Long Term System Planning

Evan Kirk
Environmental Finance Center
The University of North Carolina at Chapel Hill
919-962-2789
emkirk@sog.unc.edu
Infrastructure Wears Out
Infrastructure Wears Out

Water Tank

Leak
There are two ways to keep up your infrastructure…
Ways to Keep Up Infrastructure

Mike Daly · White Cliffs MDWUA, NM
Ways to Keep Up Infrastructure

Source: https://www.youtube.com/watch?v=rH867Y-8-VM
Two Ways to Fix Things

Proactively
Repair, rehabilitation and replacement on a set schedule

Reactively
You wait for it to break
Or We Can Hope for Divine Intervention...

Pope Francis Lays Hands On Ailing U.S. Infrastructure

NEW YORK—Treating the frail, long-overlooked structures with an unparalleled display of compassion, Pope Francis reportedly inspired a crowd of onlookers Friday by laying his hands upon the ailing United States infrastructure. “My heart just melted when I watched the pope.
Infrastructure at your system?

- All Proactive
- Mostly Proactive
- Equal mix of Proactive and Reactive
- Mostly Reactive
- All Reactive
Being Proactive

• Requires long term system planning—Asset Management and Capital Planning

• Has its advantages, according to people in the field...
Measuring Needs, Not Guessing

Ted Riehle · Old Forge, NY
Better Board Communication

Chris Jacobs · Somersworth, NH
Efficient System Management

Doug Powers · Tucumcari, NM
Fewer Emergencies

Mike Daly · White Cliffs MDWUA, NM
Justification for Rate Increases

Ted Riehle · Old Forge, NY
Five Core Components of AM

Current State of the Assets

Level of Service

Criticality

Life Cycle Costing

Long-Term Funding
Asset Management?

We’re doing it!

Heard of it but not doing it

What now?
Current State of the Assets

- What do I own?
- Where are the assets?
- What condition are they in?
- How much useful life is remaining?
- What is the replacement value?
Level of Service

Involve Customers

Involve Staff

Measurable Goals: Internal and External

Track Progress Towards Meeting Goals

What would my customers want?
What do customers care about?
Level of Service

EPA Releases Annual List Of Cities Where Tap Water Probably Fine To Drink But Tastes Kinda Off
Asset Criticality

What is the probability or likelihood that a given asset will fail?

How do my assets fail?

What’s the condition of my assets?
Asset Criticality

What is the consequence if the asset does fail?

What is the cost of the repair?

Are there legal consequences, environmental consequences, social consequences?

Are there redundant assets?
Asset Criticality

- **MEDIUM RISK**
  These assets have a long remaining useful life, but if they failed, the consequences would be major.

- **HIGH RISK**
  These assets are nearing the end of their useful life, and if they failed, the consequences would be major.

- **LOW RISK**
  These assets have a long remaining useful life, and even if they failed, the consequences would be minor.

- **MEDIUM RISK**
  These assets are nearing the end of their useful life, but if they failed, the consequences would be minor.

Consequence of Failure

Probability of Failure
Quick Exercise—4 Assets

1. Brand new well

2. Aging portable generator used in emergencies in an area with a hospital and a neighborhood

3. 20-year old lines on Forest Drive, a typical residential neighborhood

4. 20-year old meters
Asset Criticality

- **Low Risk**: These assets have a long remaining useful life, and even if they failed, the consequences would be minor.
- **Medium Risk**: These assets have a long remaining useful life, but if they failed, the consequences would be major.
- **High Risk**: These assets are nearing the end of their useful life, and if they failed, the consequences would be major.
- **Medium Risk**: These assets are nearing the end of their useful life, but if they failed, the consequences would be minor.
Life Cycle Costing: Replacement of Assets

In theory, there is an exact right point at which to replace an asset. Not possible to know the optimal time to replace every asset. So… need to use the concept of risk.
Life Cycle Costing & Risk

High risk assets: replace assets early, before failure

Low risk assets: run to failure and replace afterwards

![Diagram showing life cycle costing and risk analysis with replacement points indicated on graphs.](image-url)
Long Term Funding

• This is where capital planning comes in

• Once you figure out how to get the longest life out of your assets, plan to have the money you need to replace them when necessary
Capital Planning?

We’re doing it!

