Weather dependent variable – but long term trend is positive. Major NP system expansion is required before significant progress in actual sales growth will occur affecting this and GPCD values.

NP System – Primary Key Organizational Performance Measure

34

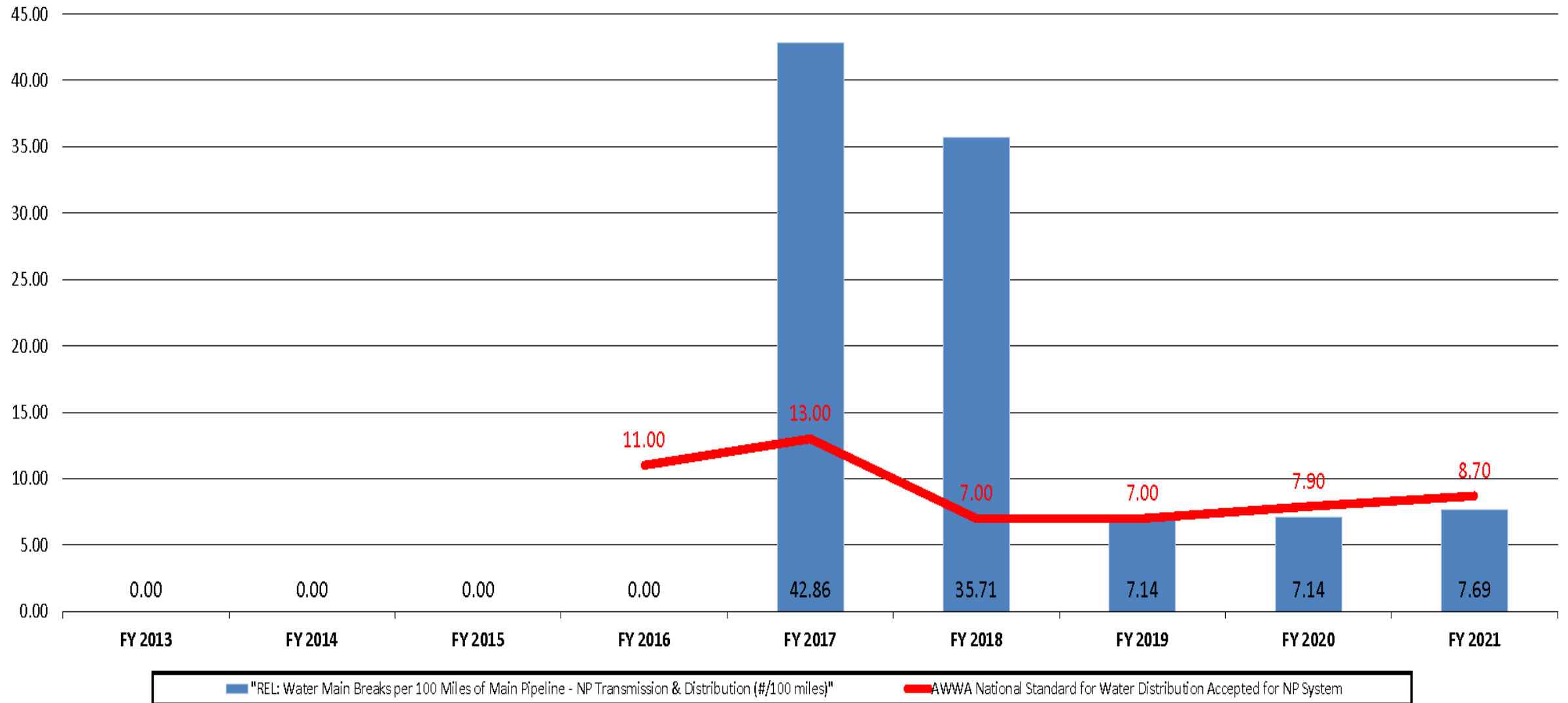
NP-1 / OPERATION & MAINTENANCE EXPENDITURES PER MILLION GALLONS PRODUCED & DISTRIBUTED (\$/MG) / SG 1.0 & SO 1.1



