



Capital Planning Approaches and Tools

Jeff Hughes – Director
Environmental Finance Center
The University of North Carolina at Chapel Hill
(919) 843-4956
jhughes@sog.unc.edu

Stephen Lapp – Community Advisor
Environmental Finance Center
The University of North Carolina at Chapel Hill
(919) 962-6203
slapp@sog.unc.edu



Capital Planning Discussion

- Are you doing capital planning?
- What “tools” do you use?
- Why is this important?

A blue-tinted photograph of industrial machinery, possibly a pump or engine, with various pipes and mechanical components visible.

Ways To Pay

- Pay as you go (current receipts)
- Save in advance and pay
- Pay later (someone loans you money)
- Grants (let someone else pay)

A blue-tinted photograph of industrial machinery, possibly a large pump or engine, with various pipes, valves, and mechanical components visible.

Grants Aren't Completely Free Money

- Not sustainable finance
- Application for the grant can be expensive – staff time and money
- Applications can take months to process
- Often lots of strings attached
- Often require a percentage match
- Lots of competition

A blue-tinted photograph of industrial machinery, likely a water treatment plant, featuring large pipes and mechanical components.

Capital Improvement Program

- Identify regulatory deficiencies (discuss with regulatory agencies, look at proposed regulations, talk to consultants) in a 10-20 year window
- Identify population changes (growth, stagnation, decline)
- Identify deferred maintenance problems or where current service is inadequate

A blue-tinted photograph of industrial machinery, likely a large pump or turbine, with various pipes, valves, and mechanical components visible.

Capital Improvement Program - Timelines

- Use **Asset Management Plan** to plan for capital expenses in the long term (~20 years)



Capital Improvement Program - Timelines

- Create a **Capital Improvement Plan** with a narrower timeline (~5 years) in more detail. Specify the projects and accurate estimates of cost. Plan where money will come from.

A blue-tinted photograph of industrial machinery, possibly a pump or engine, with various pipes and mechanical components visible.

Capital Improvement Program - Timelines

- Create a **Capital Improvement Budget** with an even narrower timeline (1 – 2 years) committing funds for the planned capital projects. Get it approved/adopted.



Where Can You Find the Prices?

- Call a vendor. Actually, call a few.
- Ask other systems
- Look at past expenses but adjust for increases in costs

