

City of Columbia
Sewer Rate Study – Why, What, and How



Let's talk about an opportunity.

Presented by

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September 24, 2010



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Key study components



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- > Revenue Requirement – How much revenue do rates need to generate?
- > Cost of Service Study – Allocated costs to different “parameters” or drivers
- > Rate Design – Ensure each customer class or type pay equitable share of costs in proportion to their usage patterns

Revenue requirement concept



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The revenue requirement is the basis for the user fees or rates to be designed.

The general concept is to answer these questions:

- >What are the costs we need to recover from our rate payers?
- >How much revenue do our rates need to generate?
- >How much revenue does the utility need to generate to operate?

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Revenue requirement concept



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The answer may vary depending on the utility, regulation, and the reporting methods management uses.

Can include:

- >Operating and maintenance costs
- >Capital additions (routine or normalized)
- >Debt service
- >Other items



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Different methodologies



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There are two accepted methodologies for developing a utility revenue requirement with different objectives

- >Cash Basis – designed to match spending
- >Utility Basis – designed for rate stability (Columbia)

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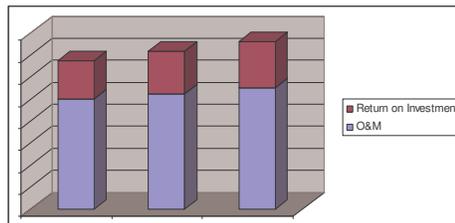
Utility basis methodology



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Goals:

- > Provide revenues to cover annual operating needs and
- > Earn an allowed (and reasonable) return on the net capital investment



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Utility basis methodology (cont.)



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Revenue Requirement =

- + O&M Expenses
- + Depreciation
- + Return on Rate Base
- + Taxes (not applicable to Columbia)
- Other Operating Revenue Sources

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Utility rates



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Next Steps....

- >Cost of Service Study
- >Rate Design

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Cost of service studies (COSS)



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- > Used to allocate the forecasted test year revenue requirement to different parameters of service
- > Allocations used to ensure customers are charged rates proportionate to the cost of serving them
- > Basis for designing proposed rates that are fair and reasonable to all customers

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Overview to COSS



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- > Revenue requirement line items are allocated to various service parameters
 - Step 1 – determine service parameters
 - Step 2 – determine appropriate allocations of each component to specific service parameters
- > Total of each service parameter is used in either the volume OR fixed rate design
 - Step 3 – design rates; ensure amounts are consistent between rate design schedules and revenue requirement and COSS summary
 - Step 4 – ensure revenue requirement is met with proposed rates

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Step one:
Determine service parameters



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- > Components related to volume, strength of sewer and fixed costs
- > Volume Parameters
 - Costs which vary directly with the rate of flow reaching the plant
 - Consist of capital and operating costs related to systems facilities sized on the basis of sewer flow

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Step one:
Determine service parameters (cont.)



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- > Sewer Strength Parameters
 - Represent capital and operating costs related to system facilities required for removal or reduction of high strength loadings
 - Examples:
 - » BOD, TSS, NH₃, TKN, and Phos
 - See definitions on next screen
 - » May be domestic or "high strength"

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Step one:
Determine service parameters (cont.)



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Fixed Cost Parameters

- > Demand – costs related to the design size of the facilities and typical fixed operating costs
- > These costs are allocated to customers based on equivalent meter size in order to establish equitable fixed rates (i.e. customers with larger meters with larger capacity requirements pay a larger portion of the cost of service) – previous study used REU methodology.
- > Customer costs – driven by number of customers
- > These costs vary with the number of customers or size of sewer connections

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Step two:
Determine appropriate allocations



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Analyze each line item in each cost of service component to determine the parameter of service causing the expense to be incurred.

Various other methodologies

- > Prior studies
- > Similar utility with similar treatment costs / processes
- > Engineering report

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Step two: Determine appropriate allocations (cont.)



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- > Amounts considered driven by the overall activities of the utility as a whole are allocated based on all other allocations.
 - Other sources of revenue (interest income, penalties, etc.) in COSS
 - General & Administrative expenses
 - General plant
- > Debt service allocated based on purpose of debt (usually capital additions, i.e. plant allocators – example: collection main)
- > Replacement fund allocated based on plant allocators of specific items making up fund

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Allocations scenarios



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- > Existing REU Methodology
- > Equivalent Meter Methodology
- > University as a Wholesale Customer (Sanitary district COS revised)
 - By Total Main Length
 - By Total Main Volume
 - By Estimated Replacement Cost

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**Allocations scenarios:
Existing REU methodology**



