



How much do leaky toilets cost property managers? A case study.

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## Profile

The Leak Beeper was invented and patented by Steve Ghertner and Vince Luciani of Ghertner Automation. It was invented in response to a recurring problem that Steve's property management company, Ghertner Property Management, was having: high water bills due to leaking toilets. Steve and Vince, both Electrical Engineers, were convinced that the solution was rather simple: what was needed was a device that could gauge when water was re-filling a toilet's water tank due to a reason other than a deliberate flush.

The Leak Beeper has two parts. One part is a small sensor that hangs off the overflow tube inside the toilet tank. This sensor is used to determine when water is flowing through the overflow tube indicating a flush or water leakage.

The other part is a beeper-sized, battery-powered unit that hangs on the outside of the tank which is used to monitor the sensor, provide logic and timing, and annunciate an alarm using a flashing light, or a wireless signal.

Upon installation, the toilet is flushed so that the unit can establish the timing of a normal or intended water flow. The flush is detected by the probe as water flows through the refill tube. A microprocessor compares every flush length to the calibration value for that toilet. From this moment on, water flows that deviate from this calibrated time are flagged as suspected leaks.

## Subject

Metro Manor is a 150-unit apartment building in downtown Nashville, Tennessee. In the 12-months prior to the test, Metro Manor consumed an average of 424,393 gallons of water per month. As a benchmark to determine potential savings, we employed Average Gallons of Water Per-unit, Per-day (AGPU). Prior to the Leak Beeper installation, AGPU was 82.

The occupancy rate remained relatively stable for the 12-months prior and post installation; 91% and 88%, respectively. The building does not have a pool or an irrigation system.

