City management and staff recognize that all organizations, both large and small, have opportunities for improvements. Staff continuously looks for those opportunities as they relate to routine activities and also seek advancements in technology and input from partner agencies to help identify efficiencies. The information included in this section will provide an overview of many of the efficiencies undertaken in recent years, as well as those that are being considered.
Water and Sewer Revenue Audit: Billing Audit

• Firm Selection
  • RFP issued on September 13, 2013
  • URM contracted on December 10, 2013

• Scope of Audit
  • “Assist in ensuring that users of retail water and sewer service provided by Columbia are properly and equitably billed for such service”

Water and Sewer Revenue Audit: Billing Audit

• Findings
  • 17,805 accounts audited
    • All customers except single family residential
  • 1,471 (8.3%) flagged for field investigation
  • 441 (2.5%) verified to have potential increased revenue

• Projected Impact
  • Estimated $1.95* M
    *40/60 over 3 years
Water and Sewer Revenue Audit:
Cost of Service Assessment

• Additional Service Offered by Auditing Firm
  • Review Business processes for efficiencies
  • Review Current costs assessed for services

• History of Account Service Requests
  • Almost 140,000 accounts
  • Service requests in 2014
    • 21,167 Move-in* - New account (service request)
    • 11,605 Move-out* - Final bill (meter read)
    • 8,858 Re-read* - Verification of monthly meter reading for billing
    • 924 Meter test* - Verify meter functionality
  *Multiple service requests may have come from the same account

Water and Sewer Revenue Audit:
Cost of Service Assessment

• Fees
  • Imposed to regulate service activities.
  • Examples include re-read of meter, meter test, non-pay disconnect, theft of service

• Administrative Charges
  • Assessed to cover cost for service requests.
  • Examples include new service, transfer of service, disconnect service

• Current Fees and Charges DO NOT Recover 100% of Costs Associated with Providing Services
Water and Sewer Revenue Audit: Cost of Service Assessment

- Improve Efficiencies
- Clearly Define Business Practices, Policies, Fees for Customer
- Update Ordinance to
  - Remove ambiguous language
  - Combine duplicated sections
  - Remove outdated sections
  - Come closer to recovering administrative costs
- Types of Changes Recommended
  - Fees
  - Debt practices
  - Adjustment processes
  - Rules of service
  - To be presented in Spring 2015
## RECOMMENDED ORDINANCE LANGUAGE CHANGES