Heard of it but not doing it

What now?
Long Term Capital Planning

• This is strongly related to asset management

• An official multi-year document that identifies and prioritizes capital projects, identifies funding sources, and sets timelines
Four approaches to paying for capital improvements
Pay As You Go
Save In Advance and Pay
Borrow and Pay Later
Get a Grant
Ways To Pay

- Pay as you go
- Save in advance and pay
- Borrow and pay later
- Grants (let someone else pay)

Money from your customers

Not easy to come by
Greetings from Irwindale USA
Find Irvindale’s Budget Expenses

What here is related to regular repair and maintenance, if anything?  
(Operating cost)

What here is related to asset rehabilitation or replacement, if anything?  
(Capital cost)

Note: Don’t include salaries
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>30-810-07 W/S OVERTIME</td>
<td>$4,500.00</td>
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<tr>
<td>26</td>
<td>30-810-08 MERIT BONUS</td>
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<td>27</td>
<td>30-810-09 HOLIDAY/EMPLOYEE APREC</td>
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<td>28</td>
<td>30-810-10 POSTAGE</td>
<td>$2,700.00</td>
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<td>29</td>
<td>30-810-11 Office Supplies/Repairs</td>
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<td>30</td>
<td>30-810-12 PHONE</td>
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<td>31</td>
<td>30-810-13 W/S UTILITES</td>
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<td>32</td>
<td>30-810-14 TRAINING</td>
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<td>33</td>
<td>30-810-15 Employee Screening</td>
<td>$105.00</td>
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<td>34</td>
<td>30-810-16 MAINT/REPAIR:SYST-EQUIP</td>
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<tr>
<td>35</td>
<td>30-810-17 Mayor Salary</td>
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<tr>
<td>36</td>
<td>30-810-18 Board Salary</td>
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<td>37</td>
<td>30-810-20 W/S UNIFORMS</td>
<td>$2,000.00</td>
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<tr>
<td>38</td>
<td>30-810-30 GAS AND OIL FOR VEHICLES</td>
<td>$4,500.00</td>
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<td>39</td>
<td>30-810-31 TIRES FOR VEHICLES</td>
<td>$600.00</td>
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<tr>
<td>40</td>
<td>30-810-32 REPAIRS TO VEHICLES</td>
<td>$1,000.00</td>
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<tr>
<td>41</td>
<td>30-810-33 SUPPLIES &amp; MATERIALS</td>
<td>$3,000.00</td>
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<tr>
<td>42</td>
<td>30-810-34 CHEMICALS AND SALT</td>
<td>$20,000.00</td>
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<tr>
<td>43</td>
<td>30-810-45 CONTRACTED SERVICES</td>
<td>$36,500.00</td>
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<td>Description</td>
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<td>---</td>
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<tr>
<td>40</td>
<td>REPAIRS TO VEHICLES</td>
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<td>SUPPLIES &amp; MATERIALS</td>
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<td>42</td>
<td>CHEMICALS AND SALT</td>
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<tr>
<td>43</td>
<td>CONTRACTED SERVICES</td>
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<td>44</td>
<td>STATE PERMITS</td>
<td>$1,700.00</td>
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<td>45</td>
<td>DUES/SUBSCRIPTIONS</td>
<td>$1,500.00</td>
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<tr>
<td>46</td>
<td>DEPRECIATION</td>
<td>$0.00</td>
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<tr>
<td>47</td>
<td>INSURANCE</td>
<td>$13,608.00</td>
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<td>HOSPITAL INSURANCE</td>
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<td>49</td>
<td>MISC EXPENSE</td>
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<td>50</td>
<td>W/S - LGERS</td>
<td>$9,272.00</td>
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<td>51</td>
<td>WATER STUDY EXPENSES</td>
<td>$24,000.00</td>
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<td>52</td>
<td>Online Payments SVC</td>
<td>$1,600.00</td>
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<td>53</td>
<td>ARRA LOAN PRINCIPAL</td>
<td>$8,875.00</td>
</tr>
<tr>
<td>54</td>
<td>PURCHASE WATER BILL</td>
<td>$2,400.00</td>
</tr>
<tr>
<td>55</td>
<td>Banking Fees</td>
<td>$500.00</td>
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<tr>
<td>56</td>
<td>CAPITAL OUTLAY NEW EQUIP</td>
<td>$0.00</td>
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<tr>
<td>57</td>
<td>TRANSFER TO OTHER FUND</td>
<td>$0.00</td>
</tr>
<tr>
<td>58</td>
<td>FINES AND PENALTIES</td>
<td>$1,500.00</td>
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</tbody>
</table>
Find Irvindale’s Financial Statements

On the Statement of Cash Flows, can you see anything here related to capital expenditures?
## Debt and Grants

