

## **Developing a Portwide Asset Management Program**

American Association of Port Authorities Marine Terminal Management Training Program

September 17, 2015

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## **Asset Management Program**





## **Asset Management Program**



#### **Creating Balance!**



## **Goal of Asset Management**





## **Asset Management Program Objectives**

#### To find out:

#### How?

- Catch Up (\$)  $\rightarrow$  Restoration
- Keep Up (\$)  $\rightarrow$  Preservation
- Moving Forward (\$)

- Document the assets owned and managed
- Understand the current state of assets
- Establish appropriate levels of service
- Prioritize the need by risk
- Understand what budget and resources are required to catch up, keep up, and move forward
- Calculate cost of service
- Communicate the infrastructure problem



## **Portwide Asset Management Program**

## Port is a small city!

- 1. Roadway assets
  - Pavement, sidewalks, curbs and gutter, lights, signage, etc.
- 2. Building assets
  - Warehouses, office buildings, comfort stations
- 3. Underwater assets
  - Wharfs, moorings, sheet piles, floating dock, etc.
- 4. Park assets
  - Playgrounds, benches, picnic tables, gazebos, etc.
- 5. Water and wastewater assets
  - Pipes, pumps, motors, MCCs, gensets, valves, hydrants, manholes, etc.
- 6. Drainage assets
  - Pipes, channels, structures, BMPs
- 7. Fleet
- 8. Urban Forestry
- 9. And more...



## Asset Management Program Methodology

- Inventory and assess condition
- Project preservation and restoration costs and schedules
- Assess criticality and estimated asset replacement costs
- Determine the desired service levels
- Understand the finance and resources required to sustain the delivery of services
- Optimize and prioritize the critical needs based on risk

## Tell the infrastructure story...



## **Asset Management Plan Development Process**





# ASSET INVENTORY & CONDITION ASSESSMENT



## **Asset Inventory / Data Collection Activities**





## **Roadway Condition Assessment**





## **Underwater Condition Assessment**









## **Building Inventory and Condition Assessment**









## **Building Maintenance and Repair Challenges**



## **Maintenance Needs**





### **Condition Assessment**





## **ADA Compliance Assessment**







## Assets are Recorded and Organized

| Hierarchy                             | Search  |                   |          |             |                     |                |             |           |        |        |              |      |      |
|---------------------------------------|---------|-------------------|----------|-------------|---------------------|----------------|-------------|-----------|--------|--------|--------------|------|------|
| ort of Sunshine                       |         |                   |          |             | Drag a columr       | header here to | group by th | at column |        |        |              |      |      |
| Annual Inspection                     | ID      | Name              | System   | Туре        | Material            | Install Year   | Size 1      | Unit 1    | Size 2 | Unit 2 | Value        | PoF  | CoF  |
| Box Culvert                           | Mn4050  | Box Culvert 4050  | Drainage | Box Culvert | CMPA                | 1976           | 2           | 07 LF     | 3      | 1 IN   | \$517,500.00 | 0.39 | 3.8  |
| Box Culvert                           | Mn4052  | Box Culvert 4052  | Drainage | Box Culvert | CMPA                | 1974           |             | 33 LF     | 3      | 1 IN   | \$82,500.00  | 0.41 | 3.8  |
| Channel                               | Mn4053  | Box Culvert 4053  | Drainage | Box Culvert | CMPA                | 1976           | 1           | 50 LF     | 3      | 1 IN   | \$375,000.00 | 0.39 | 3.8  |
| Brow Ditch                            | Mn10717 | Box Culvert 10717 | Drainage | Box Culvert | CMPA                | 1962           |             | 86 LF     | 1      | 6 IN   | \$215,000.00 | 0.53 | 3    |
| Channel                               | Mn18023 | Box Culvert 18023 | Drainage | Box Culvert | CMPA                | 1962           |             | 75 LF     | 1      | 8 IN   | \$187,500.00 | 0.53 | 3.5  |
| River                                 | Mn18063 | Box Culvert 18063 | Drainage | Box Culvert | SBC                 | 2001           | 1           | 42 LF     | 1      | 8 IN   | \$355,000.00 | 0.14 | 4.1  |
| Stream                                | Mn18064 | Box Culvert 18064 | Drainage | Box Culvert | SBC                 | 2001           |             | 61 LF     | 1      | 8 IN   | \$152,500.00 | 0.14 | 4.1  |
| Detention Basin                       | Mn21330 | Box Culvert 21330 | Drainage | Box Culvert | SBC                 | 2001           |             | 20 LF     | 1      | 8 IN   | \$50,000.00  | 0.14 | 4.1  |
| Channel                               | Mn22680 | Box Culvert 22680 | Drainage | Box Culvert | Sidewalk Underdrain | 2005           |             | 19 LF     |        | 3 IN   | \$47,500.00  | 0.1  | 3.8  |
| ▶ Dam                                 | Mn23151 | Box Culvert 23151 | Drainage | Box Culvert | Sidewalk Underdrain | 2005           |             | 11 LF     | 1      | 8 IN   | \$27,500.00  | 0.1  | 3.5  |
| Detention Basin                       | Mn23152 | Box Culvert 23152 | Drainage | Box Culvert | Sidewalk Underdrain | 2005           |             | 8 LF      | 1      | 8 IN   | \$20,000.00  | 0.1  | 3.5  |
| Filtration Pond                       | Mn23657 | Box Culvert 23657 | Drainage | Box Culvert | Sidewalk Underdrain | 1977           |             | 10 LF     |        | 4 IN   | \$25,000.00  | 0.38 | 2.9  |
| Junction                              | Mn23773 | Box Culvert 23773 | Drainage | Box Culvert | Sidewalk Underdrain | 1981           |             | 16 LF     |        | 4 IN   | \$40,000.00  | 0.34 | 3.8  |
| Catch Basin                           | Mn4104  | Box Culvert 4104  | Drainage | Box Culvert | CMPA                | 1977           |             | 55 LF     | 2      | 4 IN   | \$137,500.00 | 0.38 | 3.65 |
| ▶ CDS                                 | Mn10724 | Box Culvert 10724 | Drainage | Box Culvert | CMPA                | 1977           |             | 49 LF     | 2      | 4 IN   | \$122,500.00 | 0.38 | 3.65 |
| CleanoutAccess                        | Mn19551 | Box Culvert 19551 | Drainage | Box Culvert | CMPA                | 1977           |             | 7 LF      | 2      | 4 IN   | \$17,500.00  | 0.38 | 3.35 |
| CMP Riser                             | Mn19552 | Box Culvert 19552 | Drainage | Box Culvert | CMPA                | 1977           |             | 32 LF     | 2      | 4 IN   | \$80,000.00  | 0.38 | 3.65 |
| Concrete Riser                        | Mn4164  | Box Culvert 4164  | Drainage | Box Culvert | DBC                 | 1963           |             | 45 LF     | 4      | 8 IN   | \$112,500.00 | 0.52 | 4.5  |
| Curb Outlet                           | Mn4165  | Box Culvert 4165  | Drainage | Box Culvert | DBC                 | 1965           | 3           | 68 LF     | 9      | 6 IN   | \$920,000.00 | 0.5  | 4.5  |
| Dissipater                            | Mn4207  | Box Culvert 4207  | Drainage | Box Culvert | SBC                 | 1957           | 3           | 15 LF     | 1      | 8 IN   | \$787,500.00 | 0.58 | 3.5  |
| · · · · · · · · · · · · · · · · · · · | (       |                   |          | 1           |                     |                |             |           |        |        |              |      | 3    |



