



The Michigan ENHANCE 911 Grant Project

GIS Technical Advisory Committee
Conference of Western Wayne
July 22, 2011

Today's Agenda

- Overview of NG9-1-1
- Perspectives about GIS and 9-1-1
- ENHANCE 9-1-1 Grant Background
- GIS Project Overview and Update
- Open Discussion

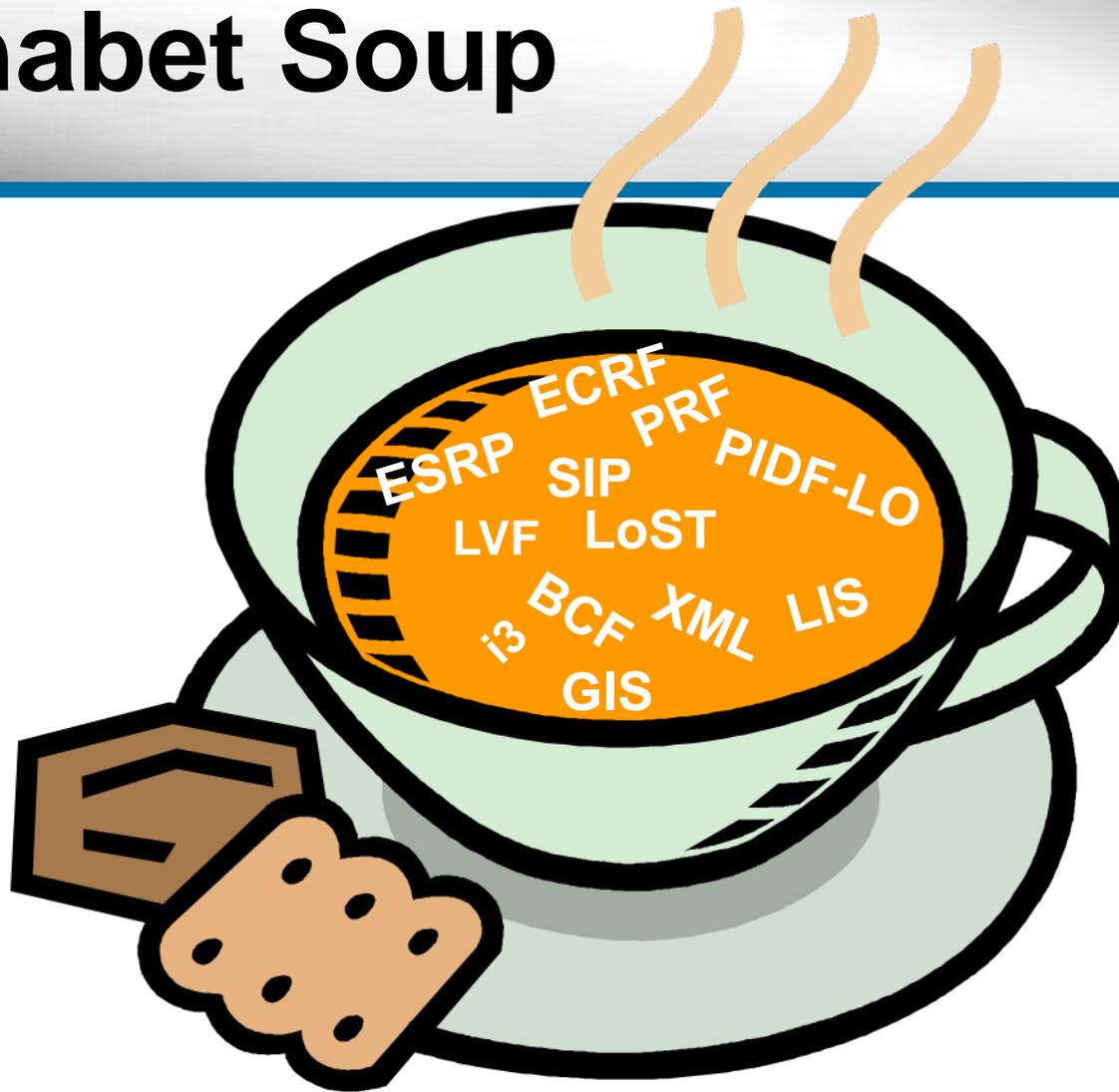
What is NG9-1-1?

- ◆ NG9-1-1 is best described as an open-standard-based, robust system of systems, that allows the public to use **any device** to request help or send information to the appropriate public safety agency
- ◆ NG9-1-1 is often considered a network, but it doesn't stop there – it is the culmination of converging many applications into a common platform.