NP System – Primary Key Organizational Performance Measure

35

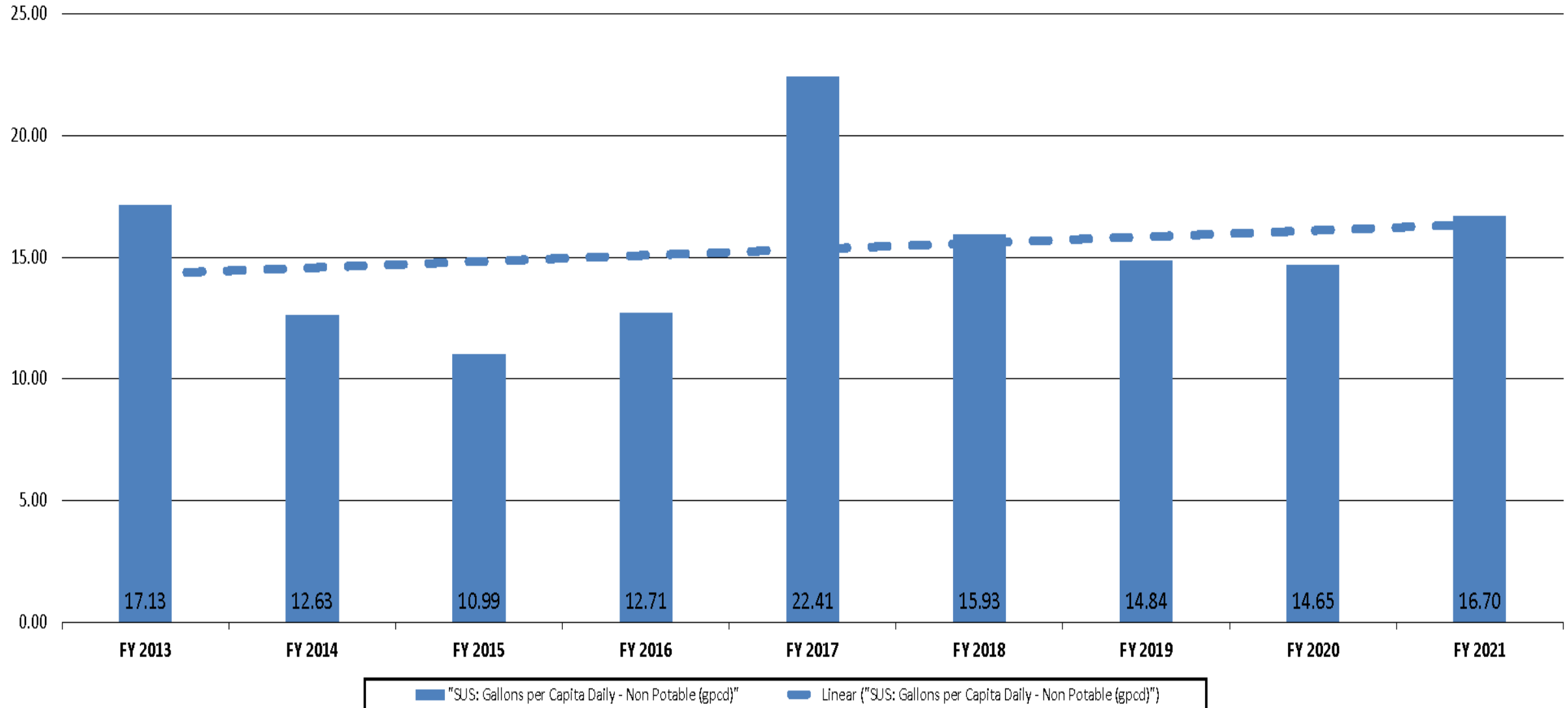
NP-2 / BREAKS PER 100 MILES OF MAIN PIPELINE (BREAKS/100 MILES) / SG 1.0 & SO 1.1