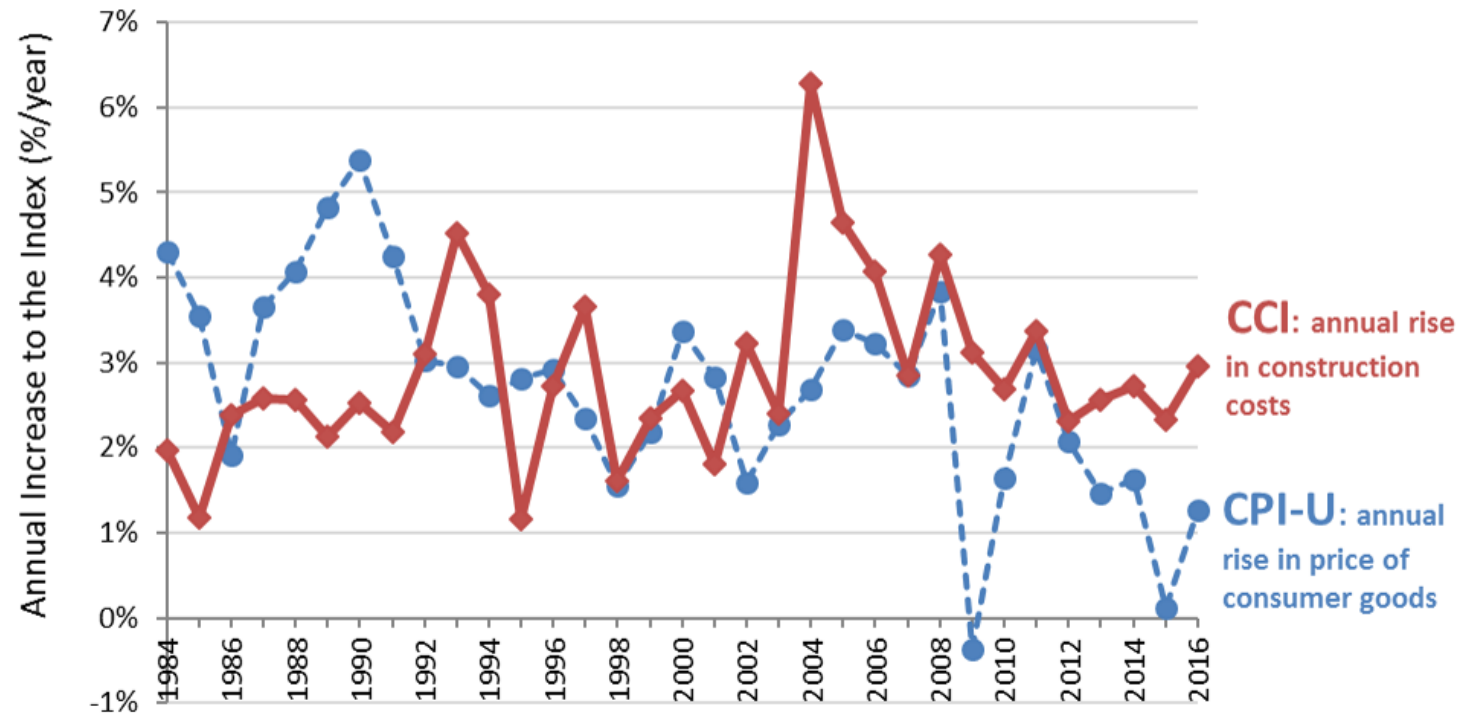


Measures of Inflation

- **Consumer Price Index (CPI)**—measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services
- **Construction Cost Index (CCI)**—average prices for labor and key construction materials from 20 cities across the United States

The **Construction Cost Index (CCI)** has been rising faster than the **Consumer Price Index-Urban (CPI-U)** in recent years

Construction costs (CCI) rose on average of **2.6%/year** in the last five years, while consumer goods (CPI-U) only rose an average of **1.3%/year** in the same period



Data graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

Data Sources: Bureau of Labor Statistics (CPI-U), Engineering News-Record ENR.com (CCI), InflationData.com (CPI-U), USDA Natural Resources Conservation Services (spreadsheet containing CCI and CPI-U).



