Water/Sewer Billing, Metering, and Water Efficiency

May 3, 2011
Two Types of Water/Sewer Billing

- Flat Rate (“Frontage”) – A series of set fees based on the size of a building and the number of water-using fixtures

- Metered – Based on actual consumption, similar to electricity and gas bills
Flat Rate ("Frontage") Charges

- Bills are based on:
  - Property size: front width, number of stories, number of apartments
  - Number and type of water-using fixtures such as Bath/Showers, Toilets (Standard and Low-Consumption), Hose Bibs, Clothes Washers, Fire Service Pipes

- The bill lists all of the items you’re being billed for – check against the actual building

- “Building Front Width” charge includes the first floor, first apartment, first toilet, first shower/tub in a building.
Flat Rate ("Frontage") Bills

- Issued in late May and payable by July 31
- Charges cover an entire year from July 1 – June 30 of the following year
- Many “frontage” bills are automatically forwarded to banks which pay the bill and include the cost in mortgage escrow payments – owners often never see and review the bill
- Frontage will be phased out by mid-2012
- Replaced by metered billing or Multifamily Conservation Program ("MCP")
Small properties are immediately placed on metered billing

“Initial Bill Cap” can be requested if the first bill is more than 150% of what the flat-rate charges would have been for the same period of time
Virtually all properties are now on metered billing except for:

- Apartment buildings with high population density and/or plumbing in poor condition
- Apartment buildings with high population density may qualify for “Multifamily Conservation Program” rate when frontage billing is ended
Requirements for All Billing Programs

- Property must be current with bills or agree to a binding payment agreement. Failure to maintain the terms of the payment agreement will result in forfeiture of the benefits of the billing program.

- Violation of Certificate of Occupancy will disqualify the property

- Billing Programs must be requested in writing

- Any credit balance from a billing program will be refunded only if it would not be used within a year.
Important Concepts

- Think about water/sewer costs as “Dollars Per Apartment Per Year” so you can compare a building to “frontage” bills.

- DEP meter bills are in HCF (Hundred Cubic Feet) Units. 1 HCF = 748 gallons.

- Average indoor water use is 65-75 gallons per person per day ($242-279 per person per year). Efficient homes use less (40-50 gallons per person per day, $149-186).
Multifamily Conservation Program Major Points

- Property must be current with water/sewer charges or have entered and keep current with a binding payment agreement
- For properties with six or more units
- Building must meet water efficiency requirements
- Large-consumption commercial tenants must be separately metered
- Fixed charge of $949.29 per apartment per year (2010-2011)
- This equals 0.34 HCF (254 gallons)/apartment/day
MCP Water Efficiency Requirements

- At least 70% of toilets, showerheads and faucets must comply with water efficiency standards

- Owner must cooperate with DEP leak inspections and must keep building reasonably leak-free

- Central laundry rooms must convert to high-efficiency clothes washers over time

- Property must be metered
Watch for an announcement from the New York City Water Board in 2011 about deadlines for MCP.
Goals for Owners/Managers

- How much does the building use? (Metered costs as $ per apartment per year)

- How does that compare with the MCP $949 per apartment per year?

- Is metered use above 0.34 HCF per apartment per day (consumption equivalent of $949 per apartment per year)

- How can I make my building more water-efficient?

- What do I need to do to qualify for MCP?
How to Read Water Meters
Displacement Meters (5/8” – 1”)

- Used in 1-8 family homes and small commercial buildings
- Six dials reading in cubic feet
- Note small leak detection dial or arrow
- Numbers with white background are a read in HCF
Displacement Meter (1.5” – 2”)

- Used for properties with 8 – 50 units and medium-sized commercial
- Six dials plus one “fixed zero” on right end
- Read all seven dials for a reading in cubic feet
- Numbers with white background provide read in HCF
Compound Meters I

- Used in medium-to-large buildings with variable flow
- “High Flow” on left
- “Low Flow” on right
- Treat like two separate meters
- This is Neptune’s version
- 2” – 6”
- “High Flow” on right
- “Low Flow” on left
- This is Amco/ABB’s version of this meter
- Treat like two separate meters
Turbine Meters

