Cost-Benefit Analysis for the AMR/AMI Installation Project

I. Background
At the September 13, 2011 meeting, the Board directed staff to prepare a cost benefit analysis for the AMR/AMI Installation Project. The project is in the second year of a five-year Infrastructure Investment Program that was started in fiscal year 2010-2011. The analysis is based on the vendor’s (Datamatic) quotation for full deployment of AMR/AMI for FY 2011-2012 in Agoura Hills as shown in Attachment A. Due to the topography, this fiscal year’s project location allows for full implementation of the mesh network that will transmit meter readings electronically to a data server. For billing or other purposes, the server data is accessed via the Internet. This implementation, similar to the installation in Chatsworth, is referred to as AMR/AMI or Automatic Meter Reading/Advanced Metering Infrastructure. In contrast, an AMR implementation only provides access to the meter reading by driving close to the meters with a laptop computer to collect the data. Because of the topography, areas like the coastal routes, Monte Nido, Malibou Lake, Old Agoura, etc., investment in infrastructure to transmit the data is not cost effective.

II. Cost
The cost analysis does not include the cost of the actual meters, boxes, lids and covers as these would have to be replaced as part of the regularly scheduled meter maintenance anyway, whether or not an AMR/AMI program is in place.

Assumptions include: useful life of equipment = 15 years, interest rate = 2%.

For the first 2 years, Table 1 shows an increase in leak investigations and/or water use surveys, similar to past experience for services in Chatsworth that were converted to AMR/AMI in 2009.
### III. Benefits

#### A. Tangible (or Operational) Benefits

Attachment B shows a breakdown of the current workload for 8 full-time Field Customer Service Representatives. Meter reading accounts for 29% of their total time. Experience with AMR/AMI services currently in use shows an 80% reduction in meter reading times. Overall, this translates to a 23% decrease in the overall workload. However, it would be offset by increased activity in leak investigations and/or water surveys as leak alarms are generated by the AMR/AMI system like in Chatsworth.

Table 2 shows the quantifiable, tangible benefits resulting from operation with AMR/AMI or AMR meters.

The *Water Balance and Audit* report in November 2009 (LVMWD Report No. 2449.00) identified a 4% non-revenue water loss in the system. Although that amount is well within the California Urban Water Conservation Council benchmark of 10% for unaccounted-for water, the AMR/AMI system will facilitate system-wide audits on a more frequent basis. These audits will attempt to identify leaks between the source (MWD) and the customer meters or through the different water-subsystems. By reducing this loss to 2% after full AMR/AMI implementation, benefits will be realized in year 6.

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**Table 1 - Project Costs**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Present worth n=15 years, i=2%</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment cost</td>
<td>$550,629</td>
<td>$550,629</td>
<td>Includes Fireflys, gateways, repeaters, etc. Water meter cost and installation under meter maintenance program.</td>
</tr>
<tr>
<td>Data hosting by Datamatic</td>
<td>$1,510 per year for 15 years</td>
<td>$19,397</td>
<td>Cost of data hosting for 3,774 meters @ $0.40 each meter per year.</td>
</tr>
<tr>
<td>Meter O&amp;M-labor</td>
<td>$7,036 per year for 15 years</td>
<td>$90,413</td>
<td>Annual &quot;lift and check&quot;, includes travel of 378 miles @ $0.60 per mile.</td>
</tr>
<tr>
<td>Meter O&amp;M-battery</td>
<td>$55,464 in year 7</td>
<td>$49,251</td>
<td>Battery cost at $12/pack with 10-year warranty. Assume total replacement before expiration.</td>
</tr>
<tr>
<td>Increase in leak investigations and/or water use surveys</td>
<td>$109,031 in years 1 &amp; 2</td>
<td>$211,690</td>
<td>Increase in based on leaks alarms in 243 out of 817 homes (30%) in Chatsworth at 3 hours per home. Leaks were confirmed in 62 residences but not quantified at this time.</td>
</tr>
<tr>
<td>Total Present Worth</td>
<td></td>
<td>$921,380</td>
<td></td>
</tr>
</tbody>
</table>

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No benefit is quantified for prevention of leaks for “billed” water or leak loss on a customer’s property. There is insufficient data to support any assumption at this time.