Long Term Capital Planning

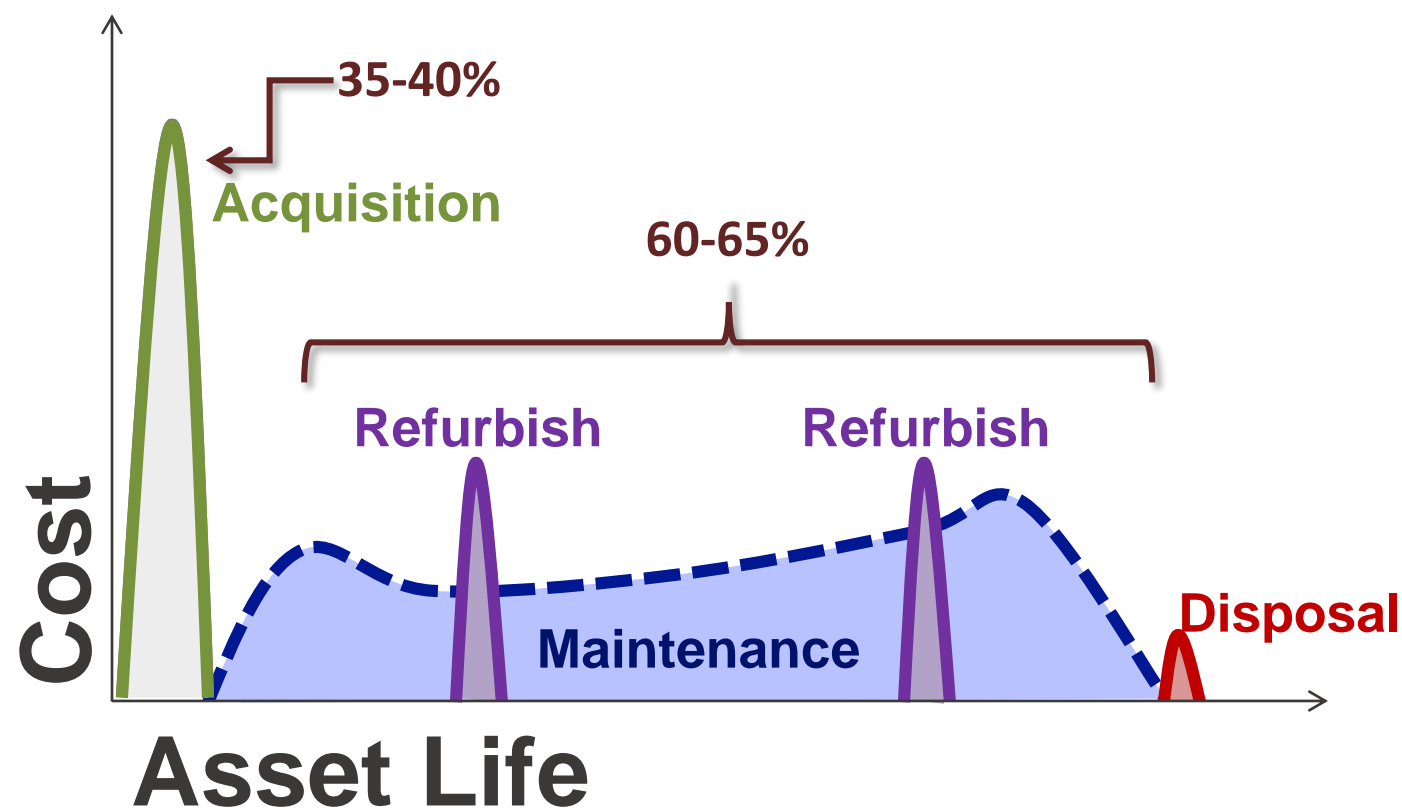
- This is strongly related to asset management
- An official multi-year document that identifies and prioritizes capital projects, identifies funding sources, and sets timelines

A blue-tinted photograph of industrial machinery, likely a large pipe or valve assembly, serves as the background for the top portion of the slide.

Reminder: Life Cycle Costing

- Purchase Price \neq Total Price

Capital Investments are Just the Tip of the Iceberg...



Source: Adapted from Steve Allbee, USEPA



WBOP and Other Tool Discussion

- Have you heard of the Waterworks Business Operation Plan (WBOP)?
- Are you using the WBOP or other planning tools?
- What aspects do you find most helpful about the tools you use?

A blue-tinted photograph of industrial waterworks equipment, including large pipes and valves, serves as a background for the top of the slide.

Waterworks Business Operations Plan

- Virginia Department of Health Office of Drinking Water assess a system's...
 - **Technical Capacity** – physical assets, as well as knowledge and skills to operate the system
 - **Managerial Capacity** – planning and organizational expertise
 - **Financial Capacity** – the ability to generate enough revenue, leverage funding, and manage funds to meet operational, maintenance, and expansion costs

WATERWORKS BUSINESS OPERATIONS PLAN

Please download one of the following files depending on your waterworks type:

[Community Business Operations Plan.zip](#)

[NTNC Business Operations Plan.zip](#)

[NTNC EZ Plan.zip](#)

[TNC Form \(Word Document\)](#)

[Serving residential populations](#)

[Serving the same non-residential population](#)

[Serving Pre-school/Daycare Facilities](#)

[Serving differing non-residential populations](#)



