Using GIS technologies to improve data communication in local government

Improving access to authoritative data for emergency response.

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Pennsylvania State University

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Agenda

- ■ Introduction
  - – *Local Government & Emergency Management*
  - – *Issues: Why is it important?*
  - – *Proposed Solution*
- ■ Methodology
  - – *Workflows*
  - – *Data Sources*
  - – *Prototype Development*
- ■ Potential Limitations
- ■ Expected Outcomes and Benefits
- ■ Projected Timeline
- ■ References

Background

"GIS is an 'intelligence nervous system' where information bridges across multiple organizations, bridging people and technology to transform how to see, think and act" ESRI, (2019)
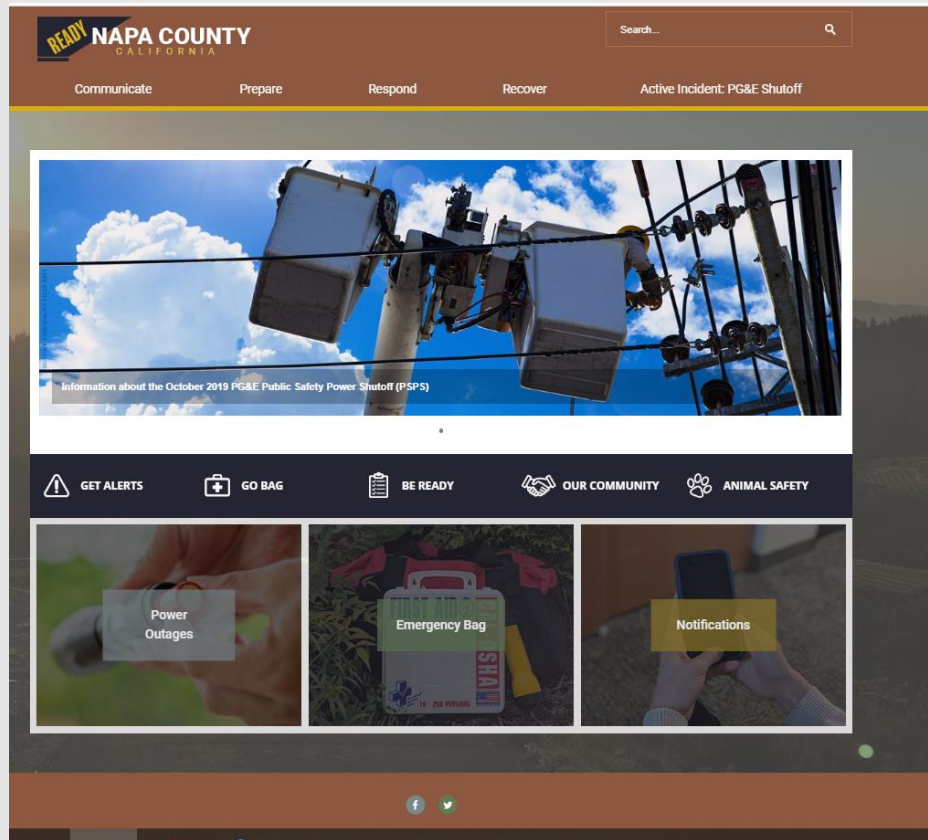
■ IT Analyst (GIS) for local government