Table 2 - Project Benefits

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Present worth n= 15 years, i= 2%</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced meter reading</td>
<td>$40,858 per year</td>
<td>$524,991</td>
<td>Reduction in meter reading hours by 80%.</td>
</tr>
<tr>
<td>Reduction in travel costs</td>
<td>$1,361 per year</td>
<td>$17,488</td>
<td>Estimate using $0.60/mile and 2,268 miles per year.</td>
</tr>
<tr>
<td>System-wide water loss prevention</td>
<td>$68,257 per year in years 6-15</td>
<td>$676,938</td>
<td>Based on 2% leak prevention of 74 AF/year in year 6.</td>
</tr>
<tr>
<td>Total Present Worth</td>
<td></td>
<td>$1,219,417</td>
<td></td>
</tr>
</tbody>
</table>

B. Intangible (or Strategic) Benefits

There are a number of unquantified, strategic benefits that justify the AMR/AMI project. These benefits cover good public relations, resource conservation, regulatory compliance, business improvement, and revenue protection.

1. Improve Customer Service

Customers will have access to more information concerning their usage.

2. Timely Leak Detection

With the ability to detect large leaks in a more timely manner, field customer service personnel can be dispatched to investigate and shut off water service to mitigate water loss and property damage. Collateral damage from water leaks can far exceed the cost of water. Oftentimes, substantial water damage occurs when customers return from a vacation and discover that a leak, such as a broken washer hose, occurred while they were away.

3. Monthly billing

The Board has expressed an interest in going to monthly billing to provide more timely information to customers. During the water allocation period, some customers shared this same view. To bill monthly without AMRs would involve doubling current meter reading efforts and post-meter reading processing and billing. Additional field and/or office personnel would need to be hired. An important business improvement that complements monthly billing is online billing payment and presentment which is currently in testing.

4. Water Budgets Implementation

The current Water and Wastewater Rate Study proposes to evaluate an irrigated-area based water budget similar to the Irvine Ranch Water District model. In contrast to water budgets
implemented in 2009 which were based on parcel sizes, each residential unit would have a unique allowance primarily based on their irrigated area and number of residents. The AMR/AMI project will facilitate this transition in conjunction with monthly billing. As an aside, water budgets rank as the rate structure that requires the greatest administrative effort to implement. In this regard, some reductions in meter reading efforts could be shifted to support this new program. Further, staff could also be used to perform surveys to resolve appeals related to irrigated area.

5. 20% x 2020 Compliance
The 2010 Urban Water Management Plan update identified the water use target to comply with the 20% x 2020 State mandate. Identification and prevention of leaks, at the customer meter, will assist the District in complying with the mandate and maintain its eligibility for State grants to fund projects.

6. Claims Resolution and Billing Disputes
Availability of water usage data on a more frequent basis will assist in the resolution of claims within the customer’s property. Having time-stamped usage data allows cross referencing with events in the water system which are archived in the SCADA (Supervisory Control and Data Acquisition) computer. In addition, leak adjustments can also be validated better using archived water usage data from the AMR/AMI meters.

7. Personnel Safety
Minimizing driving reduces accidents and exposure to inherent dangers of working in narrow roads as meter readers get in and out of their vehicles, particularly during inclement weather. It also reduces their exposure to poison plants, insect stings and reptiles. As a result, the District’s EMR or Experience Modifier Rating, which influences insurance premiums, will be favorably affected.

8. Greenhouse Gas Reduction
The District reduces its carbon footprint by decreasing its use of fossil fuel.

IV. Payback Period
The payback period for the investment is 10 years.

V. Conclusion
The cost-benefit analysis justifies implementation of the AMR/AMI Installation Project in the current FY2011-2012 Capital Improvement Program and as planned under the 5-Year Infrastructure Investment Program.
Customer service orders, 4760, 32%

Meter reading, 4400, 29%

Water use surveys, 1200, 8%

Meter maintenance, 1136, 7%

Meter reading processing, 1132, 7%

Door tags, 763, 5%

Reclaimed surveillance, 468, 3%

Others, 542, 4%

Vehicle checks/parts stocking, 416, 3%

Safety training/meetings, 256, 2%

Cross-hatched section is 80% reduction in meter reading hours. It would shift to leak investigations (customer service orders), water surveys, AMR/AMI equipment maintenance and water budgets implementation in the future.

Legend:
Activity, hours, %

Annual total workload hours = 15,073 hours (from pie chart)
Annual total productive hours for 8 positions = 8 positions x 2,080 hrs/yr x 0.8 factor = 13,312 hours
0.8 factor is productivity factor to cover vacations, holidays, etc.
Overtime, temporary help and contractors make up the difference between the workload and productive hours.

Attachment B - Field Customer Service Reps Workload