<table>
<thead>
<tr>
<th>Item</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 23-141</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Title</strong></td>
<td>Security Deposits</td>
<td>Water Service Origination Fee</td>
</tr>
<tr>
<td><strong>Accounts in arrears</strong></td>
<td>(b) Water and/or sewer service accounts two months in arrears shall be terminated for nonpayment, until a termination notice has been mailed to the billing address on file for the account. Service will be subject to termination 15 days after the date of the termination notice.</td>
<td>(b) Water and/or sewer service accounts two months in arrears shall be terminated for nonpayment, until a termination notice has been mailed to the billing address on file for the account. Service will be subject to termination 10 days after the date of the termination notice.</td>
</tr>
<tr>
<td><strong>Under/Over billing</strong></td>
<td>none</td>
<td>(c) Under billing and Over billing of a customer’s account. In the event a customer has been over billed, the customer will be entitled to a refund for the difference between the correct monthly bill and the over bill for a period of up to three (3) years. If a customer has been under billed, the Utility can recover the under billing for up to a three year period. In either case, the repayment period will be the number of billing periods when the over or under billing occurred up to three (3) years.</td>
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<tr>
<td><strong>Section 23-144</strong></td>
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<tr>
<td><strong>Special water service fees 23-144 (f)</strong></td>
<td>Charges to constitute lien; discontinuance of service authorized. All fees and charges for water service shall be a lien on the property served as provided by contract with the water customer. Services shall be discontinued for any account which is two months in arrears; provided that the city manager or his designee may authorize continued service in a hardship case upon the execution of an acceptable payment schedule which will bring the account current in not more than six months with payment in full for continued service.</td>
<td>Charges to constitute lien; discontinuance of service authorized; unpaid accounts referred to collections agency. All fees and charges for water service shall be a lien on the property served as provided by contract with the water customer. Services shall be discontinued for any account which is two months in arrears; provided that the city manager or his designee may authorize continued service in a hardship case upon the execution of an acceptable payment schedule which will bring the account current in not more than twelve months with payment in full for continued service. Unpaid accounts after this time period will be referred to the S.C. Department of Revenue for collection using the Setoff Debt Collection Program.</td>
</tr>
<tr>
<td><strong>Installation of water meters &amp; cross connection control devices 23-145(6) NEW</strong></td>
<td>None</td>
<td>Any water meter installed for use in the City of Columbia Water System must adhere to Sec. 23-62. – Application for service for selection and installation of water meters. If a domestic water meter is installed without approval of the City Engineer or his designee, the monthly water and associated wastewater bill will be estimated based on usage volume as determined by the City Engineer or his designee. The customer will be notified in writing that they have sixty days to have the appropriate meter installed according to Sec. 23-62. - Application for service. Failure to comply within sixty days will result in termination of water service.</td>
</tr>
<tr>
<td>Item</td>
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<tr>
<td><strong>Section 23-147</strong></td>
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</tr>
<tr>
<td>Installation of water meters serving fire protection sprinkler systems 23-147(b)</td>
<td>Charges for water meters serving fire protection sprinkler systems shall be the city’s cost of the meter times 1.15.</td>
<td>Charges for water meters serving fire protection sprinkler systems shall be the city’s cost of the meter times 1.15. Monthly charges for water registering on the meter will include the base charge, water and sewer volume charges, unless verified that the fire protection sprinkler system is not tied into the internal building plumbing system.</td>
</tr>
<tr>
<td><strong>Section 23-149</strong></td>
<td></td>
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</tr>
<tr>
<td>Consumers using water cooling towers for air conditioning systems 23-149(b)</td>
<td>Consumers using water cooling towers for air conditioning systems shall be given a credit of 30 cubic feet per ton per month during the service periods commencing in the months of April through October.</td>
<td>Consumers using water cooling towers for air conditioning systems shall be given a credit of 30 cubic feet per ton per month during the service periods commencing in the months of April through October. An updated Cooling Tower Credit Request Form must be submitted annually no later than January 31st of each year. Failure to do so will result in the cooling tower evaporation credit being revoked for that year.</td>
</tr>
<tr>
<td><strong>Leak Adjustment</strong></td>
<td>Policy, not ordinance</td>
<td>Ordinance with: -50% difference between high usage bill(s) and average consumption for preceding 12 months -apply to water and wastewater billing -up to 3 monthly billing cycles (consecutive or non-consecutive) per 12 month cycle -requires plumbing repair and/or parts receipts with 30 days of discovery and repair -allow adjustment to refill swimming pool if leak repair receipts provided</td>
</tr>
</tbody>
</table>
Bio Solids Update

- **Process to Explore Alternatives to the City’s Current Bio Solids**
  - WWTP Digester Improvements are the foundation for this process
  - Green alternatives (energy recovery, fertilizer, biogas, landfill reduction, etc.)
  - Potential for cost savings, alternative delivery, and alternative financing

- **Received 15 Responses**
- **Discussions Held with 6 Firms in Late 2014**

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Bio Solids Update

- **Conclusions of the Process to Date**
  - Strong interest from many firms, including major market players
  - Many proved beneficial use technologies available
  - Significant market appetite to share risk

- **Next Step is to Develop the RFP**
  - Process remains open to all firms, approach to be set by the City
AUTOMATED METER READING/
ADVANCED METERING INFRASTRUCTURE
AMR / AMI: Background

- City Has 138,602 Billed Water Accounts
  - Most have a single water meter
  - Some have multiple meters
- 584 Routes Lead to Serious Challenges
  - Fuel & man power
  - Estimated reads
  - Hidden meters
  - Rereads/ Misreads

AMR / AMI: Technology

- **AMR**: Automatic Meter Reading
  - Remote read
  - Route based
- **AMI**: Advanced Metering Infrastructure
  - Fixed network
  - Remote access (i.e. computer terminal)
AMR / AMI: Comparison

• Cities in SC with AMI
  • Columbia is one of the few in SC

• Cities in SC with AMR
  • Spartanburg – Completely AMR
    ~58,000 meters
  • Greenville – Completely AMR
    ~170,000 meters
  • Charleston – Using AMR in ~ ½ system
    ~56,000 meters out of 110,000

AMR / AMI: City Pilot

• City Pilot Tested Both
  • ~850 meters total
  • 3 test routes
    • AMR: 2 Residential Routes
    • AMI: 1 Commercial Route (Prison)
  • Both AMR/AMI worked well
AMR / AMI:
Goal of City-Wide Service

AMR / AMI:
Next Phase
AMR / AMI: 
Next Steps

• **Developing RFP**
  • For third party consultant to evaluate City system, City needs, and make recommendations for strategy and logistics of implementation
  • Anticipated release: Spring, 2015

• **Future Work Based on Recommendations**
  • Develop protocols for purchasing remote technology
  • Begin replacing meters in a key areas