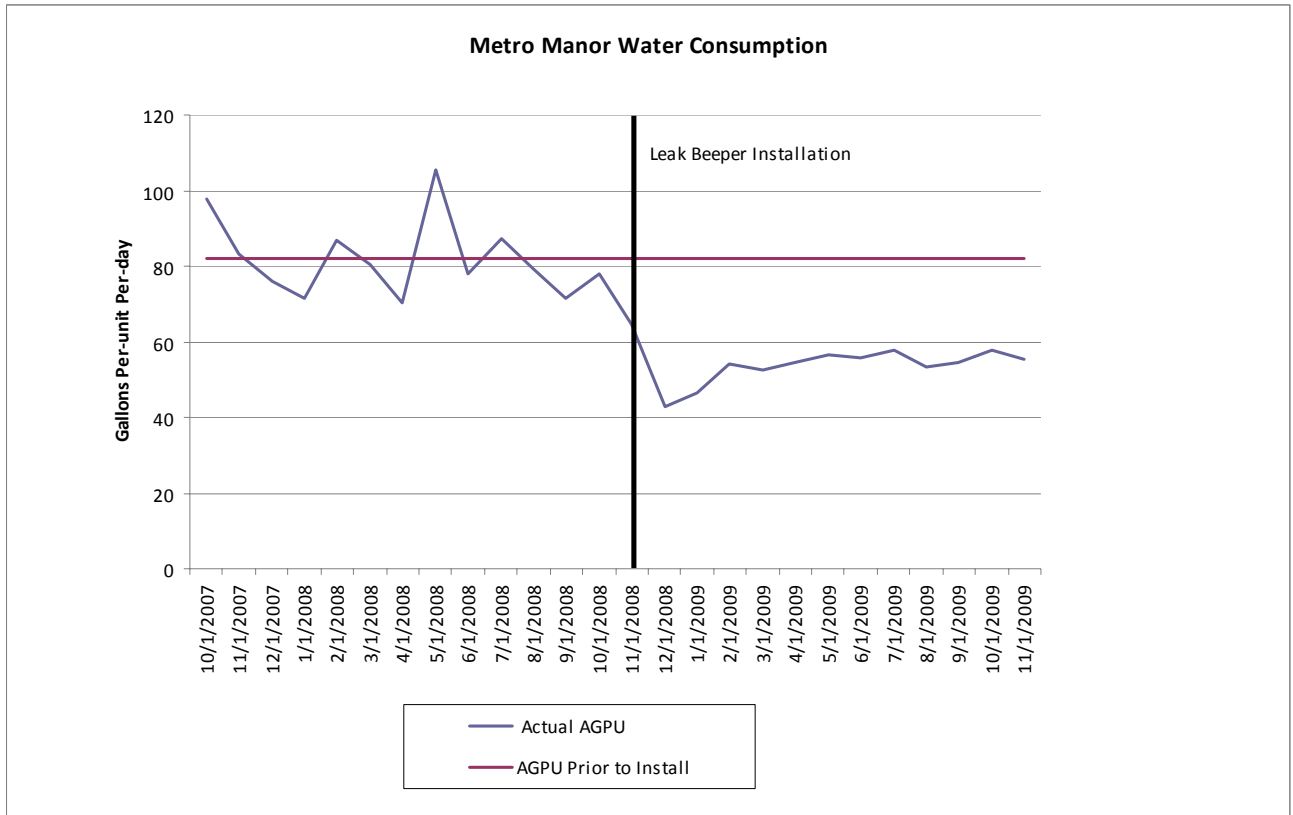
## Test

In October and early November, 2008, Leak Beepers were installed on Metro Manor's toilets. The devices were checked by on-site maintenance personnel on a monthly basis. Once leaks were indicated, the toilets were repaired in a timely manner.

## Results

- Monthly water consumption has decreased by 35% to an average of 276,591 gallons
- AGPU was reduced by 35% to an average of 53
- Monthly Water and Sewage bill decreased by an average of \$1,046 per month
  - Cumulative savings to-date are \$11,670
- Payback period for the devices was 6.2 months
- First-year Return on Investment (ROI) was 192%
- Potential added value to the property, using a cap-rate of 10% is \$116,700

## Charted Consumption



## Conclusion

Our Case Study demonstrates that leaky toilets can present a significant financial burden to property managers and that the Leak Beeper can help solve the problem.

The study also shows that the Leak Beeper is an integral tool in solving many of the frustrating issues associated with keeping toilets in good working order. Since the Leak Beeper is constantly monitoring the toilet, issues that only show themselves intermittently can be effectively flagged and then addressed.

Prior to the installation, the toilets at Metro Manor were regularly checked and maintained. Yet despite these efforts, water consumption was still 35% more than needed and resulted in significant, unnecessary costs. Our test proves that personal attention alone cannot catch all of the leaks that are occurring in a building.

In summary, over the past year, the Leak Beeper has shown itself to be a cost-effective tool in reducing overall expenses for property managers.



## Supporting Data

Cost of 1,000 Gallons of Water and Sewage in Nashville \$7.94

### Customer Data:

Number of Toilets: 150

### Monthly Consumption:

12-months Prior to Installation 424,393

12-months Post Installation 276,591

**Reduction** 35%

Gallons of Water Per-unit, Per-day Prior to Install (AGPUD) 82

Gallons of Water Per-unit, Per-day Post Install (AGPUD) 53

**Reduction** 35%

### Leak Beeper Cost:

Cost of Each Leak Beeper \$40.50

Total Cost to Equip All Toilets With Leak Beepers: \$6,075

### Leak Beeper Savings:

Annual First-year Savings Due to the Leak Beeper: \$11,670

Payback Period (Months) 6.2

ROI in Year 1 192%

Typical Nashville Capitalization Rate 10%

Potential Added Value \$116,700

### Case Study Details

Bill Date	Total Gallons	Gallons per Day	AGPU Prior to Install	Actual AGPU	Reduction
10/2/2007	448,829	16,623	82	98	
11/5/2007	437,609	14,116	82	83	
12/6/2007	412,923	12,904	82	76	
1/3/2008	364,299	12,143	82	71	
2/4/2008	443,593	14,786	82	87	
3/5/2008	383,000	13,679	82	80	
4/4/2008	383,000	11,969	82	70	
5/2/2008	501,193	17,900	82	105	
6/4/2008	464,538	13,273	82	78	
7/7/2008	445,088	14,836	82	87	
8/7/2008	443,593	13,442	82	79	
9/5/2008	365,048	12,168	82	72	
10/3/2008	371,032	13,251	82	78	Began Installation
11/5/2008	362,055	10,971	82	65	Finished Installation
12/8/2008	219,178	7,306	82	43	-48%
1/8/2009	260,321	7,889	82	46	-43%
2/5/2009	266,306	9,183	82	54	-34%
3/5/2009	249,848	8,923	82	52	-36%
4/3/2009	269,298	9,286	82	55	-33%
5/5/2009	306,700	9,584	82	56	-31%
6/4/2009	283,510	9,450	82	56	-32%
7/8/2009	333,630	9,813	82	58	-30%
8/7/2009	272,290	9,076	82	53	-35%
9/4/2009	250,596	9,281	82	55	-33%
10/4/2009	333,631	9,813	82	58	-30%
11/5/2009	273,786	9,441	82	56	-32%
<b>Post Intall. Averages</b>	<b>276,591</b>	<b>9,087</b>		<b>53</b>	<b>-35%</b>





## Installation Instructions

### Step 1

Remove toilet tank lid & hang Leak Beeper Alarm Unit on side or back of tank, so alarm light is visible.

