PRESENTATION TEAM

CHRISTOPHER HARKER, PE
• Senior Project Manager
• Transportation Group Mgr.
• 18+ Years Experience
• Envision Sustainability Prof.
• Certified Asset Mgmt Prof.

Competent with Deter. Modeling, CIP Planning, Risk Management, BRM Financial Forecasting

JARROD RUSSELL, PE
• Design Engineer
• Structural/Asset Management Team
• 7+ Years Experience
• Envision Sustainability Prof.

Competent with AASHTOWare, Survey123, CityWorks, VBA and Electronic Data Collection
DEFINING ASSET MANAGEMENT

• Sustainability of Services Should be Fundamental
• “AMP is a Comprehensive Process to Ensure Delivery of Services From Infrastructure is Provided in a Financially Sustainable Manner”
• APWA Endorsed New Asset Management Planning Strategy in 2017
• Builds Upon FHWA MAP 21 Requirements
• Includes Future Demand, Lifecycle Management, Long-Range Financial Plans
• Describes What Needs to be Done and What Can’t be Done
IDENTIFYING OWNER ASSETS

- Roadways/Streets
- Legal Bridges
- Culverts/Pipes
- Pedestrian Bridges
- Dams/Levees
- Traffic Signals
- Street Signs
- Safety Equipment
- City Parks
- Lakes/Marinas
- Stormwater Assets
- Sewer Lines
- Office Bldgs
- Commercial Bldgs
- Municipal Bldgs
- Bus Terminals
- Emergency Vehicles
- Municipal Vehicles
- Maint. Equipment
- MEP Equipment
CURRENT STATE OF KANSAS ASSETS

- Maintenance Backlog Continues to be an Issue
- Increased Federal Investment or Reform has Positively Impacted Certain Categories
- There are Still Infrastructure Sectors Where Data is Scarce or Unreliable

INVESTMENT GAP CONTINUES TO GROW

Gap has Increased from $2.1 Trillion over 10 Years to Nearly $2.59 Trillion over 10 Years

<table>
<thead>
<tr>
<th>ASSET</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIATION</td>
<td>D+</td>
</tr>
<tr>
<td>BRIDGES</td>
<td>C</td>
</tr>
<tr>
<td>DAMS</td>
<td>D</td>
</tr>
<tr>
<td>DRINKING WATER</td>
<td>C-</td>
</tr>
<tr>
<td>ENERGY</td>
<td>C-</td>
</tr>
<tr>
<td>HAZARDOUS WASTE</td>
<td>D+</td>
</tr>
<tr>
<td>INLAND WATERWAYS</td>
<td>D+</td>
</tr>
<tr>
<td>LEVEES</td>
<td>D</td>
</tr>
<tr>
<td>PORTS</td>
<td>B-</td>
</tr>
<tr>
<td>PUBLIC AREAS</td>
<td>D+</td>
</tr>
<tr>
<td>RAIL</td>
<td>B</td>
</tr>
<tr>
<td>ROADS</td>
<td>D</td>
</tr>
<tr>
<td>SCHOOLS</td>
<td>D+</td>
</tr>
<tr>
<td>SOLID WASTE</td>
<td>C+</td>
</tr>
<tr>
<td>STORMWATER</td>
<td>D</td>
</tr>
<tr>
<td>TRANSIT</td>
<td>D-</td>
</tr>
<tr>
<td>WASTEWATER</td>
<td>D+</td>
</tr>
</tbody>
</table>

G.P.A: C-
SHORTFALLS IN STRATEGY REALIZATION

• For 75 Years Engineers have Produced Great Projects
• Inherited Extensive Infrastructure Systems
• Challenge of Our Generation is Not Expansion but Maintenance

NEW CHALLENGE REQUIRES NEW STRATEGIES:

40 YEARS AGO
Focus on Project Management: Doing the Project Right.

20 YEARS AGO
Focus on Feasibility Analysis: Doing the Right Project.

NOW
We do projects as part of a life-cycle process that requires engineering engagement throughout.
FUNDAMENTAL OBJECTIVE & PUBLIC PERCEPTION

• Extend Service Lives of Existing Assets with Cost Efficient Strategies
• Reallocate Resources to Preventative, Repair and Rehab Activities
• Enhance Public Perception of Maintenance Projects
• Address Public Support Difference Now to 50 Years Ago
• **Key to Funding:** Transparency, Consistency, Relatable
• **Messaging is Key:** How Do We Affect People’s Lives

*Telling the Story...it Begins with:*

We Don’t Manage Assets...We Manage the Services Those Assets Provide to the Public
DEFINING SERVICE LEVELS

• Based Upon APWA and FHWA Strategy

• **Mindset Shift:**
  We Don’t Manage Assets...We Manage the Services They Provide
  
  • What is the Function of the Asset?
  • What Does it Provide End User?