Documents Downloaded

- Community Excel Workbook (Excel)
 - Community Form (Word)
- Planning tools
- Community Instructions Appendices A-E (PDF)
 - Community Staff Review Guide (Word)
- Informative



WBOP – Community Form

- Part 1 – Waterworks Information
- Part 2 – Staffing
- Part 3 – Management, Operations & Procedures
- Part 4 – Planning
- Part 5 – Financial Information
- Part 6 – Sustainability Improvements
- Part 7 – Worksheets and Supporting Documents
- Part 8 – Statements for Owner Signature



WBOP – Excel Spreadsheet

- Data needed to populate the spreadsheet:
 - Financial reports
 - Up-to-date budget
 - Rate sheet
 - Capital improvement plan, if you have one
 - Census data

WBOP – Excel Spreadsheet

Worksheet 1 – Six-Year Technical, Managerial & Financial Commitment Summary

- Inventories revenues, expenses, CIP, and reserves
- Financial evaluation with analyses

Line	FISCAL YEAR ENDING	2018	2019	2020	2021	2022	2023
FINANCIAL EVALUATION							
23	TOTAL REVENUE REQ.(Add 9+13+19B+20B+21B+22B)	\$ 1,286,751.00	\$ 2,982,799.00	\$ 1,254,535.00	\$ 1,290,247.00	\$ 1,343,909.00	\$ 1,343,909.00
24	NET INCOME-BUDGET SURPLUS / DEFICIT (Line 4-23)	\$ 63,049.00	\$ (1,690,289.00)	\$ 76,951.00	\$ (59,976.00)	\$ (61,386.00)	\$ (61,386.00)
ANALYSES							
27	Revenues \geq expenses	Sustainable	Not Sustainable	Sustainable	Not Sustainable	Not Sustainable	Not Sustainable
28	Operating Cash Reserve \geq Minimum Balance	Sustainable	Sustainable	Sustainable	Sustainable	Sustainable	Sustainable
29	Emergency Reserve \geq Minimum Balance	Sustainable	Sustainable	Sustainable	Sustainable	Sustainable	Sustainable
30	Debt Service Coverage Ratio	1.41	0.11	1.55	0.56	0.56	0.56
31	Debt Service Coverage Ratio $> 1.15 \times$ Debt Service	Sustainable	Not Sustainable	Sustainable	Not Sustainable	Not Sustainable	Not Sustainable
32	Household Affordability Ratio (from Revenue Projection Wksht)	0.93%	0.93%	0.93%	0.93%	0.93%	0.93%



Explanation of Analyses

Line 27: Revenues > Expenditures: A "Not Sustainable" result on this analysis could mean the waterworks does not have adequate financial capacity. The waterworks should review the submittal for errors and/or consider the following:

1. Identify any expenses that can be eliminated or reduced
2. Review the revenues to determine if the rate structure can be modified to increase revenues, increase water rates, evaluate assessment of "special charges" when applicable, etc.
3. Consider whether or not consolidation or transfer of the waterworks is a better option.

If after reviewing the data this remains "Not Sustainable," document **Sustainability Improvements** which the waterworks will take in order to address the shortfall.

WBOP – Excel Spreadsheet

Supplemental Worksheet – Budget Documentation

- Provides a template to breakdown budget or import numbers from an existing budget