### Step 2

Remove existing connector that attaches tank re-fill tube to overflow pipe, & install Leak Beeper S-Clip Probe in its place. **Make sure that water level is at least 1/4 inch from bottom of Leak Beeper Probe.** This may require lowering the Fill Valve Float.

### Step 3

Attach Leak Beeper's grounding clamp to the refill tube, about 1 inch from the probe.

### Step 4

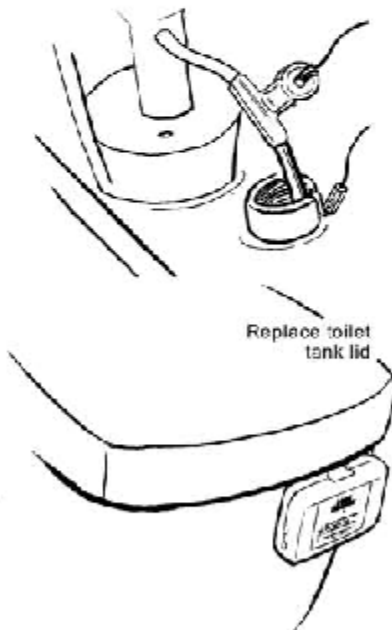
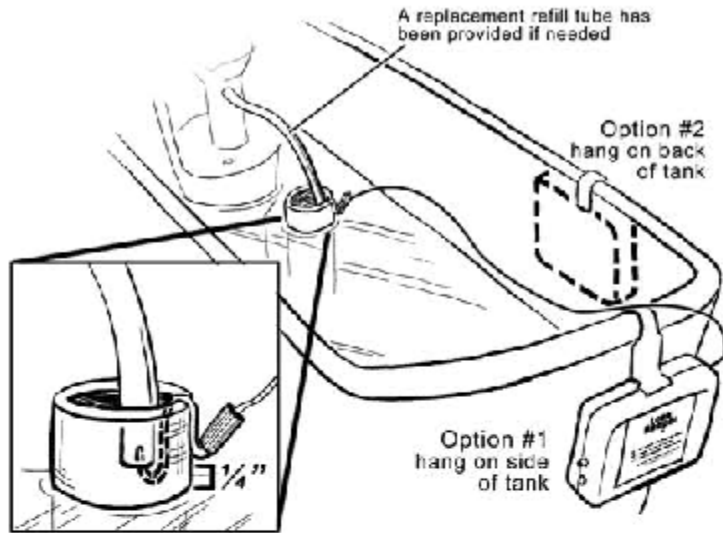
Connect the Probe Lead Plug into the Leak Beeper Alarm Unit. Make sure that the red and black wires are not twisted together. Replace Tank Lid.

### Step 5

Re-set the unit for calibration by pushing the indicator button briefly. Indicator light on the Leak Beeper will change from Red to Yellow, then to Green. The Green light will stay on to await the initial calibration flush.

### Step 6

Flush the toilet. Green light will blink while toilet is refilling. Blinking green light will stop after the toilet is refilled. The Leak Beeper is now monitoring your toilet for leaks.



#### Leak Indications:

**Blinking Red Light:** Indicates a "Short Leak", which is typically caused by a faulty flapper.

**Solution: Replace flapper.**

**Constant Red Light:** Indicates a "Long Leak" which is typically caused by a faulty fill-valve or flush-valve.

**Solution: First replace the fill-valve. If leak indication persists, replace the flush-valve.**

**Constant yellow light:** Indicates low batteries.

**Solution: Replace Leak Beeper's 2 AAA batteries.**

**Constant green light:** (when button is pushed) Indicates that the Leak Beeper and your toilet are functioning correctly.

In the unlikely event that both types of leaks occur at the same time, and that a low battery is detected, the indicator light will signal each occurrence concurrently, for 3 seconds each: a blinking red light, a solid red light and a constant yellow light.

**To clear out the leak indications and re-set the Leak Beeper for future detection, simply hold the indicator button down until the indicator light changes from Red to Yellow to Green. The Green light will stay on to await a new calibration flush.**