NP System – Primary Key Organizational Performance Measure

36

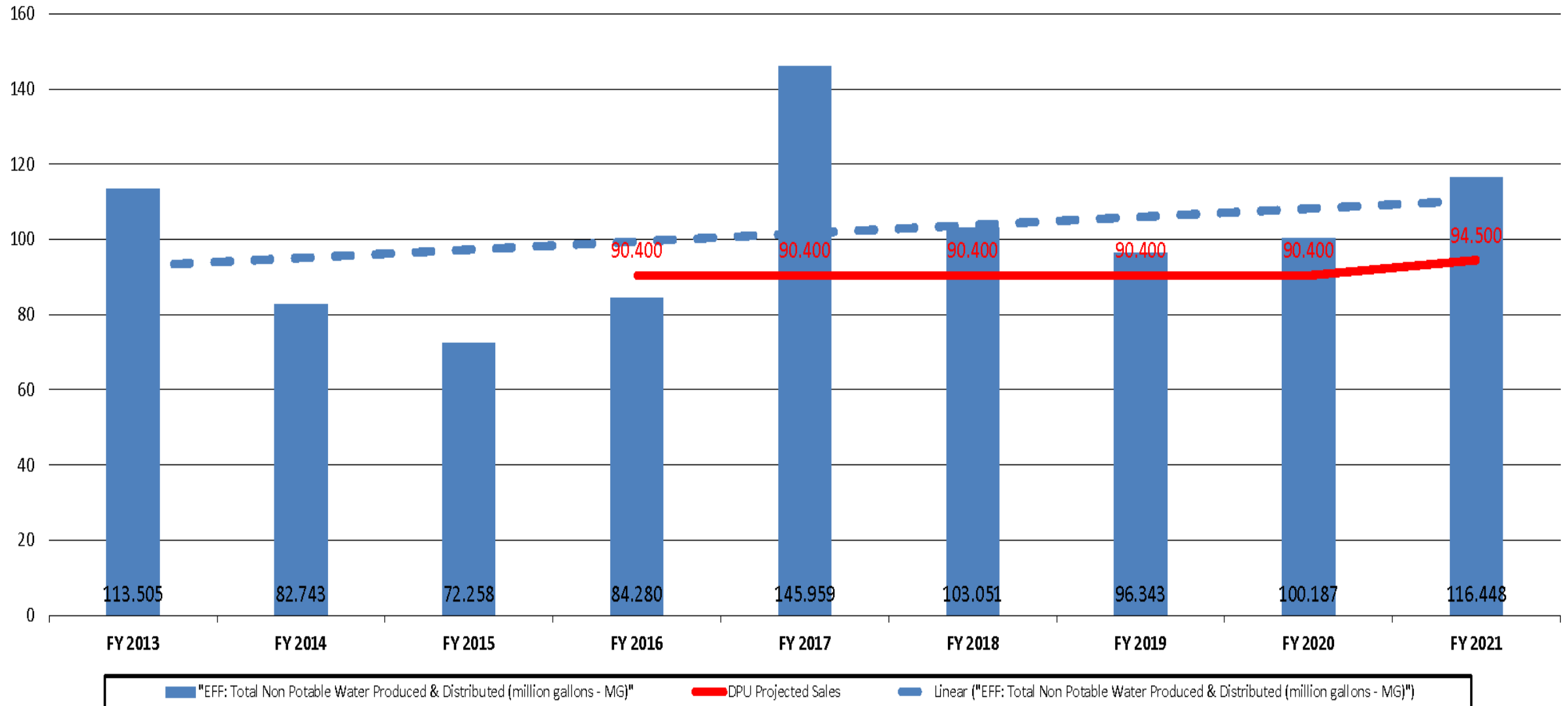
NP-3 / GALLONS PER CAPITA PER DAY (GPCD) / SG 5.0 & SO 5.1



NP System – Primary Key Organizational Performance Measure

37

NP-4 / NON POTABLE WATER PRODUCED & DISTRIBUTED - MILLION GALLONS (MG) / SG 1.0 & SO 1.1



Non-Potable Water System – Overall System Condition – GIS Report – FY 2021

38

NON-POTABLE WATER SYSTEM - OVERALL SYSTEM CONDITION - END OF FY 2021 REPORT									
ASSET CLASS	COUNT	AGE FACTOR	OPERATIONAL CONDITION	CAPACITY CONDITION	RISK FACTOR	CONDITION & RISK ASSESSMENT		REPLACEMENT COST	{CONDITION & RISK ASSESSMENT} * {REPLACEMENT COST}
Main Water Pipelines	264	0.48	2.34	2.63	2.00	2.15		\$2,518,688.50	5,415,180.28
Drain Water Pipelines	50	1.03	2.05	2.35	2.00	2.47		\$94,844.20	234,265.19
Delivery Water Pipelines	22	0.40	2.00	2.14	2.00	2.13		\$463,933.13	988,177.56
Main Water Valves	99	0.41	2.06	2.06	2.00	2.06		\$352,003.00	725,126.18
Delivery Water Valves	5	0.27	2.15	2.67	2.00	2.14		\$7,739.00	16,561.46
Water Meters	16	0.60	2.09	3.00	2.00	1.96		\$52,084.50	102,085.62
Water Booster Stations	3	0.38	1.67	2.33	2.00	1.91		\$735,000.00	1,403,850.00
Water Pressure Reducing Station	2	0.10	2.00	2.00	3.00	1.88		\$100,000.00	188,000.00
SCADA	9	1.20	2.00	2.00	2.56	3.14		\$99,000.00	310,860.00
SUMS	470							\$4,423,292.33	9,384,106.29
NP SYSTEM OVERALL SYSTEM CONDITION ASSESSMENT =					2.12	GOOD			