   – *Understanding GIS and using GIS*

Local governments provide services to the community

■ Roads, streets lights are on, clean water

   – *Use of GIS in local government improves processes*

■ Tasked to reduce community risks through emergency management processes

California's PG&E PSPS Shutoff: October 2019

Napa County. (2019). Screenshot of the Ready Napa County site for Emergency Response. Retrieved from: https://www.readynapacounty.org/
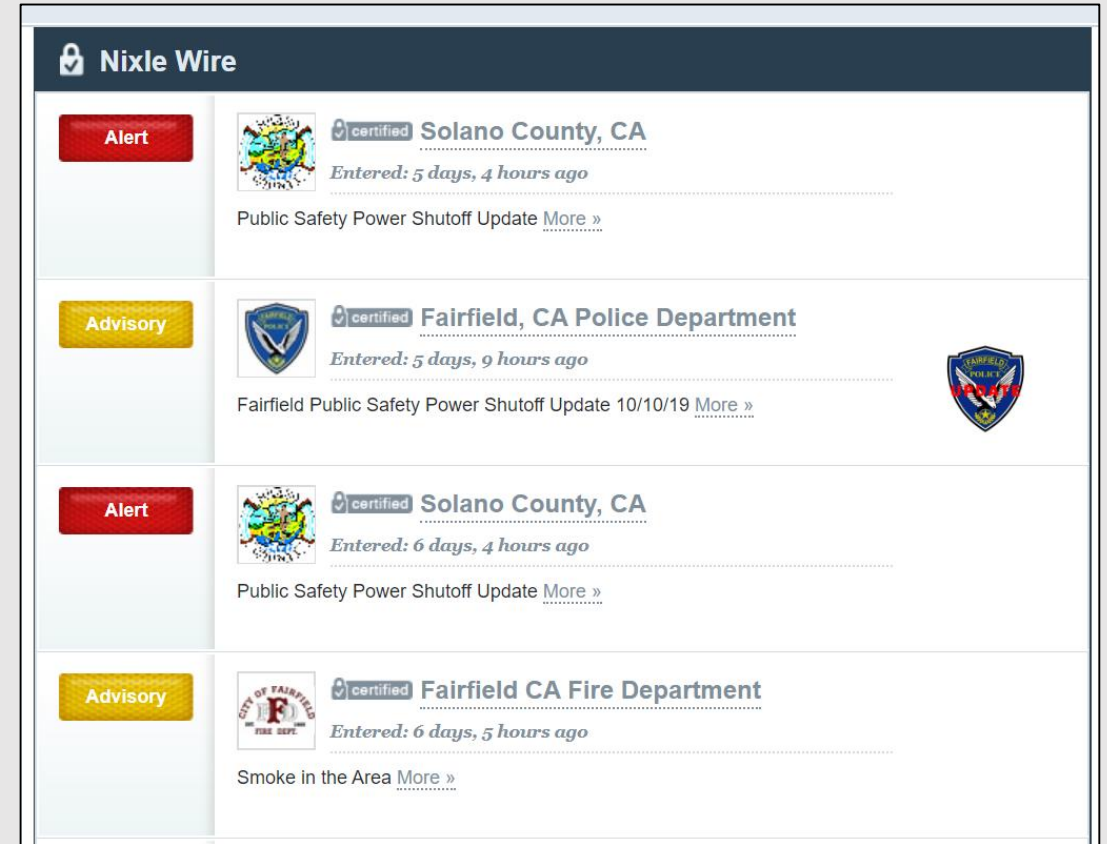
Solano County NIXLE Wire. (2019). Screenshot of the NIXLE alert system for Solano County and associated cities. Retrieved October 14, 2019 from: https://local.nixle.com/city/ca/fairfield/