- Used in larger buildings with roof tanks
- 2” – 10”
- Seven, eight or even nine dial dials including 1-3 fixed zeroes on right
- Always read all digits for reading in cubic feet
- This example has six movable dials and two fixed zeroes
Electromagnetic Meter

- Very low “pressure drop”
- High range of flow registration
Single-Jet Meter

- Single register
- Wide range of flow registration
- High accuracy
Rules for Taking a Read

- Include all numbers in the reading, particularly fixed zeroes on the right end.
- If you do this you will always obtain a read in cubic feet.
- Meters measure in cubic feet, not gallons.
- One cubic foot (CF) = 7.48 gallons.
- Utilities bill in hundred cubic foot (HCF) units.
- 1 HCF = 748 gallons.
How Often?

- Minimum once a week, preferably once a day

- If there are problems, several times a day, including evening and early morning is required

- Maintain separate data for the “low” and “high” sides of compound meters
  - In small buildings with compound meters the “high” side meter may be needed only occasionally or never
What Am I Looking For?

- Increasing trend over weeks
- Significant overnight use – overnight use should be very low in a low-leakage building
- Note new vacancies and new occupants
- Maintain data on
  - Gallons per day per apartment (total apartments)
  - Gallons per day per apartment (occupied apartments)
  - Gallons per day per person (if you have a good idea of the number of people)
How Much Should We Be Using?

- 70 – 80 gallons per person per day without water-saving fixtures (9 – 10 CF per person per day)

- Less than 60 gallons per person with water-saving fixtures (8 CF per person)

- If you’re using 100 gallons per person or more “alarms” should go off (13 CF per person)

- All numbers are approximate
Automatic Meter Reading
Advanced Metering Infrastructure ("AMI") or simply Automatic Meter Reading ("AMR")

Leveraging citywide rooftop-based wireless network

Customer Benefits:

- Reduce estimated bills and customer complaints
- Early notification of leaks
- Monthly bills (future)
- Readings four times a day or hourly
- Readings available via website
AMR Installation Plans

- System to be substantially complete by end of 2011
- Installation Contractors currently working in all boroughs
- Visit [http://www.nyc.gov/dep](http://www.nyc.gov/dep) for information about the Installation Contractors at work in your area
- Door-to-door canvassing over three years
Where Water Is Used and How to Use Less
Indoor Water Use in the “Standard” Use Home

- Toilet: 28%
- Clothes Washer: 21%
- Shower/Tub: 17%
- Faucets: 15%
- Leaks: 14%
- Dishwasher: 1%
- Other: 4%

Dishwasher
Leaks
Toilet
Clothes Washer
Shower/Tub
Faucets
Other
### “Standard” v. “Efficient” Home

**Gallons Per Person Per Day**

<table>
<thead>
<tr>
<th>End Use</th>
<th>Standard</th>
<th>Efficient</th>
<th>Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilets</td>
<td>20.1</td>
<td>5.1</td>
<td>High Efficiency Toilets</td>
</tr>
<tr>
<td>Clothes Washer</td>
<td>15.1</td>
<td>10.6 or less</td>
<td>CEE Tier 3</td>
</tr>
<tr>
<td>Showers</td>
<td>12.6</td>
<td>5 – 10</td>
<td>&lt; 2.5 gpm showerhead</td>
</tr>
<tr>
<td>Faucets</td>
<td>11.1</td>
<td>7 – 10.8</td>
<td>&lt; 2.0 gpm</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>1.0</td>
<td>0.5 – 1.0</td>
<td>CEE</td>
</tr>
<tr>
<td>Leaks and Other</td>
<td>12.7</td>
<td>&lt; 7,7</td>
<td>Monitoring</td>
</tr>
<tr>
<td>Total</td>
<td>72.5</td>
<td>36 - 42</td>
<td></td>
</tr>
</tbody>
</table>
Toilets

- National standard of 1.6 gpf is being informally superseded by 1.28 gpf: High Efficiency Toilets ("HET")
  - Gravity 1.28 gpf
  - Gravity Dual-flush 1.6 gpf/0.8 – 1.0 gpf
  - Pressurized 1.0 – 1.28 gpf
  - Commercial 1.0 gpf, 1.28 gpf and Dual Flush
Quick Residential Toilet Specification
Why Start with WaterSense As a Specification?