NP Sub-System Summary – January 2022 Water Distribution Physical Condition Assessment

39

- The current physical condition of the Non-Potable Water sub-system overall is GOOD.
- This current condition assessment is based on the End of FY 2021 GIS Report for asset management condition & risk assessment score = 2.12. A new Primary Key Organizational Performance Measure will be developed to track and trend this value year over year starting next year once more than one value is available.
- Past two years the physical condition was rated fair to good – although using a non-numeric more subjective assessment methodology.
- Known portions in poor condition: Older pipeline segments inherited from previous owners (golf course & parks). LA Reservoir pipeline washouts – Grant awarded for improvements in FY23 & FY24.
- Greatest weakness = Lack of storage volume that would enable system expansion. Bayo Booster Tank 2 phase 1 under construction and phase 2 planned for FY23. Possible conversion of Barranca Tank 1 for NP storage to serve Guaje Pines Cemetery & Barranca Mesa planned for FY24. Possible revision to USFS permit to allow a second Group 12 Tank. White Rock wwtp project planned for re-use of existing tankage for potential conversion to additional NP storage.

DW / FY23 & FY24 / O&M GOALS & ACTION ITEMS

40

- Launch the Water Valve Location/Marking/R&R Program (contract services @ \$150,000 (DW) per year for multiple years). RFP is drafted and under review by Purchasing & Legal. (also WP & NP)
- Additional FTE into the GWS crew – which will add approximately 1/3rd FTE for assistance with DW system O&M. Addition of an SOS FTE will create time for DW Supervisors to increase in field supervision & training.
- Finish the AMI meter change out program.
- Continue to work with HR to recruit and keep temporary FTE help with meter change outs.
- Continue to assist Engineering with new construction inspection: 33rd & 34th Street (Aspen Area Phase 1), North Mesa Distribution Upgrades (Development pipeline upgrade on North Mesa Road), Canyon Road (PW), DP Road Utilities Phase 2 (PW), Rose Street (PW), Bathtub Row-Nectar-Peach (PW), Central Avenue (PW), Deacon Street (PW/Dev), Finch Street (Dev), Longview (Dev) and other utility related projects as necessary.

DW / FY 23 & FY24 BUDGET/ CIP PROJECTS

41

Funded in FY22 to be Re-budgeted in FY23

- FY23 33rd & 34th Street Utilities – (PW Project) \$672,000

Funded by Budget Transfer

- FY23 Rose Street – (PW Project) \$331,000
- FY24 Bathtub Row/Nectar/Peach - (PW Project) \$593,000
- FY24 Central Avenue - (PW Project) \$351,000

Possible Economic Development Funding

- Both FY23 & FY 24 North Mesa Distribution Upgrades Phase 1 & 2 (\$675,000 and \$697,500)

New Project

- Deacon Street working with economic development to fund.

WP & NP / FY23 & FY24 / O&M GOALS & ACTION ITEMS

42

- ▶ Launch the Water Valve Location/Marking/R&R Program (contract services @ \$87,000 (WP) & \$50,000 (NP) per year for multiple years). RFP is drafted and under review by Purchasing & Legal. (also DW)
- ▶ Complete the Water Systems SCADA Transition Study to develop a comprehensive plan to transition away from a proprietary SCADA system to an open-source SCADA system.
- ▶ Launch the Well and Booster Station Pump Systems – Operation, Maintenance and Training program. 7-Year contractor assistance for enhanced O&M and training at all water system well and booster stations. (contract services \$241,000 (WP) & \$46,000 (NP) per year).
- ▶ Get OW1, OW2, OW4, Tsankowi Chlorination and Overlook Park Booster Station and Bayo Booster Tank 2 on-line.
- ▶ Continue to assist Engineering with new construction inspection: Canyon Road (PW), Rose Street (PW), OW2 & OW4 completion, Tsankowi Chlorination & Pipeline completion, Tank Repainting and Piping R&R, LA Canyon Watershed Restoration, Bayo Booster Tank 2, and other utility related projects as necessary – including the Camp May/Ski Hill Pipeline & DOE Pipeline Re-Route.