Emergency Management
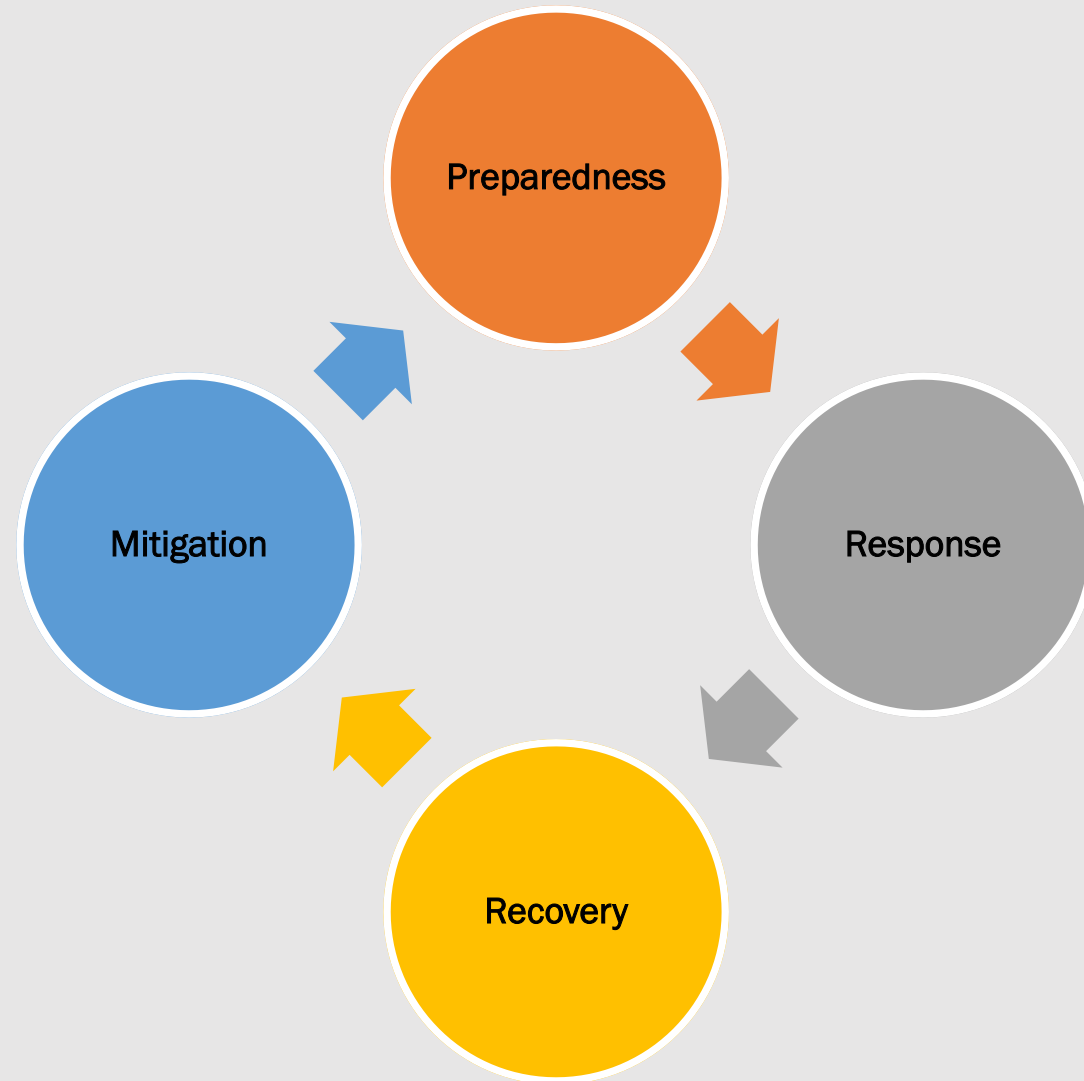
Why is this important?

- ■ Gaps in communicating data between various stakeholders in local government

- ■ Those in emergency management need access to local government specific data

- ■ Recent local emergency events have proven that there is a need for up to date information
  - – *Wildfires*
  - – *California's PG&E Power Safety Power Shutdown*
    - ■ PG&E Websites Crashed
    - ■ Community turned to Local Govt. maps

PG&E map down? Check the interactive power shut-off map here
However, since the announcement of shut-offs on Tuesday afternoon, PG&E's official site has been overwhelmed by traffic, ...
SFGate | 14d

PG&E shut down power. Too many Internet users shut down its website.
PG&E's website was down, slow or inaccessible for the past two days as the utility began warning ... The company says it has ...
Washington Post | 13d

Here we go again: PG&E customers are bracing for the worst
On Tuesday, PG&E's meteorological team members were keeping a close eye on any high winds that might materialize this week, a ...
Mercury News | 1d

