GIS SHOWCASE:
FPA TOOLS FOR STORMWATER MANAGEMENT

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Presentation

- General Introduction
- GIS as a Resource for Communities
- Developing Online GIS Data Viewers
- Integrating GIS with Stormwater
- GIS WebViewer Examples/Demonstrations
ABOUT MESHEK & ASSOCIATES, LLC

- Engineering consulting firm based in Tulsa, Oklahoma
- Established in 1988
- Specializing in Water Resource and Stormwater Engineering, Geographic Information Systems, Civil Design, Right-of-Way Services, and Surveying

Our company was founded in 1988 by Janet Meshek, PE, CFM, SR/WA, to provide superior consulting engineering services and GIS solutions to public and private clients.

Our headquarters is located in Tulsa, OK with a satellite office for GIS Services in Sumner, WA.
- Container of maps
- Computerized tools for solving geographic problems
- Spatial decision support system
- Mechanized inventory of geographically distributed features and facilities
- Method for revealing patterns and processes in geographic information
- Automation of time-consuming tasks
GIS AS A RESOURCE

- Bring available data to Decision Makers
  - Share GIS data in a format that others can interpret
  - Create customized maps for your audience

- Share the GIS investment with the Community
  - Community invests $ in new Aerials, LiDAR, and other GIS resources
  - Provide data quickly to users for repetitive requests

- Facilitate Communication
  - Utilize current mapping technologies (mobile mapping, big data, etc.)
  - Effective Data distribution

- Creative and innovative approaches in data management
  - Cutting edge of technology
  - Pioneering analysis
Implementing GIS

- **Basic** – Using GIS to share data among employees
  - Hardcopy maps
  - Desktop Software
  - Internet Based GIS Data Viewer

- **Intermediate** – Manage Inventory
  - Maintenance Records
  - Advanced Cartography
  - Document Research (Easements, etc.)

- **Advanced** – Strategic Data and Planning
  - Anticipate future infrastructure costs
  - Plan for future development
  - Prioritize areas for improvement
Investment
- Leverage available GIS information – DFIRMS, Aerials, building footprints
- LiDAR is available for large portions of the USA – USGS and other sources
- Desktop software – Server Hardware – Cloud Storage – ArcGIS Online

Training
- Online resources from ESRI – Local GIS Groups – NWGIS, SCAUG, etc.
- Community/Local College Resources; Consultants
DEVELOPING ONLINE GIS DATA VIEWERS

Online GIS Types – What should the Viewer do? Audience?

- **Informative** – Pleasing visuals to share general and/or essential information
- **Interactive/Dashboard** – Viewer with layers for data reporting and summarization
- **Technical** – Specific tools/operations to query and distribute/download data
- **Story Based** – Map with corresponding narrative and media (pictures/videos)
- **Hybrid** – Combination of any of the above elements

**ESRI Web App Builder**

**ESRI Operations Dashboard**
Story Maps Can Help Share Your Message About Risk

Flood Hazard Profile
A flood is the partial or complete inundation of water over normally dry land. Common impacts of flooding include damage to personal property, buildings, infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities. There are three common types of flooding: riverine flooding, flash flooding, and urban flooding.

The historic floods of 1984 and 1986 have led to extensive mitigation actions within the City. However, vulnerability to flood hazard remains.
DEVELOPING ONLINE GIS DATA VIEWERS

**VIEWER USERS**
- City Staff
- City Management
- City Engineers
- City Consultants
- Citizens

**GIS STORMWATER DATASETS**
- Summarize engineering data effectively
- Floodplain - DFIRMS and/or City Reg
- Preliminary & Historical Floodplain Data
- Drainage Basins
- Zoning and ROW
- MDP & CIP Projects
- Stormwater Atlas – Other Utilities
- Stormwater PDF Plans
- Elevations Certificates
- Citizen Comment Data
- Current Detailed Topo/LiDAR
- Other Stormwater Dataset
GIS VIEWER EXAMPLES/DEMONSTRATIONS

GIS Viewer Examples

- City of Tulsa Master Drainage Plan (MDP) Viewer – Informative
- City of Tulsa Hazard Mitigation Plan (HMP) – Story Map
- City of Tulsa Inventory Collection (CMS and Stormwater) – Dashboard
- Broken Arrow Capital Improvement Projects Viewer – Story Map
- Keystone Dam Release and Rainfall Scenarios – Informative
- Washington State DFIRM Map – Informative
- Smaller Viewers – Midwest City; Moore; Stillwater - Informative
Citywide MDP Viewer – Originally developed to display MDP/CIP recommended projects for City staff review. FEMA Floodplains and Regulatory Floodplains were added to complement the project data. Other datasets were added as requested by City staff to accommodate project planning and infrastructure management. Viewer serves as the go-to data resource for several Tulsa departments specifically including Planning and Engineering Services.
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WEBVIEWER IMPLEMENTATION EXAMPLES

- MDP + CIP Projects
- Drainage Basins
- FEMA & Tulsa Reg Floodplains
- Prelim & Hist. Floodplain
- Stormwater Atlas
- Stormwater PDF Plans
- Elevations Certificates
- Citizen Comment Data
- Current 2ft Topo
- Other Stormwater Datasets

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SW Data brought over from the City’s GIS and re-displayed with updated symbology and labeling
Tulsa CRS Viewer – Created to allow review of multiple disparate datasets to qualify for additional CRS renewal/accreditation.
The Public Tulsa Hazards Viewer – Site designed to inform users of hazards in their community. Users can search by address to learn about disasters and where they can occur. A separate stakeholder viewer contains more detailed data and allows tracking of project implementation.
Viewer created over the course of a couple of days to communicate increasing flood risk. Risk was due to increase dam releases and the potential extents if the levees/flap gates were to fail. A rainfall analysis was also developed to show potential flooding if the water behind levee couldn't escape to the river.
The Broken Arrow GO Bond and CIP Projects tracking viewer - Developed to augment limited staff capacity, intent is to migrate to City’s organization for maintenance after build. This was deployed using ESRI Story Maps.
Viewer created to provide a quick look at floodplain change and development. Slider provides access to older aerials to compare development with areas that have increases in floodplain.
Viewer created to highlight community problem drainage areas and discuss potential floodplain studies.
Washington State Floodplain Map – Created to publish current effective DFIRM Data for Washington State. Background is 30m DEM and hillshade for cartographic enhancement.
Effective tools to share stormwater program goals and objectives

Increase internal efficiencies in your stormwater operation

Help your community meet HMP and CRS requirements

Many Viewer options that can grow with your community’s expectations
QUESTIONS?

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