Funded in FY22 to be Re-budgeted in FY23

- ➡ WP – FY23 Barranca Tank 2 Repaint and R&R – \$1,600,000 (up from \$675,000)
- ➡ WP – FY23 MCC Upgrades - \$2,200,000 (up from \$2 million)
- ➡ WP – FY23 & FY25 Tank Piping Upgrades - \$450,000 each year (up from \$300,000)
- ➡ NP – FY23 & FY24 LA Reservoir Canyon Restoration - \$400,000 per year (+/-)

Funded by Budget Transfer

- ➡ WP – FY22/FY23 Canyon Road Utilities – (PW Project) \$381,000 (up from \$254,000)

Possible Economic Development Funding

- ➡ WP - FY23 Camp May/Ski Hill Pipeline – \$6 million (up from \$4 million)

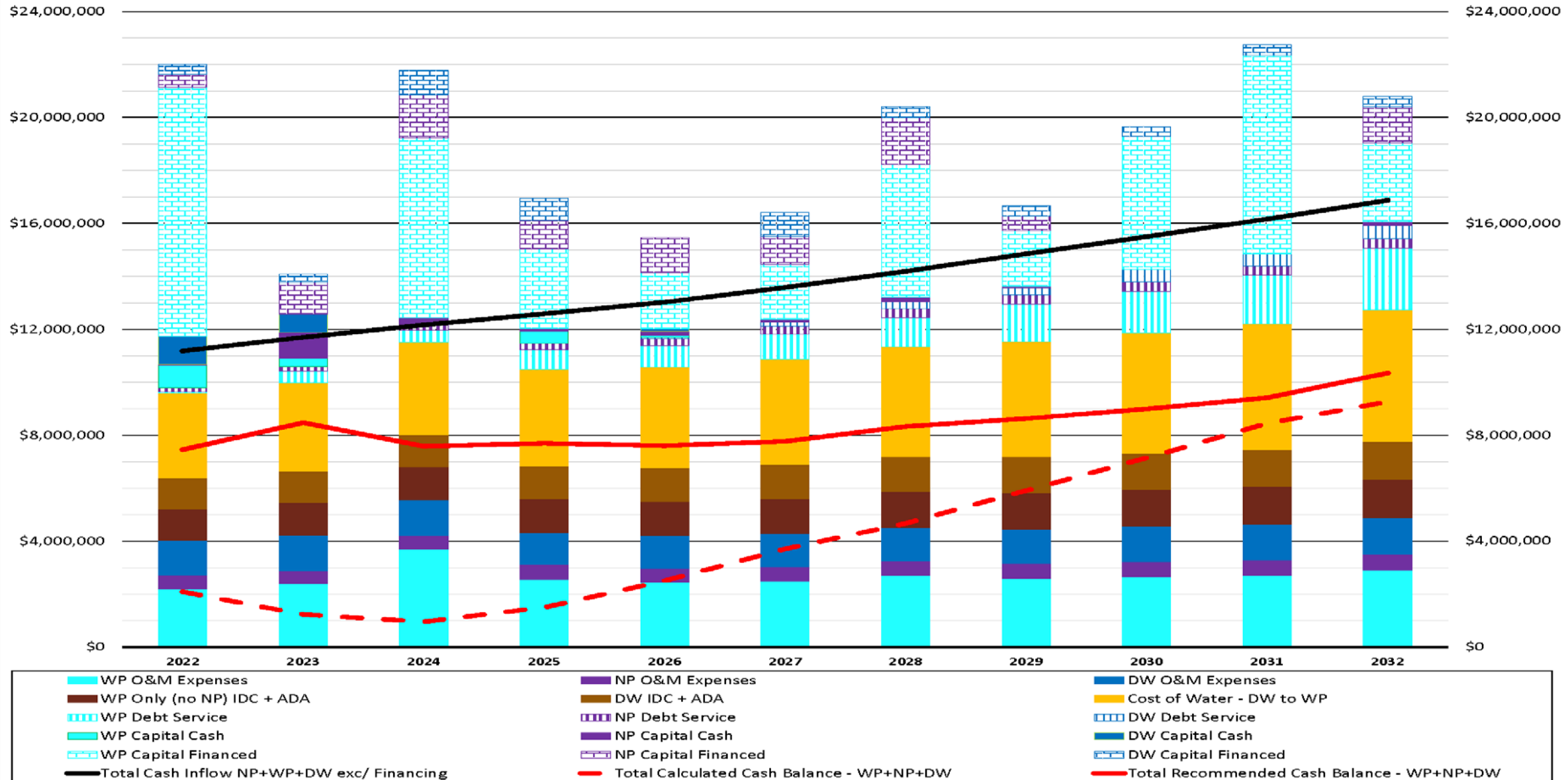
New / Carry Over Projects

- WP – FY23 Rose Street – (PW Project) \$323,000 (up from \$215,320)
- NP – FY23 Bayo Booster Station Tank 2 Phase 2 – \$1,600,000 (up from \$675,000) (WTB G/L/C)
- WP – FY24 Repaint and R&R Guaje Booster Station No. 1 Tanks 1 & 2, Guaje Booster Station No. 2 Tanks 1 & 2 and Guaje Booster Station No. 3 Tanks 1 & 2 - \$2,800,000 (up from \$2,200,000)
- WP – NM 4 Pipeline R&R - (NM DOT) \$4,000,000 (up from \$2,980,000)
- NP – FY24 NP Guaje Pines Cemetery Feed Pipeline & Barranca Tank 1 Conversion - \$1,500,000 (up from \$990,000) (WTB G/L/C)

Total Water Fund (WP + NP + DW) / 10-Year Revenue – Expenditure - Cash Balance Graph

45

FY 2023 BUDGET - ANNUAL INCREASE 4.5% WP & 5.0% NP & 4.0% DW AND ALL CIP FINANCED- 10-YEAR FORECAST - WATER FUND (NP+WP+DW) REVENUE / EXPENSE / CASH BALANCE 1/07/2022 version



Overall Water Fund Summary – January 2022 DW, WP & NP Water Systems Financial Condition Assessment

46

- The current financial condition of the Overall Water Fund is FAIR.
- Cash balance reserves not currently meeting policy goals but, with projected rate adjustments, trending in a positive direction.
- Covid and severe weather events have harmed supply chains across the globe and impacted construction labor availability. Acquisition of equipment, parts, supplies and labor is more difficult, expensive and time consuming. CIP project cost estimates have been increased 50% for all CIP projects throughout the 10-year FY23/FY24 budget forecast.
- To offset these additional costs, DPU is recommending two actions: 1) Debt finance all major CIP projects, and 2) Increase rates over the 10-year budget forecast period adequately to cover these additional costs without deferring any planned CIP projects or O&M initiatives.
- Projected water rate increases: DW (Retail) = 4.0% / WP (Bulk or wholesale) = 4.50% / NP = 5.0%. All rate increases are projected annually for the 10-year planning period.
- The projected water rate increases are required to continue DPU's pipeline R&R and equipment modernization CIP programs - necessary to operate and maintain all three water systems (DW, WP & NP) while simultaneously developing and maintaining a stable cash balance reserve.