PG&E cutting power to 179,000 amid windy conditions
The company has vowed to correct those issues."While we stand by our decision ... San Mateo counties on the western side.
KCRA | 6h

Challenges

- Data sharing practices need to be improved
  - *Organizational constraints*
    - Social
    - Monetary
    - Policy
    - Personnel

- Data needs to be applicable at the local level

- Lack of authoritative and quality geospatial data
  - *No electronic data standards*
  - *QA/QC of geospatial data need improvement*
  - *Future coordinate system changes*

" In a case study of regional GIS sharing practices in New Jersey, the authors noted that the highest requestor of utility data came from emergency managers."

Artigas, F., Elefante,D., & Marti, A. (2009)

NPMS. (2019). Screenshot of the Public National Pipeline Mapping System showing gas transmission pipelines. Retrieved from: https://pvnpms.phmsa.dot.gov/PublicViewer/

Proposal

To address issues of improving access to authoritative data for the City of Fairfield, California.

Development of a prototype to link geospatial information to previously inaccessible authoritative data.

Authoritative Data

Emergency Management

Current Status: Utility Data

Need to know where utilities are located during emergencies

Water, Sewer, Storm, Transportation Utility data

Enterprise geodatabase

No data standards

Is GIS data = survey level data?

Scanned copies of survey level project plans housed in file folders

Not easily accessible

Not always georeferenced

AUTHORITATIVE!

Current Status: Processes

- Previous GIS assessments

- No written standard operating procedures.

- GIS Data currently available through existing intranet GIS web applications
  - *Eliminated widespread use of printed map books of utilities*

- Data creation priorities
  - *Still use paper / pdf files*
  - *Constraints in creating geospatial data*
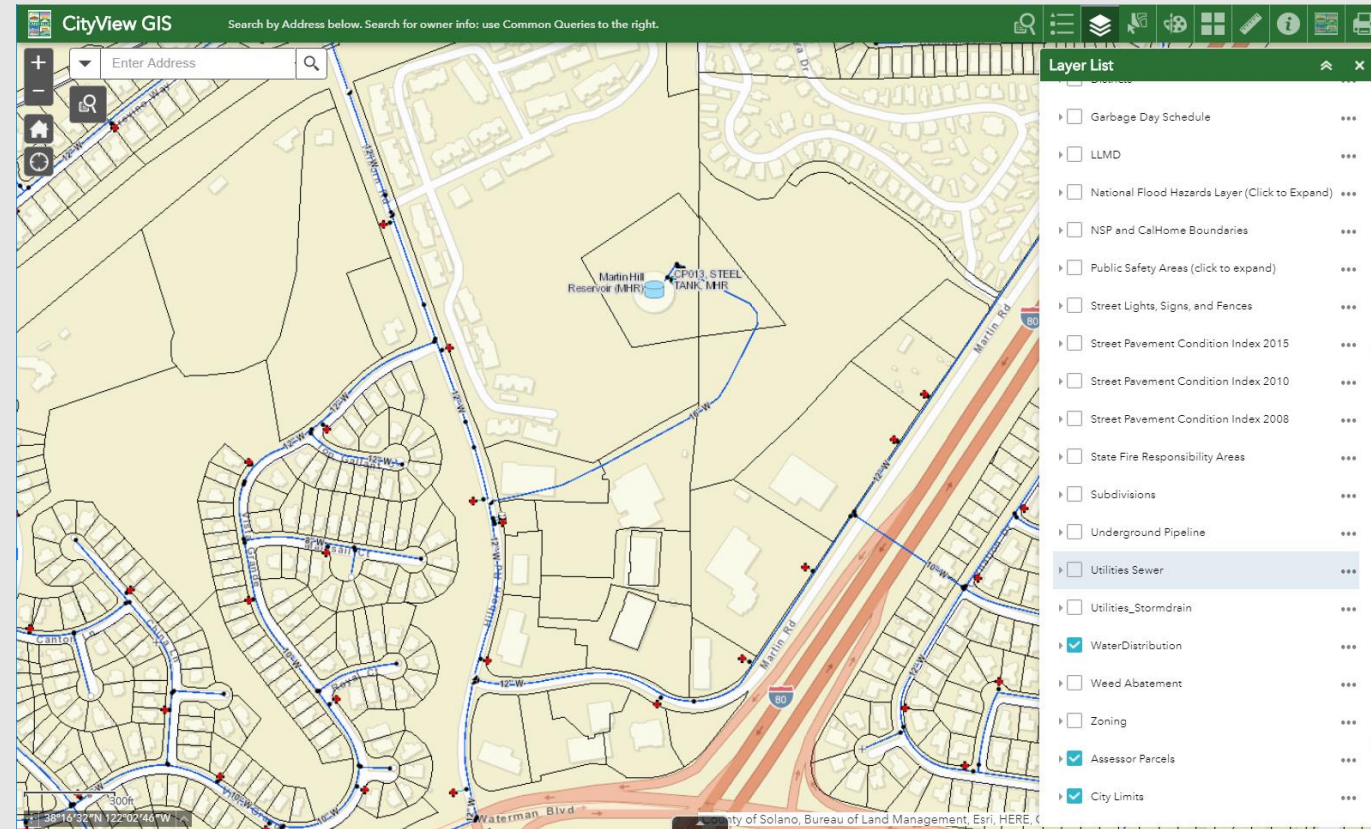
Current Status: Other applications