## **Condition Assessment Results**





## **Installation & Consumption Profiles**







## **RISK ASSESSMENT**



# PoF CoF Risk

**Probability of Failure** (Timing to Failure)

- Mortality
- Capacity
- Level of Service
- Financial Efficiency

#### **Consequence of Failure**

(Impact of a failure)

- Economic
- Environment
- Social



## **Risk Profile**

| e                     | 10 | 238                    | 426 | 916 | 481 | 105 | 83 | 281 | 234 | 100 | 217 |  |
|-----------------------|----|------------------------|-----|-----|-----|-----|----|-----|-----|-----|-----|--|
| Probability of Failur | 9  | 8                      | 18  | 70  | 31  | 2   | 5  | 50  | 41  | 5   | 35  |  |
|                       | 8  | 82                     | 174 | 124 | 57  | 139 | 25 | 170 | 133 | 17  | 61  |  |
|                       | 7  | 17                     | 5   | 24  | 3   | 6   | 4  | 54  | 11  | 4   | 14  |  |
|                       | 6  | 45                     | 56  | 134 | 7   | 58  | 15 | 98  | 16  | 26  | 56  |  |
|                       | 5  | 54                     | 58  | 83  | 30  | 8   | 22 | 53  | 14  | 3   | 36  |  |
|                       | 4  | 73                     | 29  | 266 | 39  | 51  | 40 | 34  | 5   | 10  | 20  |  |
|                       | 3  | 1                      | 20  | 177 | 60  | 34  | 32 | 23  | 29  | 22  | 20  |  |
|                       | 2  | 9                      | 6   | 18  | 8   | 7   | 3  | 6   | 2   | 6   | 18  |  |
|                       | 1  | 31                     | 5   | 74  | 0   | 1   | 1  | 0   | 0   | 4   | 0   |  |
| Total number of       |    | 1                      | 2   | 3   | 4   | 5   | 6  | 7   | 8   | 9   | 10  |  |
| asset: 7008           |    | Consequence of Failure |     |     |     |     |    |     |     |     |     |  |



## **State of Facilities**





## **State of Pavement**





## **Risk-Based Strategy**





## LIFE CYCLE COST ASSESSMENT



## **Calculating the Timing to Failure**





## **Asset Life Cycle Investment Logic**



KAYUGA

## **Asset Management Tool**

• IRIS (Infrastructure Reinvestment Intelligence System)





## **Asset Valuation (Parks)**





# Understanding the Need (Year By Year... Asset By Asset...)



Row Count = 75,585

## **Prioritize by Risk**





## **Results are Mapped**





## **Understanding the Impact of Funding**

![](_page_34_Figure_1.jpeg)

#### **10 YEAR PROJECTED RENEWAL NEED**

![](_page_34_Picture_3.jpeg)

#### **10 YEAR PROJECTED RENEWAL NEED**

![](_page_35_Figure_2.jpeg)

![](_page_35_Picture_3.jpeg)

## What If We Don't Do Anything?

![](_page_36_Figure_1.jpeg)

**10 YEAR BACKLOGS AT CURRENT BUDGET** 

![](_page_36_Picture_3.jpeg)

## What If We Increase the Funds by 5%?

![](_page_37_Figure_1.jpeg)

#### **10 YEAR WORK BACKLOGS AT 5% INCREASE**

![](_page_37_Picture_3.jpeg)

## **Scenario Comparison**

![](_page_38_Figure_1.jpeg)

![](_page_38_Picture_2.jpeg)

## **Asset Management Data Flow**

![](_page_39_Figure_1.jpeg)

![](_page_39_Picture_2.jpeg)

# Using Asset Management Results to Understand and Communicate

- Catch Up
- Keep Up
- Moving Forward

## Managing Risk & Planning for the Future

![](_page_40_Picture_5.jpeg)

![](_page_41_Picture_0.jpeg)

## Thank you!

![](_page_41_Picture_2.jpeg)