APPENDIX

Individual Water System – January 2022 – RECB Graphs

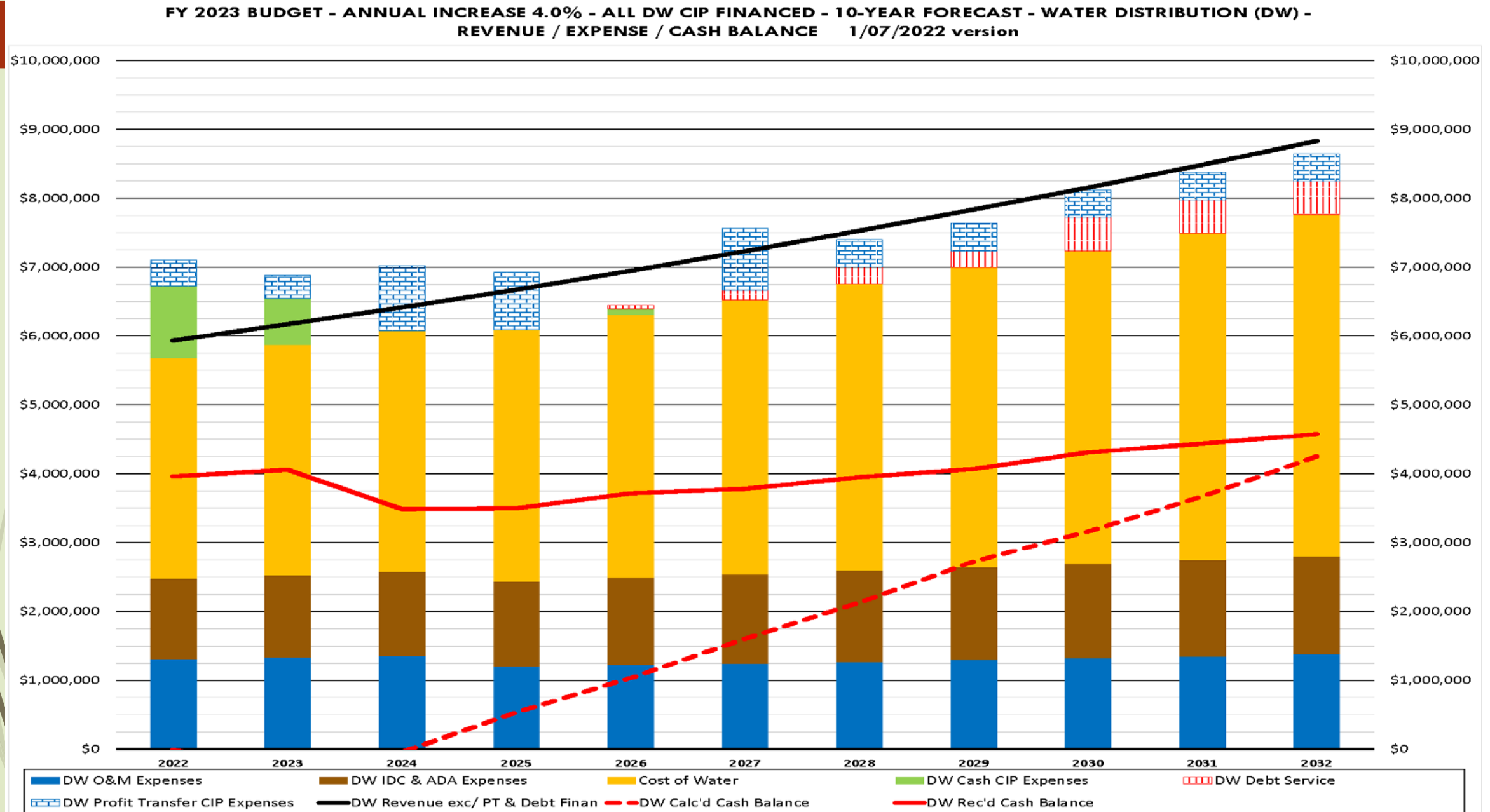
Financial Condition Assessment

47

- The RECB (Revenue / Expense / Cash Balance) Graph for each individual water system are included in this appendix.
- For the first time in many years the RECB graphs for all three individual systems (DW/WP/NP) are all trending in the same positive direction. The result is that a stable Water Fund (all three systems combined) is projected to trend in a positive direction with all three system's finances working together.
- Prior years of having one system with an excessive cash balance cover for a separate system with a negative balance is projected to end.
- Variables factored into the projections include: FY23 & FY24 financing terms are 1.0% over 20 years; Later FY's financing terms are 3.0% over 20 years; NP CIP financing remains through the WTB as always; CIP project costs have been increased 50% for the entire 10-year planning period; Labor & O&M costs have been projected to increase 2.0% per year for the entire 10-year planning period.
- Changes in variable factors will be re-considered on an annual basis during the budget approval process – as has been the practice for many years – so these projected rates can be modified as necessary throughout the 10-year planning process.