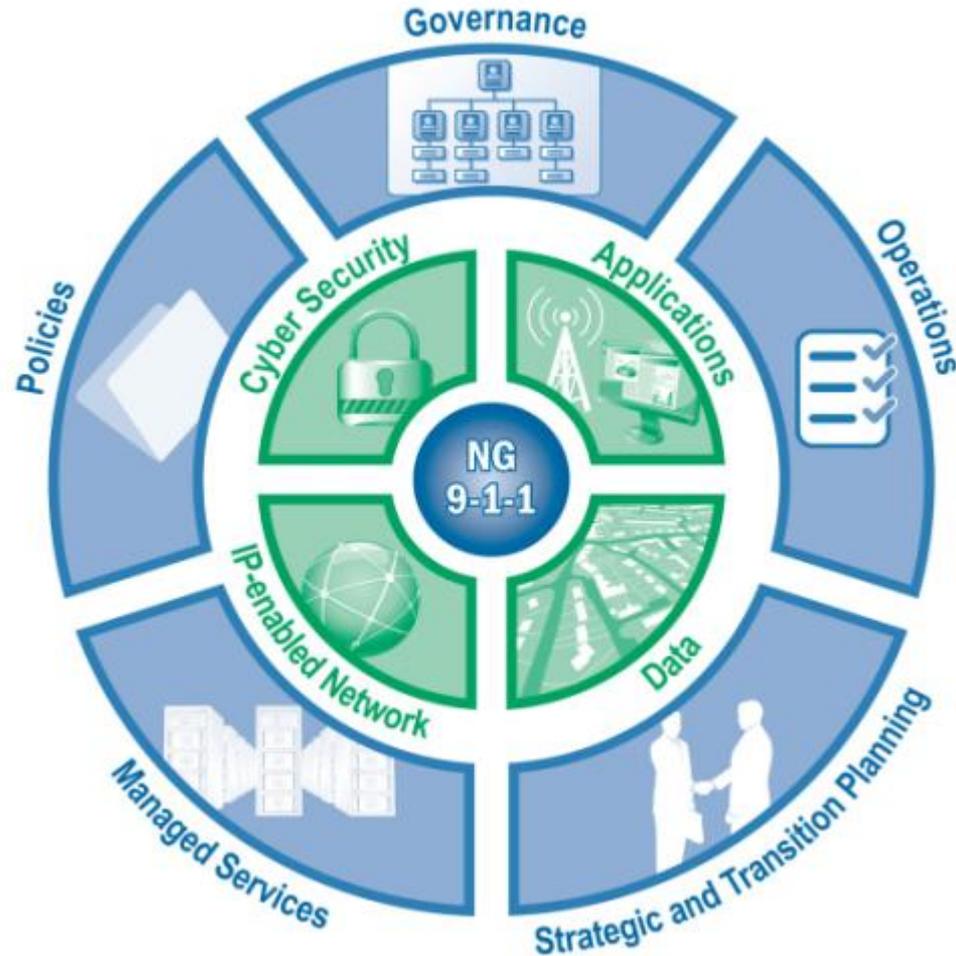
What is NG9-1-1?

- ◆ It contains the functions of the legacy 9-1-1 system while allowing for greater interoperability, convergence and better utilization of financial and human resources, in a secure environment
- ◆ NG9-1-1 does not have a “chosen” or preferred entry point
- ◆ NG9-1-1 comprises operational and technical objectives into a strategic roadmap for the future

Alphabet Soup



What is Next Generation 9-1-1



Today's 9-1-1 System – Timeline

1968:

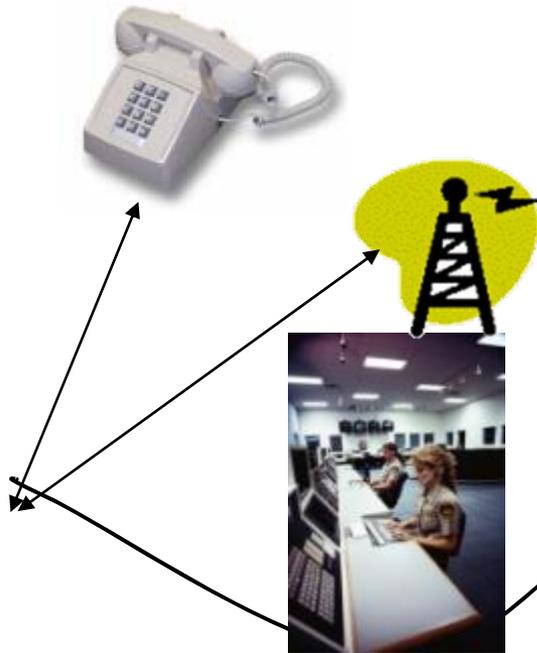


Basic 9-1-1:

- Copper Land Line
- Analog Technology

**1980s–90s:
Enhanced 9-1-1:**

- ANI / ALI



**1990s – 2000s:
Wireless E9-1-1:**

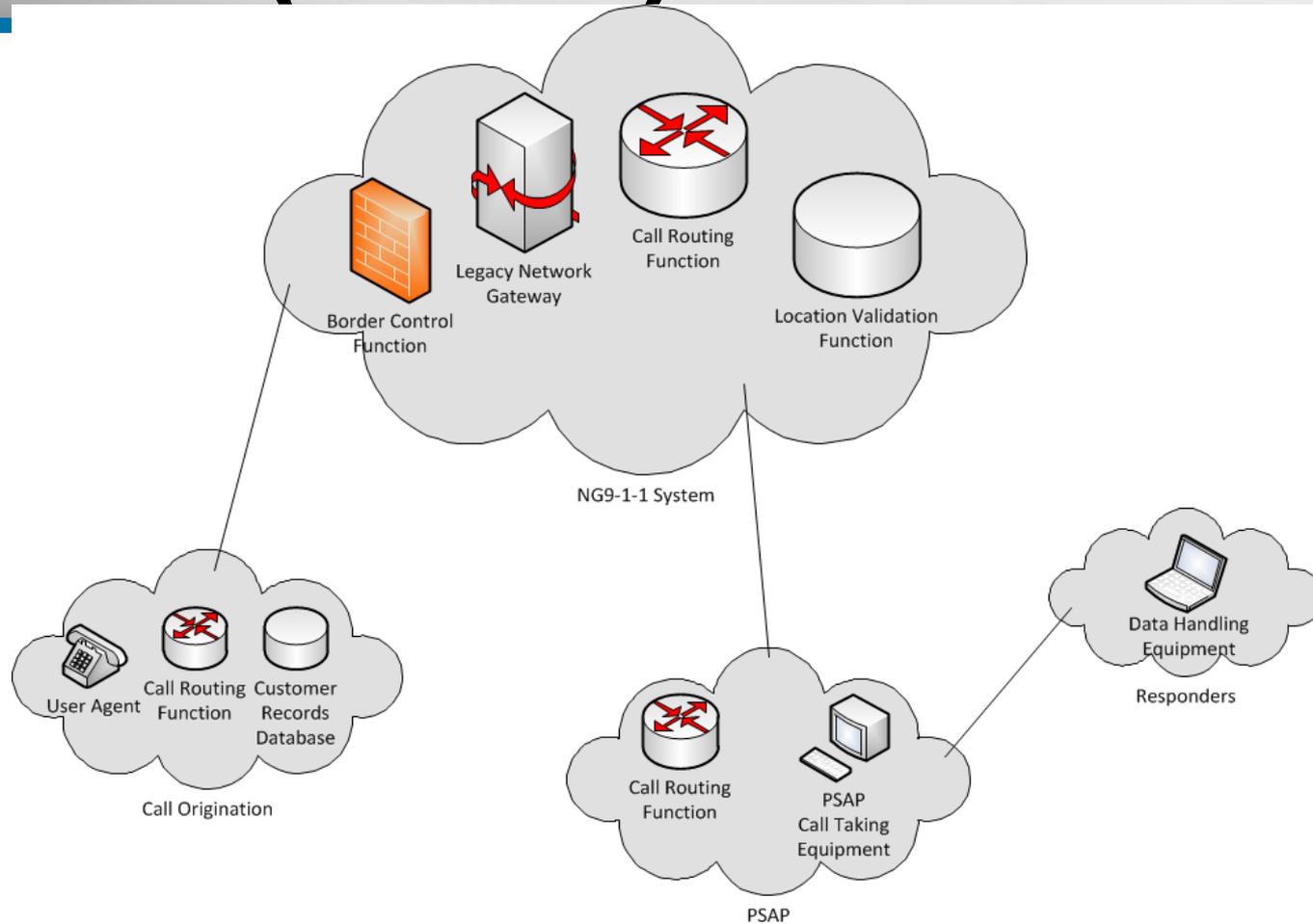
- Phase I
- Phase II

Today:

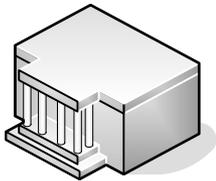


**Voice over IP, Images,
Video, Text, Telematics**

Emergency Services IP Network (ESInet)



So why is NG 9-1-1 necessary?



PSAPs have a problem

Limited bandwidth to support applications

- E9-1-1 architecture can be overwhelmed with new converged communications
- Multiple connections can be costly
- Constantly upgrading to support new applications

PSAPs cycle through upgrades to stay ahead of their customers



End users have a problem

Rising demand for bandwidth

- Public quickly moving to VoIP, security, video, and wireless applications are driving demand
- Residential multimedia trends - broadband access, gaming, VoIP, IPTV driving demand

Bandwidth Limitations

- CAMA trunking
 - Limited bandwidth cannot easily support broadband capable devices
- Functionality must be augmented to support all current devices
 - Wireless and Cellular
 - Unregistered nomadic VoIP caller
 - Mobile VoIP caller
- Unified communications limitations
 - Text messaging (critical for hard of hearing)
 - Images
- Local limitations
 - Does not support call taking by geographically dispersed PSAPs

NG 9-1-1: What it isn't

- ◆ NG 9-1-1 is not going to put local PSAPs out of business
- ◆ Is not going to work without local participation, collaboration and teamwork
- ◆ It is not going to use the public internet for emergency communications
- ◆ Going to keep patching the current system to accommodate new technology
- ◆ A fad, the public is demanding it by adopting new technologies, services and applications

But, if NG9-1-1 isn't here yet...can we wait??

- ◆ True, but many entities are currently planning NG9-1-1 deployment, migrations, etc
 - And some are even deploying networks and other NG9-1-1 foundational elements
- ◆ The systems that are **being bought today will likely be migrated to NG9-1-1** as opposed to fork lifted
- ◆ Entities need to start the planning process now
 - New Costs, new Operations, new Processes, new Technology
 - Functional requirements
 - Increase role of GIS – data accuracy is critical for call routing
 - Security must be **built into NG9-1-1 from the outset**, not bolted on later
 - The SNC is already working on pieces that will needed across the state:
 - GIS Project
 - Legislative Issues