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BCRSD as sole Wholesale Customer (REU methodology)					
Columbia Wastewater Department					
Customer Class	Fixed Charge Revenue (\$)	Volume Charge Revenue (\$)	Total Revenue (\$)	Projected Revenue at Current Rates (\$)	Rate Adjustment
Residential (Inside City)	\$ 2,464,059	\$ 4,732,224	\$ 7,196,283	\$ 6,006,622	19.8%
Public Authority (Inside City)	\$ 555,899	\$ 1,076,618	\$ 1,632,517	\$ 843,780	93.5%
Commercial Industrial (Inside City)	\$ 225,935	\$ 3,291,322	\$ 3,517,257	\$ 2,630,964	33.7%
Residential (Outside City)	\$ 153,254	\$ 356,749	\$ 510,003	\$ 419,032	21.7%
Commercial Industrial (Outside City)	\$ 6,248	\$ 12,100	\$ 18,348	\$ 10,621	72.7%
Total			\$ 12,874,407	\$ 9,911,020	29.9%

**Allocations scenarios:
Equivalent meter methodology**



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BCRSD as sole Wholesale Customer (equivalent meter methodology)					
Columbia Wastewater Department					
Customer Class	Fixed Charge Revenue (\$)	Volume Charge Revenue (\$)	Total Revenue (\$)	Projected Revenue at Current Rates (\$)	Rate Adjustment
Residential (Inside City)	\$ 2,654,130	\$ 4,732,224	\$ 7,386,353	\$ 6,006,622	23.0%
Public Authority (Inside City)	\$ 62,062	\$ 1,076,618	\$ 1,138,680	\$ 843,780	34.9%
Commercial Industrial (Inside City)	\$ 565,153	\$ 3,291,322	\$ 3,856,475	\$ 2,630,964	46.6%
Residential (Outside City)	\$ 116,803	\$ 356,749	\$ 473,552	\$ 419,032	13.0%
Commercial Industrial (Outside City)	\$ 7,247	\$ 12,100	\$ 19,347	\$ 10,621	82.2%
Total			\$ 12,874,407	\$ 9,911,020	29.9%

Allocations scenarios:
Wholesale



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Wholesale is defined as:

“The business of selling goods to *retailers* that are then *resold* in smaller quantities”

Allocations scenarios:
Wholesale by line length



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Title BCRSD & MU as Wholesale, Mains Allocation Based on Total Main Length (ft)					
Utility Columbia Wastewater Department					
Customer Class	Fixed Charge Revenue (\$)	Volume Charge Revenue (\$)	Total Revenue (\$)	Projected Revenue at Current Rates (\$)	Rate Adjustment
Residential (Inside City)	\$ 2,618,076	\$ 5,170,783	\$ 7,788,859	\$ 6,006,622	29.7%
Commercial Industrial (Inside City)	\$ 557,476	\$ 3,596,346	\$ 4,153,822	\$ 2,630,964	57.9%
Residential (Outside City)	\$ 115,216	\$ 389,810	\$ 505,027	\$ 419,032	20.5%
Commercial Industrial (Outside City)	\$ 7,149	\$ 13,221	\$ 20,370	\$ 10,621	91.8%
Total Retail			\$ 12,468,077	\$ 9,067,240	37.5%
BCRSD			\$ 252,004	\$ 402,500	-37.4%
MU			\$ 644,327	\$ 843,780	-23.6%

**Allocations scenarios:
Wholesale by line volume**



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Title BCRSD & MU as Wholesale, Mains Allocation Based on Total Main Volume (ft ³)					
Utility Columbia Wastewater Department					
Customer Class	Fixed Charge Revenue (\$)	Volume Charge Revenue (\$)	Total Revenue (\$)	Projected Revenue at Current Rates (\$)	Rate Adjustment
Residential (Inside City)	\$ 2,538,193	\$ 5,013,011	\$ 7,551,204	\$ 6,006,622	25.7%
Commercial Industrial (Inside City)	\$ 540,466	\$ 3,486,613	\$ 4,027,080	\$ 2,630,964	53.1%
Residential (Outside City)	\$ 111,701	\$ 377,916	\$ 489,617	\$ 419,032	16.8%
Commercial Industrial (Outside City)	\$ 6,931	\$ 12,818	\$ 19,749	\$ 10,621	85.9%
Total Retail			\$ 12,087,649	\$ 9,067,240	33.3%
BCRSD			\$ 363,866	\$ 402,500	-9.6%
MU			\$ 912,892	\$ 843,780	8.2%