1	REVENUES	
2	Water Sales	\$ 315,000.00
3	Fees and Service	\$ 7,000.00
4	Other Revenue	\$ 10,000.00
5	TOTAL REVENUES (Add 2-4)	\$ 332,000.00
6	EXPENSES	
7	Operation & Maintenance Expenses	
8	Salaries & Other Benefits (Operator)	
9	Power & Other Utilities	\$ 16,850.00
10	Chemical & Treatment	
11	Monitoring	
12	Materials, Supplies and Parts	
13	Transportation Expenses	\$ -
14	Miscellaneous Expenses	\$ 27,100.00
15	Total Operation & Maintenance Expenses(Add 8-14)	\$ 43,950.00
16	General and Administrative Expenses	
17	Salaries & Benefits	\$ 305,681.00
18	Office Supplies & Postage	\$ 25,725.00
19	Insurance-Vehicle, Liability, and Workers Comp.	\$ -
20	Legal & Accounting	\$ 2,000.00
21	Engineering & Professional Services	\$ 6,000.00
22	Fees - and Taxes (VDH Waterworks, etc)	\$ -
23	Miscellaneous Expenses	\$ 700.00
24	Total General Administrative Expenses (Add 17-23)	\$ 340,106.00
25	Depreciation Expense (See Instructions)	\$ -
26	TOTAL O, M & ADMIN EXPENSES (Add 15+24)	\$ 384,056.00



TOTAL REVENUE REQ.(Add 26+28+40+44+48+52+ 56)	\$ 384,056.00
BUDGET SURPLUS (DEFICIT) (Subtract 5-58)	\$ (52,056.00)



WBOP – Excel Spreadsheet

Supplemental Worksheet – Revenue Projection

- Input:
 - Connections
 - Minimum charges
 - Commodity/volumetric rate
 - Minimum use
 - Breakdown of residential and commercial customers
 - Total gallons produced
 - Total gallons sold for residential and commercial

WBOP – Excel Spreadsheet

Supplemental Worksheet – Revenue Projection

- Output:

CALCULATED RESULTS PAGE						
FOR PROJECTED FISCAL YEAR	2018	2019	2020	2021	2022	2023
SECTION IV - WATER USE EVALUATION						
18. Gallons of Water Produced	3,500,000	3,552,500	3,605,788	3,659,874	3,714,772	3,770,494
19. Gallons associated with Res min use bills	0	0	0	0	0	0
20. Gallons associated with Non-Res min use bills	0	0	0	0	0	0
21. Residential Customers with > min use bill	585	590	598	606	612	620
22. Gallons Associated with minimum use portion of all non-minimum use Residential Customers	0	0	0	0	0	0
23. Non-Residential Customers with > minimum bill	0	0	0	0	0	0
24. Gallons Associated with minimum use portion of all non-minimum non-residential customers	0	0	0	0	0	0
25. Gallons applied to Residential commodity charge	2,991,695	3,036,570	3,082,119	3,128,351	3,175,276	3,222,905
26. Gallons Applied to the Non-Residential commodity	0	0	0	0	0	0
SECTION V - REVENUE SUMMARY						
27. Annual Revenue from Res Min Bills	\$ 8,820.00	\$ 10,495.80	\$ 11,668.86	\$ 12,592.64	\$ 18,942.00	\$ 21,801.00
28. Annual Revenues from Non-Res Min Bills	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
29. Revenues From Res Non-min customers	\$ 189,940.17	\$ 208,316.96	\$ 220,205.53	\$ 233,182.30	\$ 309,930.60	\$ 341,818.52
30. Revenues from Non-Res Non Min customers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
31. Revenues from Sale of Water	\$ 198,760.17	\$ 218,812.76	\$ 231,874.39	\$ 245,774.94	\$ 328,872.60	\$ 363,619.52
32. Total Annual Projected Revenues For the PWS	\$ 215,260.17	\$ 235,312.76	\$ 248,374.39	\$ 262,274.94	\$ 345,372.60	\$ 380,119.52
SECTION VII - AFFORDABILITY EVALUATION						
33. Annual Average User Charge, AUC (Bill Per Residence)	\$ 344.40	\$ 361.62	\$ 379.70	\$ 398.69	\$ 418.62	\$ 439.55
34. Monthly Average User Charge (Bill Per Residence)	\$ 28.70	\$ 30.14	\$ 31.64	\$ 33.22	\$ 34.89	\$ 36.63
35. Median Household Income, MHI (From US Census)	\$ 36,836.00	\$ 36,836.00	\$ 36,836.00	\$ 36,836.00	\$ 36,836.00	\$ 36,836.00
36. Household Affordability Ratio (AUC/MHI)	0.93%	0.98%	1.03%	1.08%	1.14%	1.19%
37. Is the actual HAR <=2%?	YES	YES	YES	YES	YES	YES