Current Relationship With GIS and 9-1-1

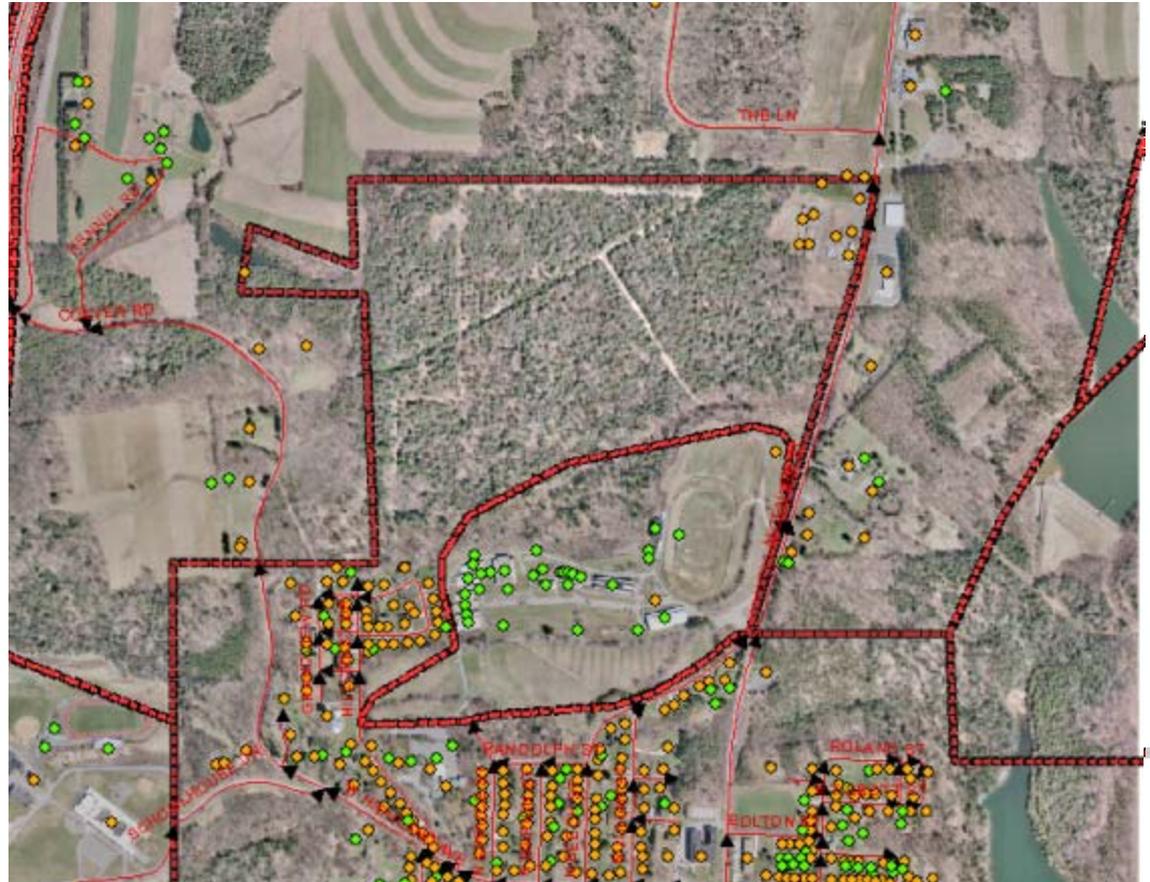
Benefits of GIS data in 9-1-1

- ◆ Location, Location, Location
 - Locate address, coordinates, physical location on earth's surface
 - Provides reference location for dispatch on map
 - Accurate GIS data reduces risk by providing improved location information