**Allocations scenarios:
Wholesale by line replacement cost**



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Title BCRSD & MU as Wholesale, Mains Allocation Based on Estimated Replace Cost (\$)					
Utility Columbia Wastewater Department					
Customer Class	Fixed Charge Revenue (\$)	Volume Charge Revenue (\$)	Total Revenue (\$)	Projected Revenue at Current Rates (\$)	Rate Adjustment
Residential (Inside City)	\$ 2,593,801	\$ 5,122,839	\$ 7,716,640	\$ 6,006,622	28.5%
Commercial Industrial (Inside City)	\$ 552,307	\$ 3,563,000	\$ 4,115,307	\$ 2,630,964	56.4%
Residential (Outside City)	\$ 114,148	\$ 386,196	\$ 500,344	\$ 419,032	19.4%
Commercial Industrial (Outside City)	\$ 7,083	\$ 13,099	\$ 20,181	\$ 10,621	90.0%
Total Retail			\$ 12,352,472	\$ 9,067,240	36.2%
BCRSD			\$ 285,663	\$ 402,500	-29.0%
MU			\$ 726,273	\$ 843,780	-13.9%

Allocations scenarios: Summary

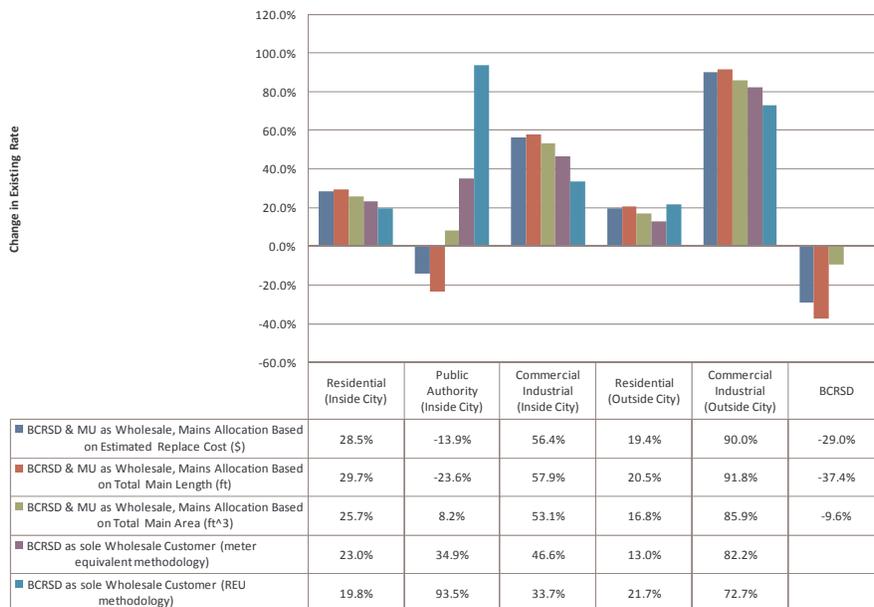


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Title	Change in Rate Comparison with Different Methodologies				
Utility	Columbia Wastewater Department				
Customer Class	BCRSD & MU as Wholesale, Mains Allocation Based on Estimated Replace Cost (\$)	BCRSD & MU as Wholesale, Mains Allocation Based on Total Main Length (ft)	BCRSD & MU as Wholesale, Mains Allocation Based on Total Main Area (ft ²)	BCRSD as sole Wholesale Customer (meter equivalent methodology)	BCRSD as sole Wholesale Customer (REU methodology)
Residential (Inside City)	28.5%	29.7%	25.7%	23.0%	19.8%
Public Authority (Inside City)	-13.9%	-23.6%	8.2%	34.9%	93.5%
Commercial Industrial (Inside City)	56.4%	57.9%	53.1%	46.6%	33.7%
Residential (Outside City)	19.4%	20.5%	16.8%	13.0%	21.7%
Commercial Industrial (Outside City)	90.0%	91.8%	85.9%	82.2%	72.7%
BCRSD	-29.0%	-37.4%	-9.6%		

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Scenarios Comparison



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Scenario pros and cons
REU / meter equivalent – retail



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Scenario	Pros	Cons
BCSRD as sole Wholesale Customer (meter equivalent methodology)	Assigns fixed costs more equitably based on meter size	Increased administration over existing methodology
BCSRD as sole Wholesale Customer (REU methodology)	Status quo easy to administer	Assumes all customers have same characteristics

Scenario pros and cons
Meter equivalent – wholesale



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Scenario	Pros	Cons
BCSRD & MU as Wholesale, Mains Allocation Based on Total Main Area (ft)	<ul style="list-style-type: none"> > Reduces costs to wholesale customers > Easier billing administration for wholesale customers 	<ul style="list-style-type: none"> > Increased plant record administration over existing methodology > Requires detailed analysis and record keeping of assets associated with wholesale customers > Allows other multi-users to petition for same status > Increased burden on retail customers > Assumes all sewer mains are uniform

Scenario pros and cons
Meter equivalent – wholesale (cont.)