• **Anticipated Results**
  • Significant increase in meter accuracy
  • Reduction in manpower needs
Purchasing Efficiencies

- **Reverse Auction**
  - An auction where the sellers place bids
  - Can incorporate value-added bids
  - Cuts costs and time for finding quotes

- **Drinking Water Success**
  - In 2013, chemical purchase auction came in over $75,000 under estimate (2.6% savings)
  - Will incorporate reverse auction in future chemical purchases
Pumping Efficiencies

• 2012 Canal Plant Renovations
  • Used variable frequency drive pumps
  • 4 VFD raw water pumps
  • 2 High service pumps (25 MGD)

Peak Demand Cut By 17.5%
Smart Manhole Cover System

- Pilot Test of Remote Monitor Covers Complete
- Implementing the Hadronex Smartcover System
- Allows for Continual Remote Monitoring of Critical Manholes

**Smart Manhole Cover System**

**Major Benefits**
- Improved system monitoring
- Reduced man hours and overtime during rain events
- Significant safety improvement over current operations
Apprenticeships and Certifications

• **Apprenticeship Programs**
  - Drinking Water Plants Complete
  - Wastewater Plant Complete
  - Wastewater Maintenance Complete
  - Water Distribution In Development

• **Certifications Through Labor Licensing & Regulation**
  - Drinking Water Operator Licenses
  - Wastewater Operator Licenses
  - Wastewater Collection Licenses
  - Water Distribution Licenses
Membership In Professional Organizations

- **American Public Works Association Members**
  - SC chapter board member
- **SC Chapter of the American Water Works Association Members**
  - Utility membership for all staff
  - Staff representation on various committees
- **Water Research Foundation Representatives**
- **Water Utility Council Representatives**
- **Water Environment Association of South Carolina Members**
  - Utility membership for all staff
  - Staff representation on various committees
RFEI FOR EFFICIENCIES
RFEI for Efficiencies

- Opened on February 24, 2015
- 9 Respondents
- Reviewing responses per resolution R-2015-015:
  - Responses related to “sale, lease, service concession arrangement or certain public-private financing or refinancing of the system or any related capital improvement projects” are being removed from process and will not be considered.
- Remaining responses will be reviewed by committee
OTHER INITIATIVES
Other Initiatives:
FOG & Root Cause

- **Fats, Oils, & Grease (FOG) Program**
  - Wastewater maintenance working with FOG inspectors
  - FOG program has been significantly enhanced
  - Grease related SSOs are down considerably, but remain a major cause

- **Root Cause Analysis**
  - SOP developed and being implemented to determine root cause of SSOs
  - Helps ensure the right corrective action is taken and repeat SSOs are reduced

Other Initiatives:
Cityworks

- **City’s Computerized Maintenance Management System**
  - Improved use of the system
  - Produces **Key Performance Indicators** to track workload, produce maintenance schedules, and compare preventative and corrective maintenance

- **Wastewater Collection System**
  - Improved tracking and reduction of work order backlog
  - Better organization of preventative maintenance

- **Wastewater Treatment Plant**
  - Cityworks now used on portions of Plant processes
  - Collecting information on all Plant assets
  - Will implement at the Plant per CD requirements
Other Initiatives:
Asset Management - Wastewater

- Developing Asset Management for Wastewater
  - Developed from CD driven initiatives
  - Based on condition of assets
  - Based on risk of failure
  - Allows for proactive planning (workload and financial) for asset renewal
- Collected Asset Information for All Pump Stations
- Currently Collecting Information for Plant Assets

Other Initiatives:
Hydraulic Model - Wastewater

- Developing a Hydraulic Model
- Can Better Predict Collection System capacities
- Capacity and Rehabilitation Investment Decisions Are Better Informed; Can Be Proactive Before Capacity Limitations Exist
- Past CIP Investments Were Reactive
Other Initiatives:
GIS & Mapping Improvements - Wastewater

- Past GIS and Mapping Information Was Not Reliable
- Sewer Mapping Program Is Being Implemented
- Will Result In:
  - Reliable collection system mapping
  - Major time savings for field staff
  - Getting the “right information, in the right hands, at the right time”

This map shows sewer in wrong location.

Staff can lose a lot of time looking for infrastructure in the wrong location.

Other Initiatives:
Wastewater Treatment Plant Operations

- Second Utility in the State to Submit Electronic Daily Monitoring Report
- Implementing HACH-WIMS as Plant Operations Decision Tool
  - Efficient plant operations
  - Utilizing an improved WWTP SCADA system for electronic data collection
  - Results in man-hours reduction as well as reliable plant performance
- SCADA Systems Are Undergoing a Major Upgrade
  - WWTP data collection
  - Collection system pumping information and warning system