- 1.28 gpf maximum flush volume
- Minimum 350 grams MaP test score for flush performance
- Requires use of pilot fill valve (no ballcock type valve)
- Design must not allow adjustment of the fixture to flush above 1.68 gpf (single flush fixtures) or 1.40/2.00 for dual flush fixtures
- Requirement by Local Law starting 7/2012
Specifying Beyond “WaterSense”

- Pressurized fixtures flush at less than 1.28 gpf, i.e. 1 gpf
- Some fixtures have flushing performance that exceeds 350 grams on the MaP test – requires comparing the WaterSense list with MaP scores to learn which products exceed 350 grams
Pressurized-Tank Toilet
What’s All This About MaP Testing?

- “Maximum Performance” flushing test using realistic test media developed in 2005 for several water utilities who wanted a more reliable measure of toilet flush performance

- Flushing 250 grams of media is considered a “passing” grade although WaterSense and some utilities prefer to use 350 grams. Many toilets can clear far more and pressurized fixtures usually flush more than 1,000 grams

- 250 grams based on clinical data of human waste production

- If a manufacturer has not submitted a product for MaP testing that should be taken as a sign of lack of confidence in the product. “If it’s not on the MaP, don’t go there”
Data is inconclusive about the amount of incremental savings from dual flush fixtures

Average flush volume varies from 1.0 – 1.1

Are the residents “environmentally conscious?”

Is education part of the goal?

Research the specific product. Toilets with a “wash down” type design may often flush solids at the “half flush” while this is less likely for “siphonic” toilet designs
Toilet-Related Links

- http://www.cuwcc.org/products_tech.lasso#HETs
- http://www.epa.gov/watersense/
- http://www.toiletflapper.org/
Modest retrofit reductions (1 gallon per flush) are possible from existing nominal 5 gpf toilets

Toilet leaks are the largest single source of leaks – and the one most often missed

Alternate refill devices are available that protect against “silent” toilet leaks
Repair Your Leaking Toilets: 
*Save Water and Stop Flushing Away Your Water Bill*

High water bills are often caused by leaking toilets that waste large amounts of water.

<table>
<thead>
<tr>
<th>Size of Leak</th>
<th>Amount of Water Waste Per Day</th>
<th>Approximate Cost of Waste Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>30 gallons</td>
<td>$0.25</td>
</tr>
<tr>
<td>Medium</td>
<td>250 gallons</td>
<td>$2.30</td>
</tr>
<tr>
<td>Large</td>
<td>Up to 4,000 gallons</td>
<td>As much as $40</td>
</tr>
</tbody>
</table>

**WHAT CAUSES A TOILET LEAK?**

- The flapper becomes warped or damaged and does not provide a watertight seal on the flush valve. In-tank toilet cleaners can cause flapper damage.
- The flapper, trip lever or chain may lose its alignment with the flush valve, leaving a gap that can cause a leak.
- The flush valve can develop small cuts or other damage that causes a leak between it and the flapper. This is usually caused by grit or sediment.
- The fill valve can become stuck in an open position causing water waste as it flows down the overflow tube. This can happen when your water pressure changes in your home.

**THE TOILET THAT LEAKS WHILE YOU SLEEP**

Toilet leaks are often frustrating because they can be intermittent and hard to detect. If you have a toilet that uses a float ball-style fill valve similar to the one in the diagram, higher water pressure overnight in your building or neighborhood can cause the float ball to open and stay open until the pressure decreases. This could cause a leak while you are sleeping.
Dye Tablets for Toilet Leak Detection
In-Tank Chlorine Cleaners
Typical Causes of Toilet Leaks

- Flapper chain gets tangled and holds flapper open slightly: Adjust so that chain is no longer than necessary

- Sediment scores flapper seat or builds up (clean)

- Refill valve (ball cock type) goes out of adjustment so water level is never reached before overflow occurs: Move adjustment screw slightly or bend ballcock arm slightly downward
Alternative Refill Devices
Fluidmaster “Leak Sentry” does not refill tank if there’s a leak – limits loss to one tank

- You must flush twice at next use: Once to refill the tank and once to flush the toilet

MJSI “HydroClean” emits a whistling sound if there’s a toilet leak
Displacement Products
Pressure spikes or debris in water can cause “phantom flushes” or leaking valve.