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Scenario	Pros	Cons
BCSRD & MU as Wholesale, Mains Allocation Based on Total Main Area (ft ³)	<ul style="list-style-type: none"> > Reduces costs to wholesale customers > Easier billing administration for wholesale customers 	<ul style="list-style-type: none"> > Increased plant record administration over existing methodology > Requires detailed analysis and record keeping of assets associated with wholesale customers > Allows other multi-users to petition for same status > Increased burden on retail customers

Scenario pros and cons
Meter equivalent – wholesale (cont.)



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Scenario	Pros	Cons
BCSRD & MU as Wholesale, Mains Allocation Based on Estimated Replace Cost (\$)	<ul style="list-style-type: none"> > Reduces costs to wholesale customers > Easier billing administration for wholesale customers 	<ul style="list-style-type: none"> > Increased plant record administration over existing methodology > Requires detailed analysis and record keeping of assets associated with wholesale customers > Allows other multi-users to petition for same status > Increased burden on retail customers

Step 3: Design rates



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Primary objectives

- >Generate revenue requirement through rates which follow the cost of service study
- >Design rates which are fair and equitable to all customers, considering both the cost of providing service, customer bill impacts and the goals of the community

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Step 3: Design rates - volume



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Volume Charge

- >Begin with the cost of service for all volume related parameters (volume, strength) from the COSS summary schedule
- >Determine loadings (gallons / pounds) of wastewater treated for test year
 - Volume obtained per sales summary
 - Strength calculated based on volume
- >Water has rate blocks; sewer almost always flat volume charge

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Step 3:
Design rates – fixed charge



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Fixed Charge

- >Begin with the cost of service for all fixed cost service parameters (demand, customer costs) from the COSS summary schedule
- >Determine number of meters forecasted for test year per sales analysis

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Step 3:
Design rates – fixed charge (cont.)



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Demand Portion of Fixed Charge

- >The demand portion of the fixed rate is the driver of the variance in the fee by meter size

$$\begin{aligned} & \text{Total Demand per COSS (\$)} \\ & / \text{ Total \# of Equivalent Meters (A)} \\ & = \text{Annual Demand Factor (does NOT change per meter size)} \\ & / \text{ \# of Billing Periods (4=quarterly, 12=monthly, 6=bi-monthly)} \\ & = \text{Charge per Equivalent Meter per Billing Period} \\ & \times \text{Demand Ratio} \\ & = \text{Demand Charge per Meter Size per Billing Period} \end{aligned}$$

(A) – Equivalent meters calculated by multiplying # of meters by PSC approved demand ratios. A 5/8" or 3/4" = 1 while a 4" meter = 25. The demand ratios create a proportionate usage between meter sizes – a 4" meter is designed to accommodate 25x more than a 5/8".

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Step 3:
Design rates – fixed charge (cont.)



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Customer Cost Portion of Fixed Charge

>Customer cost portion is the same regardless of meter size.

Total Customer Costs per COSS (\$)
/ Total # of Meters (per sales analysis for test year)
/ # of Billing Periods (4=quarterly, 12=monthly, 6=bi-monthly)
= Charge per Customer per Billing Period

RESULT: Add together the equivalent meter charge and customer charge for each meter size to arrive at the proposed fixed charge per meter size:

Equivalent Meter Charge
+ Customer Charge
= Proposed Charge per Period

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Step 4:
Ensure adequate rate design



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- > Last section of rate study should have a sales analysis using new rates
 - Shows resulting revenues from volume and meter charges using proposed rates
- > Make sure total revenues from volume are consistent with volume parameters on COSS summary
- > Make sure total revenues from fixed charges are consistent with fixed cost parameters on COSS summary

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Other things to consider



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- > Community Needs
- > Wholesale Typically for Resale
- > Intermunicipal Agreements
- > Septic Haulers
- > Industrial Contracts

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Community needs



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City Council asked to rank factors for developing rates from:

- >Consistency with past practices
- >Rate simplicity
- >Administrative feasibility to implement due to limitations of CIS system or utility bill size
- >Ease of implementation of rate structure

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Community Needs (cont.)



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- > Price signaling to promote conservation
- > Price signaling to promote usage
- > Rate stability year to year
- > Movement towards cost of service
- > Social concerns (elderly, low income)
- > Environmental concerns
- > Stewardship of large industrial loads
- > Rate competitiveness

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Community Needs (cont.)



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City Council Identified the following as the top three weighted objectives that can be incorporated into the rate design:

- >Environmental Concerns
- >Social Concerns
- >Conservation

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Industrial contracts



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Contracts utilities should put in place if a large industrial customer is causing additional cost to utility; contract requires industry to pay a certain amount of debt service regardless of usage, etc.

> **Example** – Richland Center dairies – additional pretreatment processes required CWF debt

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This is a test for text



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