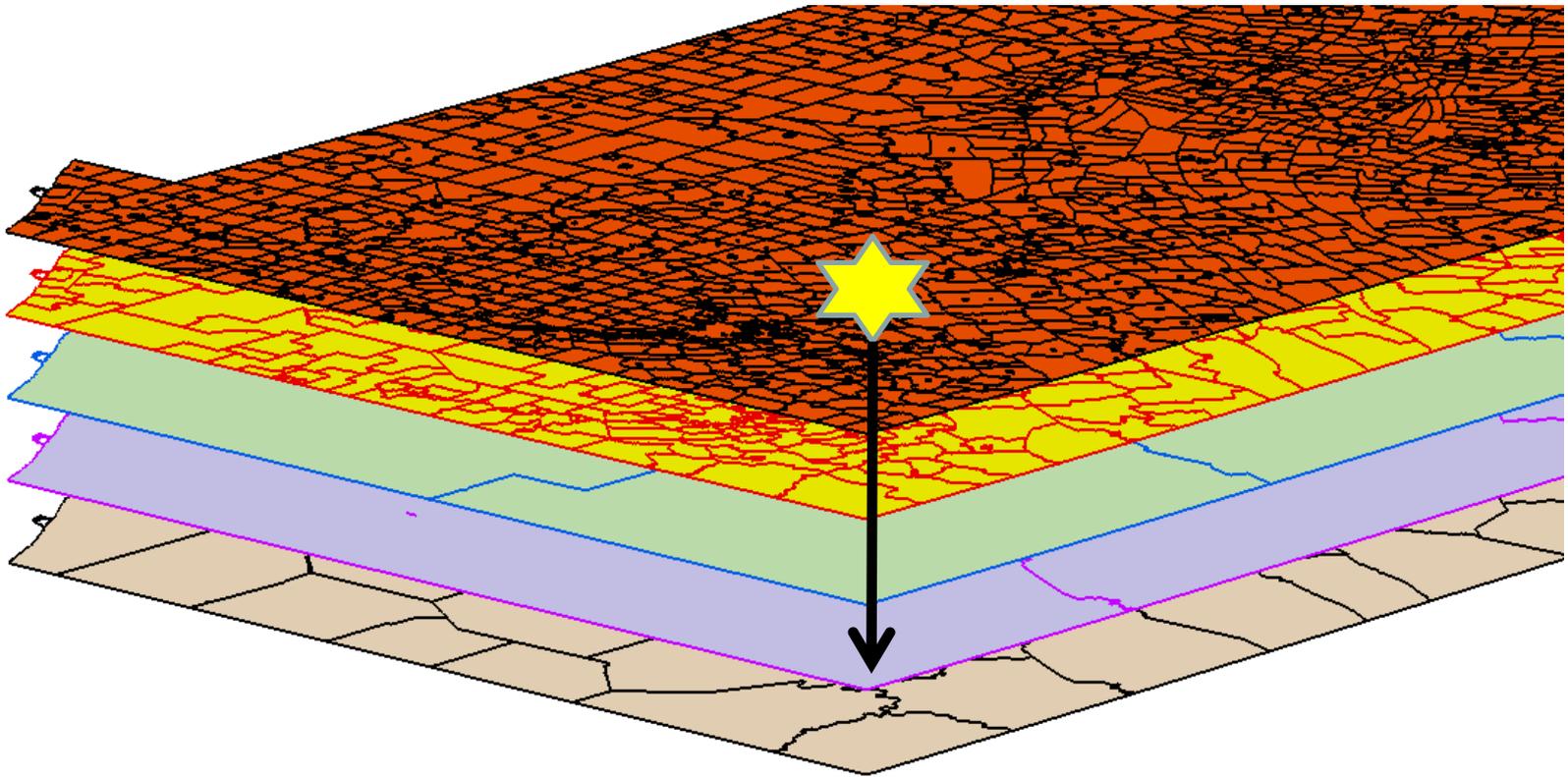
Geographic Information Systems

◆ GIS data layers

- County
- PSAP
- ESZ
- Roads
- Address Pts
- Imagery



GIS data for 9-1-1



GIS data for 9-1-1



GIS data for 9-1-1



Overview of GIS and 9-1-1 Today

Automatic Location Identification (ALI) Database

814-555-7777

814-555-7777

John Doe

111 Maple Ln

Anytown, USA

ESN 123

Fire: Station 1

Police: PD 1

EMS: EMS 4

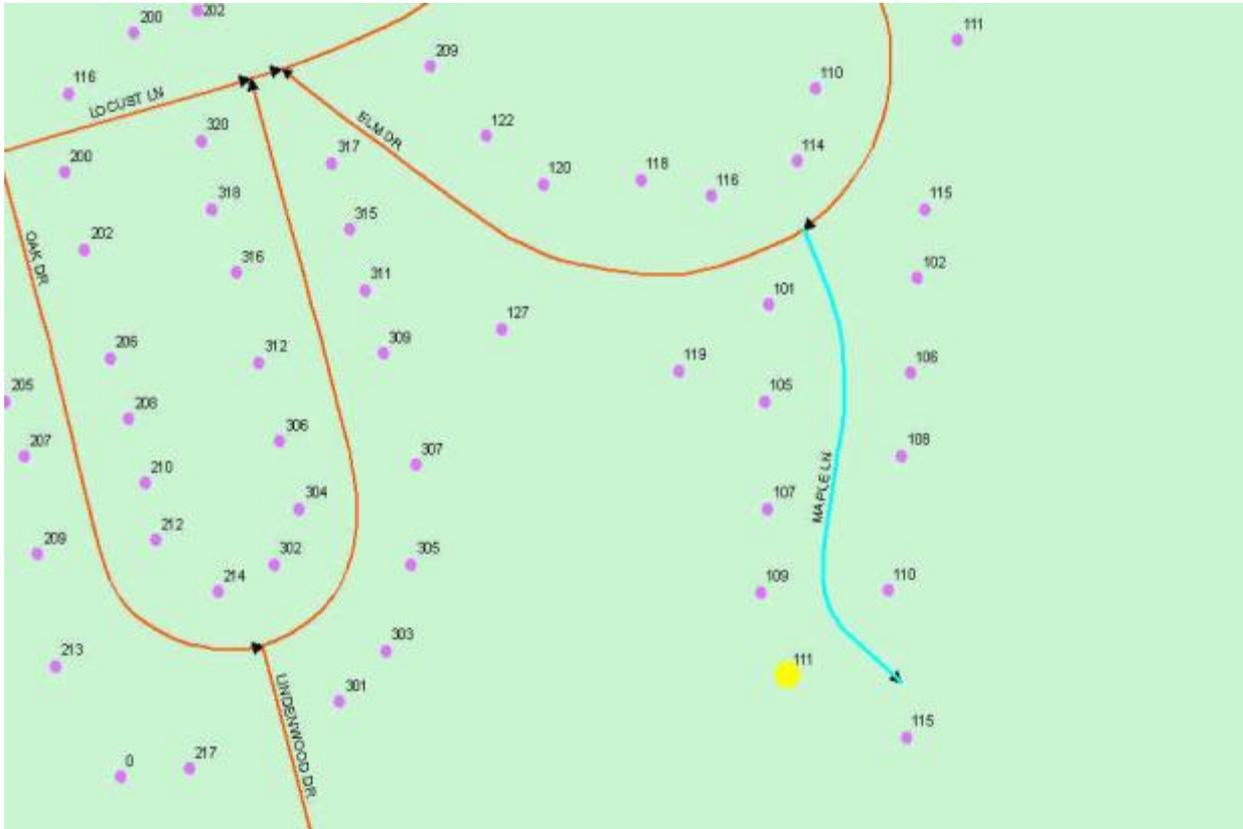
ESN 123

PHONE	HOUSENO	HOUSESUF	STREET	COMMUNITY	STATE	ESN	CUSTOMER
814-555-7474	400		9TH ST	ANYTOWN	PA	123	J SMITH
814-555-7777	111		MAPLE LN	ANYTOWN	PA	123	JOHN DOE
814-555-1234	811		11TH ST	ANYTOWN	PA	123	LARRY GREENE
814-555-2345	801		TERRACE BLVD	ANYTOWN	PA	234	MIKE JONES
814-555-1277	432		WARREN AVE	ANYTOWN	PA	456	ACME IND
814-555-7643	716		ARMSTRONG PL	ANYTOWN	PA	123	FACTORY 2
814-555-9876	123		WARREN AVE	ANYTOWN	PA	123	JAMES WOOD
814-555-8532	510		7TH ST	ANYTOWN	PA	123	PHIL BLACK
814-555-8712	706		OAKHILL LN	ANYTOWN	PA	123	BUD SMITH
814-555-5678	521		WOODWARD AVE	ANYTOWN	PA	765	JOE COFFEE
814-555-567	456		WOODWARD AVE	ANYTOWN	PA	765	JANE DOE

Master Street Address Guide (MSAG)