Shutting water supply to building or valve can cause valve to unseat and turning water back on can result in valve remaining open – potential 35 gpm.
Basic Recommendation for Clothes and Dish Washers
Clothes Washers: The Best EnergyStar Products

- Consortium for Energy Efficiency ("CEE") sets three tiers of energy and water efficiency performance
- Water Factor = Gallons per Cubic Foot Capacity

<table>
<thead>
<tr>
<th>Standard</th>
<th>Water Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Star</td>
<td>8.0</td>
</tr>
<tr>
<td>CEE Tier 1</td>
<td>7.5</td>
</tr>
<tr>
<td>CEE Tier 2</td>
<td>6.0</td>
</tr>
<tr>
<td>CEE Tier 3</td>
<td>4.5</td>
</tr>
</tbody>
</table>
Also has water-oriented specs for dishwashers and commercial kitchen equipment in addition to energy specs
Residential Faucet Quick Spec: WaterSense

- Maximum 1.5 gpm at 60 psi; Minimum 0.8 gpm at 20 psi

- Complies with NSF61 ("no lead" alloy)

- Commercial faucets available at 0.5 and 1.0 gpm along with 15-second duty cycles
Showerheads

- Current standard 2.5 gpm at 80 psi
- Local Law requires 2.0 gpm 7/1/2012
- If low pressure conditions exist, specify “pressure compensating”
- Constant temperature shower valves important
- If trying for less than 2 gpm, consider a hand-held showerhead
Steam Heated Buildings

- Old condensate return lines can leak, losing water and energy

- If the return lines are more than 20 years old, consider a water meter to monitor losses on the makeup water line

- Condensate pipes may be leaking behind walls or under the basement floor
Roof Tank Overflow

- Indicated by significant night time water use
- Caused by float valve failure
- Roof tank should be inspected and maintained annually
Washing the Sidewalk

Waterbroom

Watersweeper
Reducing Costs: Commercial Tenants

- Whenever possible, install owner submeter for commercial tenants and make sure they are obligated to pay their share of water/sewer costs.

- Most important if the tenant is in a food-related, health-related or other water-using business.

- Once-through water-cooled equipment is a common source of major use and leaks.
The Submetering Debate
American Water Works Association Research Foundation study indicates 15% savings over simply passing along water/sewer costs

Users should pay for what they use at every level

Without submetering owners are subsidizing waste by tenants

Submetering would reduce rents for most apartments
Submetering would have to be performed by private companies working for the owner – utilities have no legal relationship with tenants.

Consumer protection rules and oversight of submetering companies would be required.

Owners would no longer have a financial incentive to fix leaks unless building structure is effected.

In New York, rent regulation would have to be revised (as it was for individual electric metering).

Many submetering technologies do not allow tenants to read their own meters.

Major change required in plumbing design of apartment buildings.
Tenants and Cooperators Have a Part to Play

- Education by co-op board and tenant organizations should be aimed at understanding that:
  - Wasting water leads to higher housing costs
  - Water is not “free” even if they do not pay for it directly
  - Report leaks to building management and if they do not act, to HPD and DEP

- Turn the following into negative images:
  - Defrosting food under running water
  - Flushing a tissue down the toilet
Additional Sources of Information

- DEP web site: [www.nyc.gov/dep](http://www.nyc.gov/dep)

- Billing Issues: (718) 595-7000 or write:
  - BCS Correspondence Unit, NYC Department of Environmental Protection, 59-17 Junction Blvd., 7th Floor, Flushing, NY 11373-5107

- Water Efficiency Resources:
  - [www.allianceforwaterefficiency.org](http://www.allianceforwaterefficiency.org)

- Energy Efficiency Resources: [www.getenergysmart.org](http://www.getenergysmart.org)