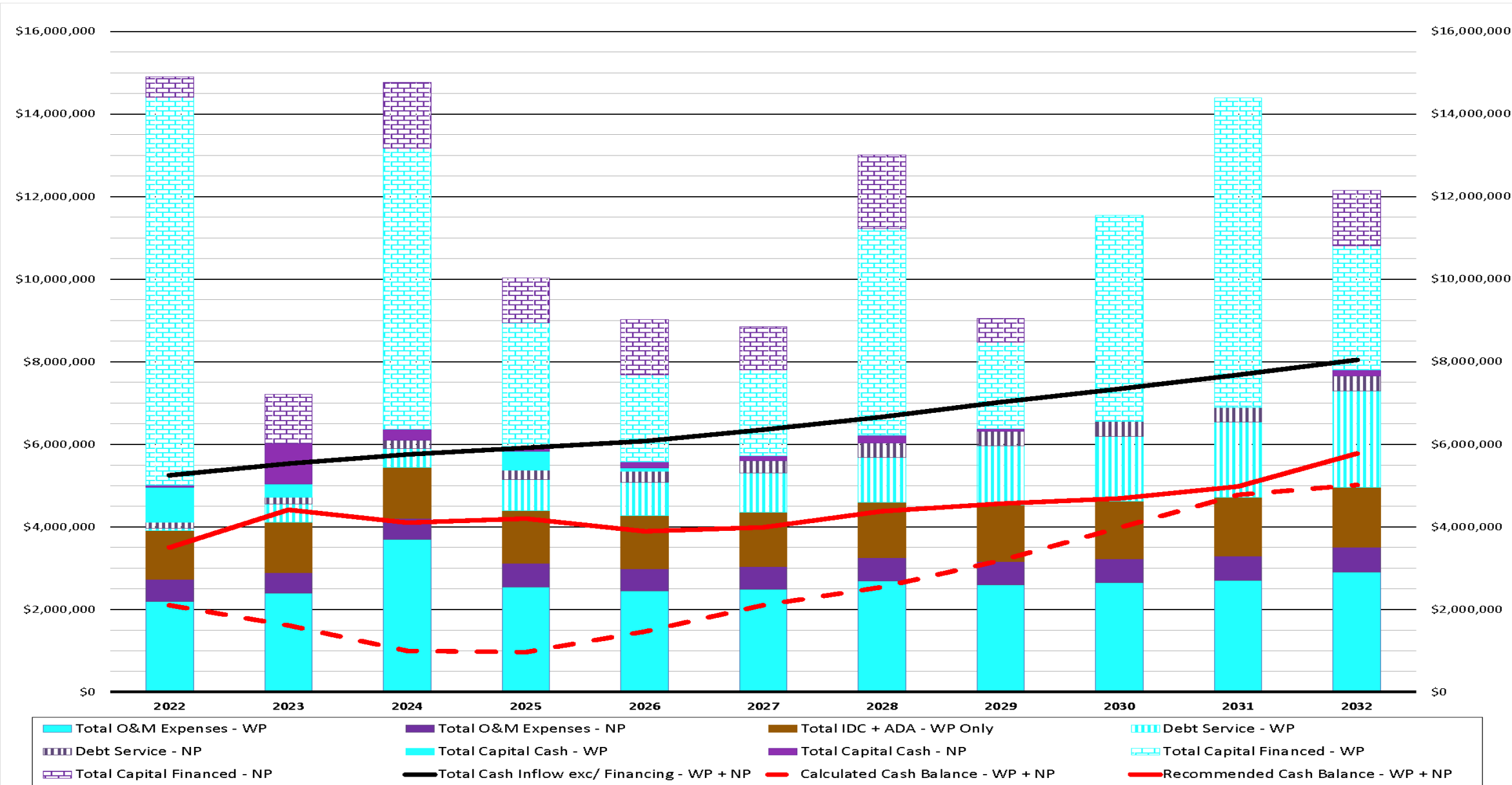
Water Distribution System Sub-Fund (DW) / 10-Year RECB Graph / FY23 Budget

48



Water Production & Non-Potable Sub-Fund (WP&NP) / 10-Year RECB Graph / FY23 Budget

FY 2023 BUDGET - ANNUAL INCREASE 4.5% WP & 5.0% NP AND ALL WP CIP FINANCED & NP CIP FINANCED PER WTB - 10-YEAR FORECAST - WATER PRODUCTION & NON-POTABLE (WP+NP) - REVENUE / EXPENSE / CASH BALANCE 1/07/2022 version



Non-Potable Sub-Fund (NP) / 10-Year RECB (modified)Graph / FY23 Budget

50

FY 2023 BUDGET - ANNUAL INCREASE 5.0% - 10-YEAR FORECAST - NON-POTABLE WATER (NP) - REVENUE / EXPENSE 1/07/2022 version