PRE	STREETNAME	STRE	POST	LOW	HIGH	SIDE	COMMUNITY	STATE	ESN
N	6TH	ST		376	398	B	ANYTOWN	PA	020
	MAPLE	LN		100	156	B	ANYTOWN	PA	123
N	WARREN	AVE		700	798	B	ANYTOWN	PA	020
	WOODWARD	AVE		1100	1198	B	ANYTOWN	PA	020
N	6TH	ST		614	698	B	ANYTOWN	PA	020
	HOSE HOUSE	ALY		401	499	B	ANYTOWN	PA	020
	HOSE HOUSE	ALY		301	399	B	ANYTOWN	PA	020
	HOSE HOUSE	ALY		299	299	B	ANYTOWN	PA	020
N	5TH	ST		700	706	B	ANYTOWN	PA	020
N	5TH	ST		628	698	B	ANYTOWN	PA	020
N	5TH	ST		600	626	E	ANYTOWN	PA	020

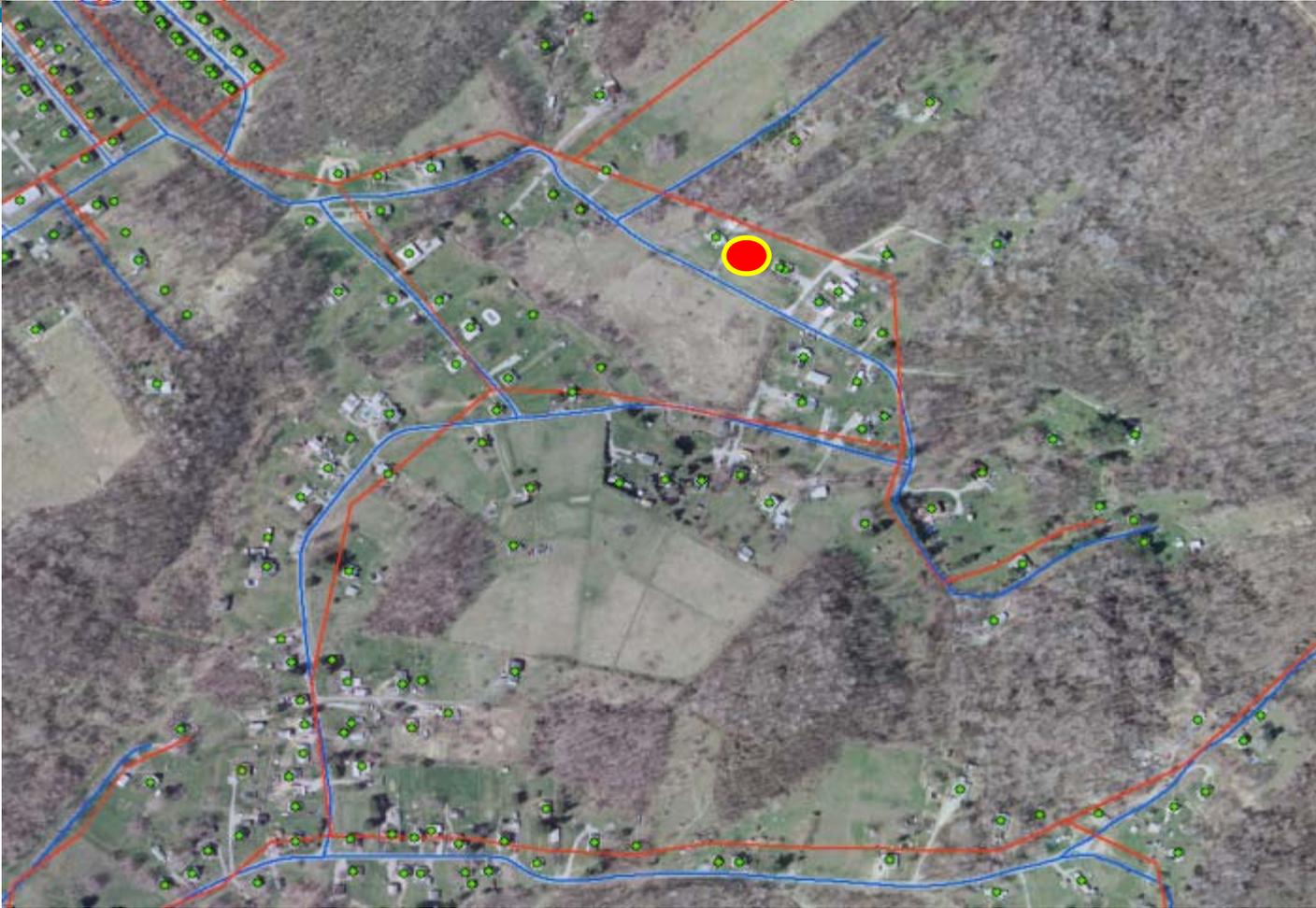
Overview of GIS and 9-1-1 Today



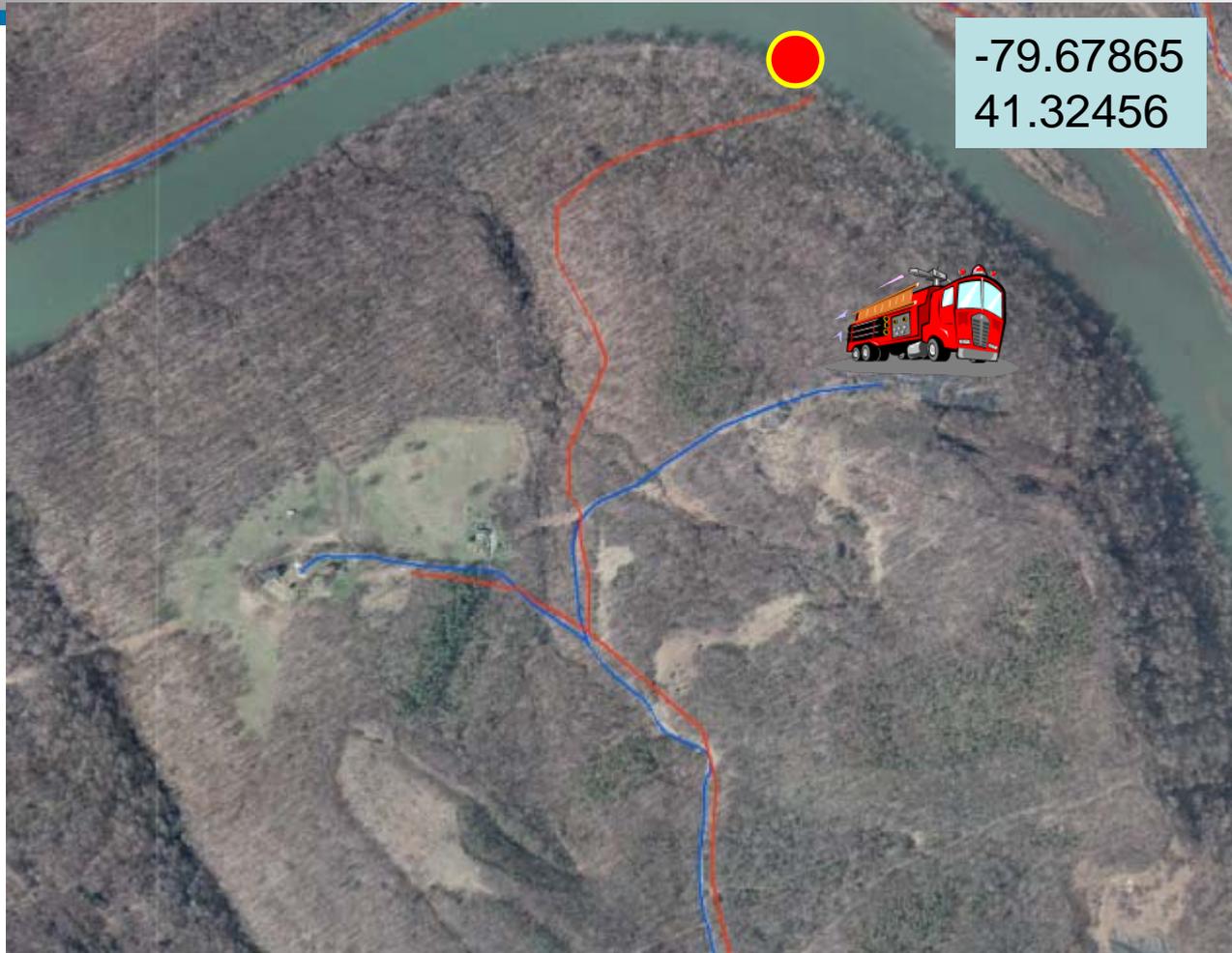
Overview of GIS and 9-1-1 Today