WBOP – Excel Spreadsheet

Supplemental Worksheet – Household Affordability

COMMUNITY Waterworks						
Supplemental Worksheet: Household Affordability						
Calculated cells are highlighted in Green ~ All financial figures automatically rounded to the nearest whole number ~						
OWNER:			PWSID NUMBER/S:			
FISCAL YEAR ENDING	2018	2019	2020	2021	2022	2023
HOUSEHOLD AFFORDABILITY RATIO						
1. Annual Average User Charge, AUC (Bill Per Residence)	\$ 279.00	\$ 306.00	\$ 318.00	\$ 339.00	\$ 357.00	\$ 372.00
2. Monthly Average User Charge (Bill Per Residence)	\$ 23.25	\$ 25.50	\$ 26.50	\$ 28.25	\$ 29.75	\$ 31.00
3. Median Household Income, MHI (From US Census)	\$ 41,163.00	\$ 41,163.00	\$ 41,163.00	\$ 41,163.00	\$ 41,163.00	\$ 41,163.00
4. Household Affordability Ratio (AUC/MHI)	0.68%	0.74%	0.77%	0.82%	0.87%	0.90%
AFFORDABILITY INDICATOR						
5. Is the actual HAR <=2%?	YES	YES	YES	YES	YES	YES

WBOP – Excel Spreadsheet

Supplemental Worksheet – Debt & Bond Reserve

[illegible]

Who to contact



ODW Capacity Development Division and the Sustainability Coordinators can assist

- **North-Central Region**

Ms. Julie Floyd, Supervisor
(540) 829-7315

julie.floyd@vdh.virginia.gov

- **Southside Region**

Ms. Susan Miner
(804) 864-8086

susan.miner@vdh.virginia.gov

- **Western Region**

Ms. Tamara Anderson
(540) 463-0405

tamara.anderson@vdh.virginia.gov

Plan to Pay: Scenarios to Fund your C.I.P.

<http://efc.sog.unc.edu> or <http://efcnetwork.org>

Find the most up-to-date version in Resources / Tools

Free, simplified Excel tool allowing you to list your capital projects and plans for funding them, and automatically estimates rate increases

Tool developed by
UNC
ENVIRONMENTAL
FINANCE CENTER

Plan to Pay: Scenarios to Fund your C.I.P. (Capital Improvement Plan)

Version 2.6 (Updated November 2015)

20-year capital planning Debt and/or capital reserve financing options Guided data inputs Simple data needs

Financial dashboard outputs Estimates necessary rate increases over time to pay for capital projects

Start

1) Use tabs at bottom of screen and buttons to navigate to different pages.

2) In "Data Input 1", enter utility characteristics, rates and usage information in blue cells.

3) In "Data Input 2", enter details on capital improvement projects in the light blue cells. Each row is a different project.

4) In "20-Year Projections", view your fund balance projections for 20 years and observe the estimated rate increases needed each year to pay for your Capital Improvement. No data entry required on this page.

5) After all your utility information and capital improvement project details are entered, go to the "Dashboard" to view long term trends in your financial reserves, rate increases and average bills, and capital investments.

INSTRUCTIONS

Next: Enter C.I.P. Projects View Fund Balance View Dashboard

Financed: \$ 950,000
et: \$ 750,000

Pre-Exist: Input amount incurred for the year.

