Implementing a Surface Water Infrastructure Inspection and Asset Management Program

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City of Federal Way

4/25/19
“These older homes are tricky. You never know what kind of pipes you’ll find.”
• Abstract submission and original presentation by:
  Jon Kulju
  Former Asset Management Coordinator
  City of SeaTac
  Public Works Stormwater Division
Why Inspections and Asset Management?

• Underground system
  – mixture of legacy systems and new systems

• Loss of information as workforce changed
  – as built not necessarily how it was built

• Maintain Level of Service
  – Cost effective management

• Regulatory Requirements

• AND…
Risk Management
Show of hands – what’s the status of your program?
Setting up the System

- Purpose/Scope
- Budget
- Equipment
- Software
- Hardware
- Personnel
- Video work process
It’s all connected…

- Field Work
- Information Technology
- Data analysis
- Planning
- Financing
- Fixing
- Maintaining and operating
Purpose/Scope
What are we looking for?

USMH: CM00000499
DSMH: CM00000500

Obstacles

Obstacles Trash
SOCcer BALL
### What’s the Budget?

**SeaTac - 2016**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>$240,209</td>
</tr>
<tr>
<td>Software</td>
<td>$44,370</td>
</tr>
<tr>
<td>Professional Services</td>
<td>$7,650</td>
</tr>
</tbody>
</table>

- The equipment and software was purchased using the Houston-Galveston Area Council (H-GAC) and National Joint Powers Alliance (NJPA) intergovernmental contracts.

**Federal Way - 2011**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>$216,417</td>
</tr>
<tr>
<td>Software</td>
<td>$19,151</td>
</tr>
</tbody>
</table>

- Equipment purchased and installed by City staff
- Software bids received from:
  - Cues (awarded)
  - Cobra
  - Western Systems and Fabrication (POSM)
  - Pipeline Analytics (WinCam)

Lesson Learned: Budget for ongoing license/software maintenance costs and upgrades! $1800/year annual cost plus $2300 for upgrade from XP to NET in 2019.
City of SeaTac acquisition plan
May 2015 - January 2016

Functionality
Reliability
Maintenance
Ease of use
Equipment Purchases

Lesson Learned: Talk to IT about storage needs – Be realistic
Start at 4 TB and expect to NEED MORE!

4 Terabytes Storage
Lesson Learned:
Wireless technology for pole cams – the wires continually needed repair!
$4,000 in 2017 to retrofit one camera
Lesson Learned: Consider where you need to park for your Video needs! $24,000 in 2021 to change to a Box Truck
Personnel and Work Flow

Asset Management Inspection Workflow

Begin Day

Engineering requests inspection

AMC reviews inspection requests

Schedule Inspection

Determine Safety Requirements

Obstruction to Video Inspection

Y

Notify Maintenance

N

Conduct Initial Inspection with Pole Camera

Condition Red

Condition Yellow

Condition Green

Detailed Inspection with Tractor Camera

CIP Project Completed

CIP list, Maint. RWO or Emergency

Condition Red

Condition Yellow

Condition Green

Record Data in Database/GIS

Update CW

Complete Inspection

Maintenance notifies AMC when obstruction removed

Asset Mgmt Coordinator

Maintenance Division

Engineering

Emergency

-----> Interim Capture of Condition

1. Emergency Inspections – AMC will receive notification that an inspection needs to take place immediately. This may occur at a moment’s notice and will take priority over all other inspections schedules.

2. Transportation Project Support – Engineering may have a planned project that requires stormwater asset inspection. A message from the City Engineer or subordinates requesting inspection with details on stormwater asset and date needed.

3. Known Problem Areas – A message may come from Engineering or Maintenance to inspect an asset that has historically had reports of problems. AMC will coordinate with the requestor for further information.

4. High Consequence of Failure or High Probability of Failure Inspections. AMC will coordinate with Stormwater Staff to identify priority areas for inspection.