- ◆ Plays an important role in providing location to 9-1-1 call takers on mapping displays in PSAP, especially during wireless calls
- ◆ Importance of accurate and complete GIS data effective decision-making by call takers – trust in the data
- ◆ What if GIS data is incorrect or incomplete?
 - Incorrect routing of emergency responders
 - Increases response time
 - Lives in jeopardy – every second counts

Issues Today - Accuracy



Issues Today – Accuracy



Issues Today – Current Data



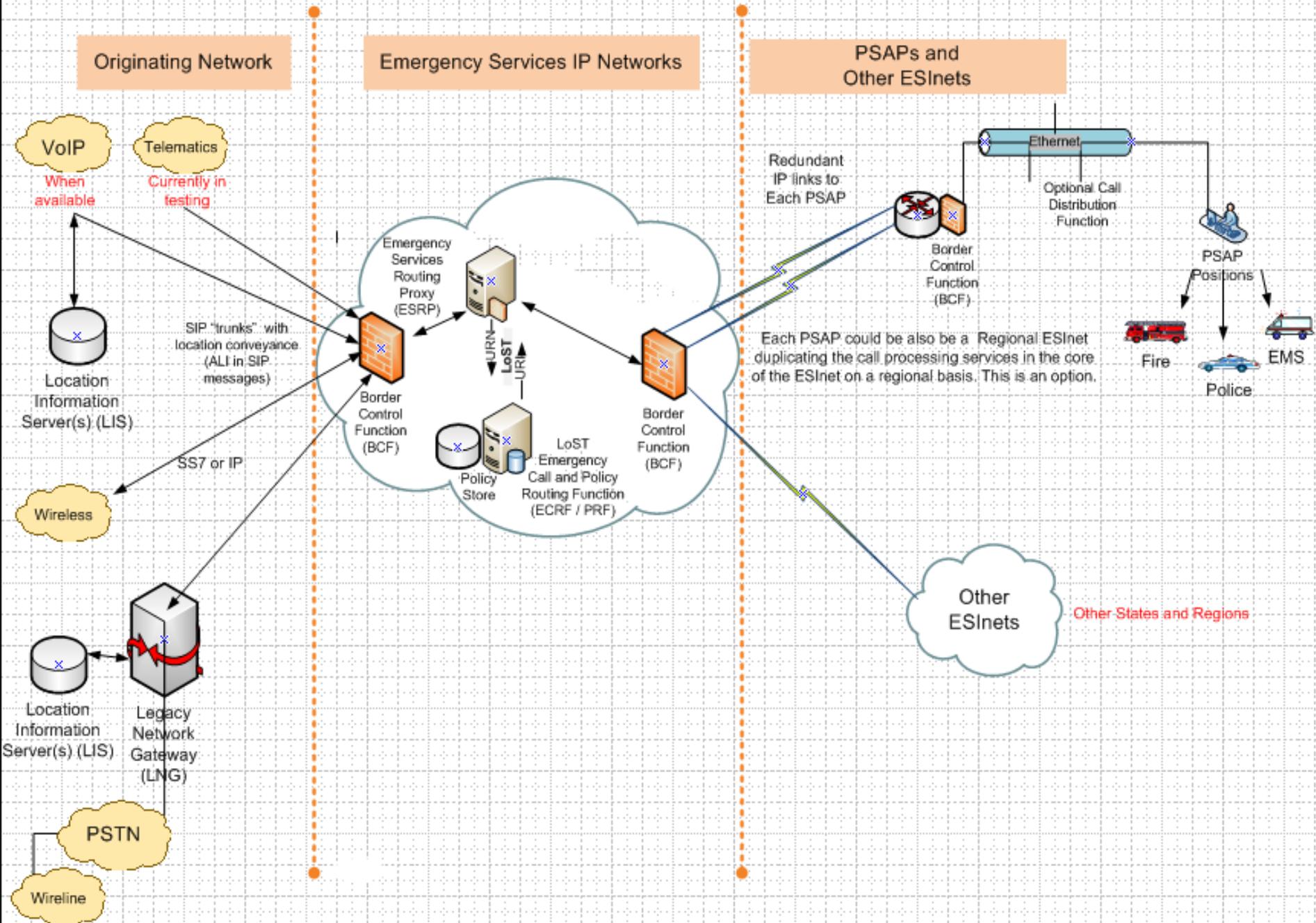
Role of GIS in a Next Generation 9-1-1 (NG 9-1-1) Environment