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Customer Deposits Received</td>
<td>12,513</td>
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<tr>
<td>Customer Deposits Returned</td>
<td>(16,239)</td>
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<tr>
<td><strong>Net Cash Provided (Used) by Operating Activities</strong></td>
<td>$2,785</td>
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<tr>
<td><strong>CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES:</strong></td>
<td></td>
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<tr>
<td>Decrease in Due From Other Funds</td>
<td>$2,417</td>
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<tr>
<td><strong>Total Cash Flows from Noncapital Financing Activities</strong></td>
<td>$2,417</td>
</tr>
<tr>
<td><strong>CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES:</strong></td>
<td></td>
</tr>
<tr>
<td>Acquisition and Construction of Capital Assets</td>
<td>($83,115)</td>
</tr>
<tr>
<td>Principal Paid on Bond Maturities</td>
<td>(8,875)</td>
</tr>
<tr>
<td>Principal Paid to Jones County</td>
<td>(4,800)</td>
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<tr>
<td>Capital Contributions - Grants</td>
<td>82,222</td>
</tr>
<tr>
<td>Other Nonoperating Revenue</td>
<td>2,418</td>
</tr>
<tr>
<td><strong>Net Cash Provided (Used) by Capital and Related Financing Activities</strong></td>
<td>($12,150)</td>
</tr>
<tr>
<td><strong>Net Increase (Decrease) in Cash and Cash Equivalents</strong></td>
<td>($6,948)</td>
</tr>
<tr>
<td>Cash and Cash Equivalents, July 1</td>
<td>42,716</td>
</tr>
<tr>
<td><strong>Cash and Cash Equivalents, June 30</strong></td>
<td>$35,768</td>
</tr>
</tbody>
</table>
Find Irvindale’s Financial Statements

On the Statement of Revenues, Expenses and Changes in Net Position, what is the annual depreciation on the water system assets?
# Annual Depreciation

## Operating Revenues

<table>
<thead>
<tr>
<th></th>
<th>Water and Sewer Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Charges for Services</strong></td>
<td>$324,180</td>
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<tr>
<td><strong>Water and Sewer Taps</strong></td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Other Operating Revenues</strong></td>
<td>13,706</td>
</tr>
<tr>
<td><strong>Total Operating Revenues</strong></td>
<td><strong>$339,386</strong></td>
</tr>
</tbody>
</table>

## Operating Expenses

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personnel</strong></td>
<td>$176,759</td>
</tr>
<tr>
<td><strong>Water and Sewer Operations</strong></td>
<td>148,499</td>
</tr>
<tr>
<td><strong>Depreciation</strong></td>
<td>140,087</td>
</tr>
<tr>
<td><strong>Total Operating Expenses</strong></td>
<td><strong>$465,345</strong></td>
</tr>
</tbody>
</table>

**Operating Income (Loss)**

($125,959)
https://www.youtube.com/watch?v=d8A7MJXFV1U&t=1115s

Webinar: Demystifying Depreciation and How to Make Use of It
What is Depreciation?

- Loss of value of an asset not restored by current maintenance

- An economic fact for any water system

- From both physical factors and functional or non-physical factors
Causes of Depreciation

Physical Factors

• Wear and tear resulting from use

• Decay, rot, rust, and corrosion from the passage of time and the elements

• Related to the extent that there is regular maintenance

Source: AWWA's Financial Management for Water Utilities: Principles of Finance, Accounting, and Management Controls
Causes of Depreciation

Functional or Non-Physical Factors

- Obsolescence due to new designs, innovations, and other improvements
- Inadequacy to meet current demand
- Changes in regulations

Source: AWWA’s Financial Management for Water Utilities: Principles of Finance, Accounting, and Management Controls
Straight Line Depreciation Example

Purchase Price: $10,000

Useful Life: 10 years

Annual Depreciation: ($1,000)
“Fully Funding” Depreciation

• By the time the asset is scheduled to wear out, you will have saved the purchase price of the asset

• This isn’t as good as doing asset management and capital planning, but it is better than nothing
If Irvindale were to fully fund depreciation, what would it do to the rates?

What concerns might there be?
With Depreciation

Revenues Needed from Rates:
$344,445.00

$484,532
The Rates with Depreciation

$89.73  
$63.79 base

$14.74  
$10.49 per 1,000 gallons

$80.02  
$54.08 base  
$1.59 per 1,000 gallons

$25.00 base

$10.63  
$6.37 per 1,000 gallons
“Fully Funding” Depreciation

• At this point for Irvindale, fully funding depreciation is too little, too late since they have not been doing this.

• They would not be able to save enough to pay for existing assets if they start funding depreciation now.
So What Can Irvindale Do?

• Pay as you go
• Save in advance and pay
• Borrow and pay later
• Grants (let someone else pay)
• Defer rehabilitation/replacement

Tip! You can mix and match approaches
Exercise

• Using the assets we discussed earlier, come up with a plan of how to pay for their replacement
Plan to Pay: Scenarios to Fund your C.I.P.

http://efc.sog.unc.edu or http://efcnetwork.org

Find the most up-to-date version in Resources / Tools

Free, simplified Excel tool allowing you to list your capital projects and plans for funding them, and automatically estimates rate increases.