• **Service Driven Approach:**
  Balancing Community and Technical Service Levels

• **Community Service Levels:**
  Measures How the Public Receives the Service and Whether Value is Provided

• **Technical Service Level:**
  Defined By Operational/Condition Data and Performance vs. Desired Outcomes
BASIC LEVEL VERSUS PREFERRED LEVEL

ASSET MGMT PLAN DEFINES
- What Services are Provided
- How Services are Provided
- What the Service Levels are
- How Service Performance is Measured
- What Funds are Required

Clearly Define What is the Basic Service and What is Preferred

REQUIRES COMMUNITY ENGAGEMENT
- Buy-In and Input (Surveying)
- Messaging
- Branding
- PIAC District Champions

Different Service Levels Have Different Prices Associated – What is Really Needed
**ASSET LIFE CYCLE**

**TYPICAL SERVICE LIFE**

- **Years 1-2 Design Phase**
- **Years 3-4 Construction Phase**
- **Years 5-55 Operations and Maintenance Phase**
  - 80-85% of an Assets Life is the Operation Maintenance Phase
  - Difficult to be Proactive if Not Engaged Until Problems Arise
  - Asset Management is Mechanism for Engagement
- **Years 56-60 Planning and Replacement Phase**

Indicates phase where engineers are currently engaged.
RISK MANAGEMENT

• APWA and FHWA Risk-Based Decision Making
• Risk is Inherent with Every Asset and Action
• Owner Assumes Risk with Every Management Decision
• No Decision, or a Deferred Decision, is a Decision

APWA DEFINES FIVE RISK CATEGORIES:
• Triple Bottom Line – Financial, Social, Environmental
• New Categories = Safety and Functional

APWA Provides Guidelines for Defining and Quantifying Risk Categories
RISK INTEGRATION

RISK ASSESSMENT

• Includes All Entries From Risk Registry
• Assigns “Likelihood” of Occurrence
• Frequency of Happening
• Assigns “Severity” of Consequence
• How Bad Once Occurred
• Process Requires Agency Input

RISK MATRIX

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insignificant</td>
<td>Minor</td>
</tr>
<tr>
<td>(Risk easily mitigated by normal day to day process)</td>
<td>(Additional cost up to 10% of Schedule Additional cost up to 10% of Budget)</td>
</tr>
<tr>
<td>Minor</td>
<td>Moderate</td>
</tr>
<tr>
<td>(Additional cost up to 30% of Schedule Additional cost up to 30% of Budget)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>Major</td>
</tr>
<tr>
<td>(Additional cost up to 50% of Schedule Additional cost up to 50% of Budget)</td>
<td></td>
</tr>
<tr>
<td>Catastrophic</td>
<td>Project abandoned</td>
</tr>
</tbody>
</table>

IDENTIFYING & QUANTIFYING RISK

• Known – Known: You Know What the Risk Is – Ex. Unknown Utilities
• Known – Unknown: You Know/You Don’t Know What the Risk Might Be. Ex. Public Acceptance
• Unknown – Unknown: Ex. Sudden Departure of the PM
PROACTIVE VS. REACTIVE
• Looking Beyond the “Current Snapshot”
• Incorporate Work Action Benefits
• Capital Finance Management

IMPROVING RETURN-ON-INVESTMENT
• Tracking Performance of Work Actions
• Quantifying Additional Asset “Functional Life”
• Knowing What and When to Take Action
• Maximize Efficiency of Resources

MINIMIZING/CONTROLLING RISK
• Tracking Performance of Work Actions

AVOIDING EMERGENCIES
• Life-Cycle and Deterioration Based Planning
DATA-DRIVEN DECISION MAKING

AM PLAN
Reliable, credible and functional AM Plan

AM PLAN ELEMENTS
- CIP/STIP
- Budget
- Forecasting
- O&M Methodology
- Repair Options
- Deterioration Modeling
- Life-Cycle Planning

DATA COLLECTION
Data gathering is the foundation for asset management
DATA COLLECTION & STORAGE

**RED CORNER**

**NAME**
Electronic Data Collection & Storage

**HOMETOWN**
The Cloud

**TRAITS**
- Streamlines data flow between processes
- Nearly infinite storage
- Easy access to all data
- Simple to update and maintain
- Can be an effort to establish upfront

**BLUE CORNER**

**NAME**
Paper Data Collection & Storage

**HOMETOWN**
“We’ve Always Done It This Way”

**TRAITS**
- Transfer to computer after collection
- No automatic data updates
- Takes up space over time
- Cumbersome to maintain
- Many processes already in place
DATA FORECASTING

Engineering Judgment

Historical Trends

Statistical and Probabilistic Modeling
All else equal, which asset to work on first?
PUBLIC INVOLVEMENT IN THE ASSET MANAGEMENT PROCESS
AM PLANNING & CROSS-DEPARTMENT COORDINATION
QUESTIONS?

Christopher Harker, PE
charker@benesch.com

Jarrod Russell, PE
jrussell@benesch.com