Similar studies have been made on developing geospatial products that link files and maps in historical/architectural fields

There are existing applications that have linked files

Los Angeles City Airport

San Mateo County

ESRI web template
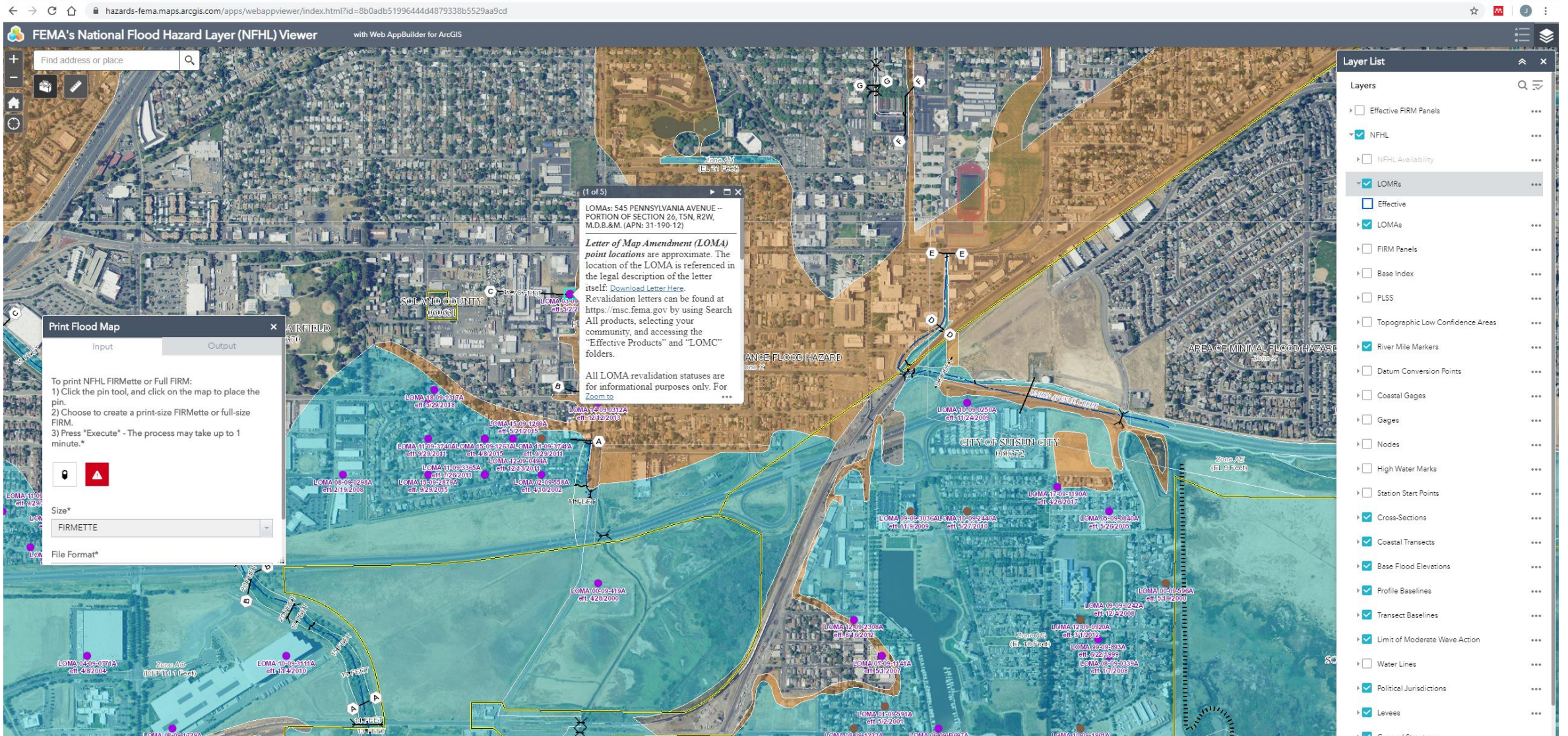
FEMA. 2019. Screenshot of National Flood Hazard Layer (NFHL) Viewer. Retrieved from:
https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd

Methodology

How do I get there?

Literature Review

■ Further literature review on organization issues affecting local government

    – *Effective data sharing practices*

    – *Emergency Management*

Public Works & Emergency Management Workflows

- Current Capabilities & Constraints
  - *Authoritative Data*
  - *Personnel*
  - *Systems: SQL, ESRI*
- Data Needs Requirements
  - *Emergency Management links*
- Promote the importance of authoritative data sharing between stakeholders
  - *Meetings*
  - *Surveys*

Data Sources

City Municipal Files of City Projects, Subdivisions

Pdf scan files

Set naming convention exists

**Existing Enterprise Utility GIS data**

Prototype Development

- Develop & run Python script to read current folders into a table

- Follow up with stakeholders to identify additional data needs

- Develop prototype for linking data to geospatial layer

- Work on editor prototype and data viewer prototype
  - *Web App Builder → Portal/ArcGIS Online*
  - *Open Source*

- Provide to users for testing
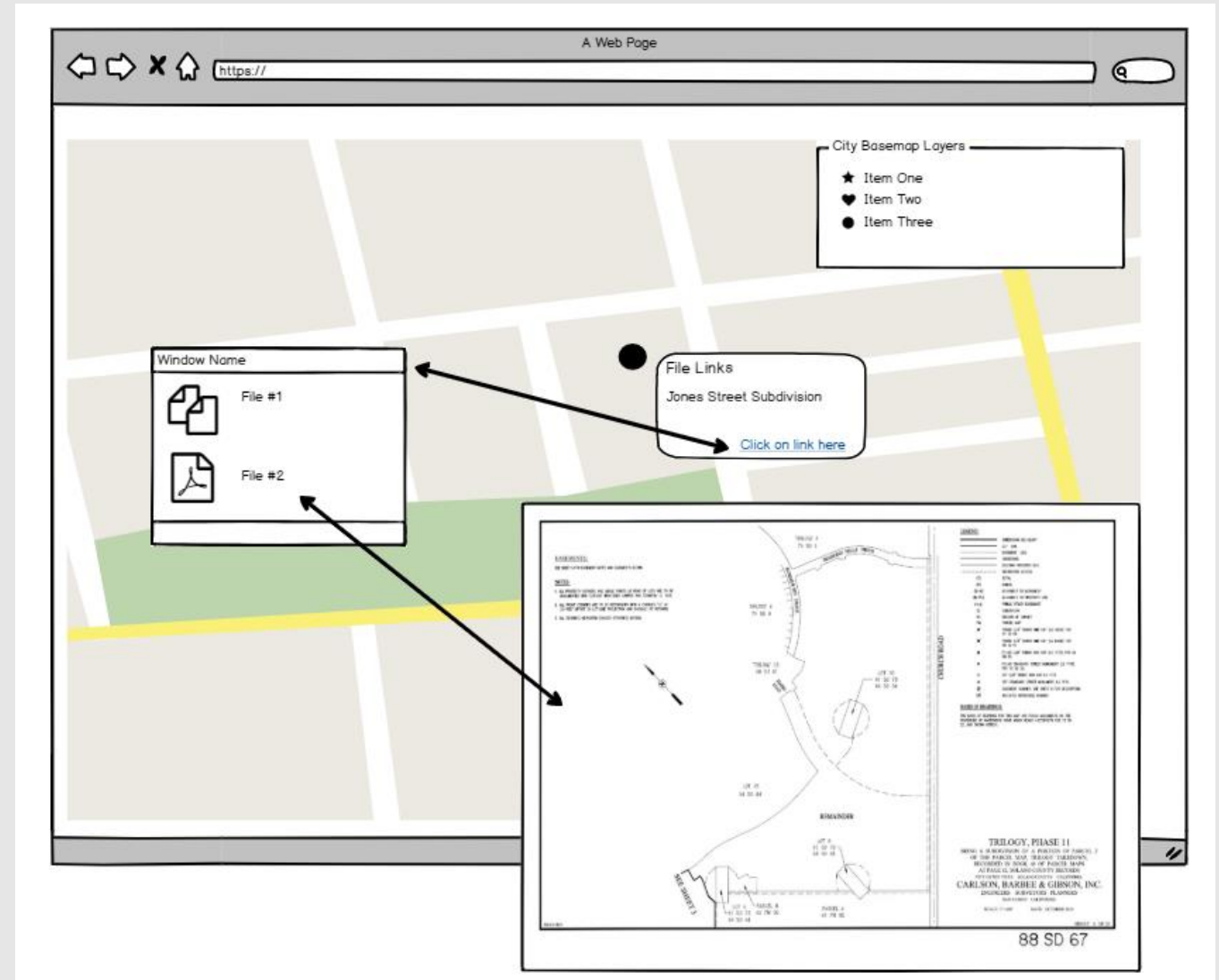
Potential Limitations

- Network connection issues
  - *Mitigation: Consult with City IT staff.*

- Data access not allowed across departments
  - *Policy and/or technical constraints*
  - *Mitigation: Present a proof of concept to management, city attorney review and approval.*

- Organizational reluctance to change
  - *Mitigation: Departmental permission to conduct research, management level support.*

- Personnel Issues:
  - *Retirements, Leave organization*
  - *Mitigation: Ensure organization continuity, build redundancy*

Expected outcomes and benefits

- Increased interdepartmental awareness of data/responsibilities
  - *Increased access to authoritative data*

- Efficient workflows to access data

- Improved response in emergencies

- Data governance improvements
  - *Incentivize data management practices → quality data*

- Future: implement electronic data standards and workflows

Timeline

August – October 2019

Phase 1
- Literature Review
- Initial Data Source Identification

November – December 2019

Phase 2
- Workflow Identification
- Needs Assessment Development

January – February 2020

Phase 3
- Gather Data
- Technology Review

February – June/July 2020

Phase 4
- Prototype Development
- Testing
- Obtain application approval

Late Summer / Early Fall 2020

Phase 5
- Present results

Questions & Feedback

Thank You.

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