Capital Improvement Projects - 20 Years

Project Name	Project Construction Start Year	Project Construction End Year	Project Construction Period (Years)	Estimated Construction Cost (at start)	Annual Construction Cost (at start)	Estimated Cost at the End of Year	Cost at End of Year
Project 1: Water main replacement	2015	2016	2	\$ 1,000,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000
Project 2: Sewer main replacement	2017	2018	2	\$ 1,000,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000
Project 3: Water treatment plant upgrade	2019	2020	2	\$ 1,000,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000
Project 4: Sewer treatment plant upgrade	2021	2022	2	\$ 1,000,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000
Project 5: Water main replacement	2023	2024	2	\$ 1,000,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000
Project 6: Sewer main replacement	2025	2026	2	\$ 1,000,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000

Water and Sewer Rates in FY15

Input the residential customer water & sewer rates at 5,000 gallons/month of use and 8.7 customers. Current monthly rates:

Rate Type	Rate (\$/month)
Water	\$ 5.87
Sewer	\$ 17.34

Usage Billed to Customers in FY15

Category	Residential	Non-residential
Number of Customers	10,000	2,000
Total Monthly Use (1,000's of gallons)	50,000	20,000
Annual Customer Rate Growth (%)	1.0%	1.2%

Estimated Rate Changes Needed to Maintain the Fund Balance

Category	FY15	FY16	FY17	FY18
Estimated Rate Changes Needed to Maintain the Fund Balance	N/A	0.0%	0.1%	0.2%
1 Year Increase (Decrease) in Rate (per 1,000 Gallons)	N/A	\$ 0.00	\$ 0.01	\$ 0.02
Monthly Base Charge ("Minimum Charge")	\$ 12.34	\$ 12.34	\$ 12.34	\$ 12.34
Volume Rate at 5,000 gallons/month (5,000 gallons)	\$ 5.87	\$ 5.87	\$ 5.87	\$ 5.87
Volume Rate at 10,000 gallons/month (10,000 gallons)	\$ 11.74	\$ 11.74	\$ 11.74	\$ 11.74
Approximate Monthly Charge for 5,000 gallons (S)	\$ 29.35	\$ 29.35	\$ 29.35	\$ 29.35

Projected Fund Balance

Category	FY15	FY16	FY17	FY18
Total Revenues	\$ 5,115,000	\$ 5,001,000	\$ 5,000,000	\$ 5,000,000
Base Charges	\$ 1,174,800	\$ 1,174,800	\$ 1,174,800	\$ 1,174,800
Usage Charges	\$ 3,139,800	\$ 3,139,800	\$ 3,139,800	\$ 3,139,800
Interest Earned from Previous Year's Positive Balance	\$ 0	\$ 0	\$ 0	\$ 0
Revenues from Other Sources (Reserve Charges)	\$ 100,200	\$ 100,200	\$ 100,200	\$ 100,200
Total Revenues	\$ 5,115,000	\$ 5,001,000	\$ 5,000,000	\$ 5,000,000

Financial Reserves (End of Year)

Rate Increases

Total Cumulative System Investment

Software: CUPSS (EPA)

<http://www.epa.gov/cupss/>

CUPSS Mobile App

CUPSS Check Up Program for Small Systems Set-up | Switch Utility | Create User | Help | Training | Exit

My Home My Inventory My O & M My Finances My Check up My CUPSS Plan

Welcome Back Helen, Beauty View Acres Subdivision - DW

What would you like to do today?

[Do Some Training](#)

[Create or Update My Schematic](#)

[Create or Update My Inventory](#)

[Print My Check Up Reports](#)

[Enter a New Task or Work Order](#)

[Search Asset and Maintenance](#)

[Enter My Finances](#)

[Work on My CUPSS Plan](#)

My Calendar

April 2008						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10

My Messages and Alerts

Popup Messages Are Off. Click To Turn On.

Reminder - Today's Tasks	8
Tasks Currently Past Due	160
Assets Needing Update	0
Number of High Risk Assets	2

Verizon 10:25 PM 62%

New Asset - 0.4.0

+ Basic information

+ Status and Condition

+ Cost and Maintenance

+ Manufacturer and Supp...

Errors

- * Name is required
- * Location is required
- * Category is required
- * Type is required
- * Condition is required
- * CoF is required
- * Redundancy is required

New Asset My Assets Export