5. Routine Inspections – When other priorities above have been met, routine inspection of stormwater assets will be conducted on a regular inspection cycle.

Date: January 25, 2017, JMK

City of SeaTac Workflow Chart – hand out available
City of Federal Way setup  
Personnel and Data management

• In house video services
  – Maintenance and Emergency support
    • 0.5 FTE
    • 2 inspection personnel (with minimal traffic control)
  – Data management
    • .25 FTE – combination GIS and inspection personnel
  – Condition assessment and prioritization
    • .25 FTE SWM Engineer Tech with PACP certification
      – Certification - $700/person
      – One class/year
  – In house and contracted repair
    • .25 FTE SWM Project Engineer

• Contracted video services
  – Citywide pipe assessment - $1.00/lf
  – Three years
  – Red, yellow, green assessment
Personnel and Workflow

**SeaTac**
2016 - 2018

- In house: 339,652 lf
- System total: 424,566 lf

**Federal Way**
2011 - 2018

- In house: 181,850 lf
- Contracted: 226,828 lf
- System total: 792,431 lf

~51%
Lesson Learned:
Work with IT and Software rep to ensure data from contracted inspections can be imported
**ITpipes Analysis Modules**

Data integration into GIS and your Maintenance Management Software.
Inspections and Video

Handout of video inspection field report available

Inspected on 6/29/2018 and 7/3/2018

Pipe object ID 76670 12" ADS SC7542 Condition: No obvious defects. Used push camera to video inspect. Was able to inspect approx. 2,050 downstream. Approx. 70 feet downstream pipe #76671 is tapped into this pipe.

Pipe object ID 76671 8" HDPE Drisco Score: 0-0 No obvious defects. Used push camera to video inspect. Was able to inspect approx. 20 feet downstream. Approx. 70 feet downstream pipe #76672 is tapped into this pipe.

VIDEO INSPECTION FIELD REPORT - 2018

City of Federal Way, Surface Water Management

Asset ID: *object ID 76670 Work Order #: 

LF Inspected: 75LF Inspection Team: A.B. & J.L

Asset Type: CC Material: CMP Size: 12 Conditional Score: 70

Location: 10th Ave SW just north of SW 295th St

Reason for Inspection: Requested per Management

Video Recorded? Yes No Equipment Used: Ultra Shorty w/ OZ11 pan & tilt

Confined Space Entry? Yes No Entry No.

GIS Updates Required? Yes No If Yes, attach updated map and send to Paul for updates.

Damages to Report? Yes No 

Description: Various small holes throughout pipe run on bottom of pipe. Likely caused by corrosion and rust.

Maintenance Required? Yes No 

Vector Services Required? Yes No 

Inspection Observations:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>approx. 2050 downstream</td>
<td>Various small holes throughout pipe run on bottom of pipe. Likely caused by corrosion and rust.</td>
</tr>
<tr>
<td>Continuous</td>
<td>Various small holes throughout pipe run on bottom of pipe. Likely caused by corrosion and rust.</td>
</tr>
</tbody>
</table>
Considerations

• Plan long term
  – Budget
    • Risk Management – stick with the plan
    • Asset condition – required to fix what you find
    • Actionable results
    • Hardware and Software maintenance
    • New equipment
    • Resources
  – Changes in regulatory requirements
Considerations cont…

• Plan long term
  – Adaptability
    • Bi-directional interface
    • Data storage needs
    • Program integration with existing systems
    • Changes in technology
      – Remote collection
      – Drone use
    • Analytic tools
Considerations cont...

• Plan long term
  – Personnel
    • Staffing - inspections
      – Part time program?
      – Full time program?
    • Staffing – asset assessment and prioritization
  • Training
  • Succession planning
    – SOPs and Guidelines
Considerations cont…

• Plan long term
  – Safety
    • Confined space entry
    • Fall arrest
    • Traffic control
  – Also a resource issue
Questions?

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