GIS in NG9-1-1

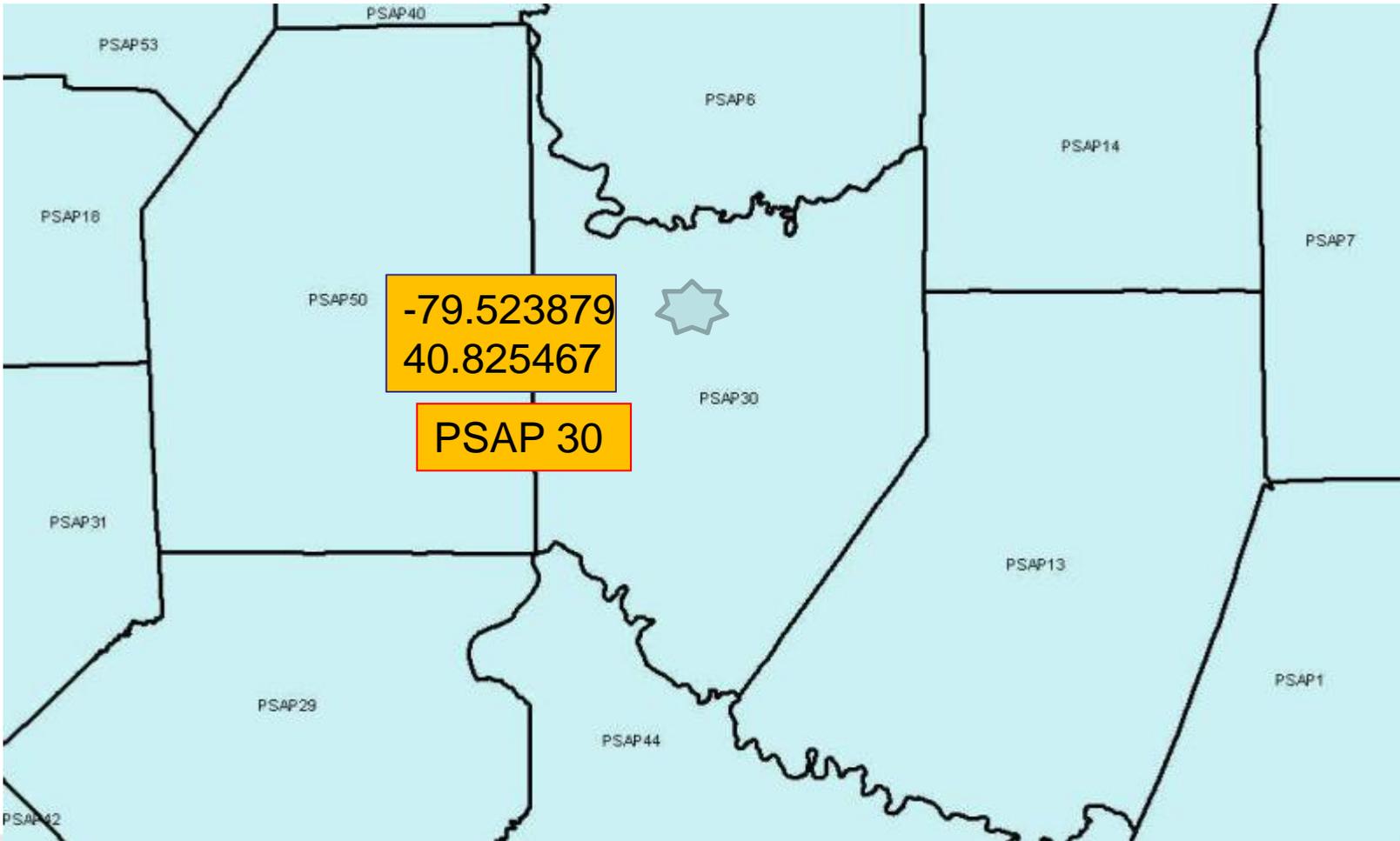
- ◆ GIS plays crucial role in NG9-1-1 call routing - ECRF
- ◆ Routing database is GIS data centric
- ◆ Accuracy of GIS data is paramount
- ◆ Shared data – coordination
- ◆ 9-1-1 authority is responsible for the data
- ◆ Location is delivered with call
- ◆ Location is pre-validated using GIS data - LVF

Full NG-9-1-1

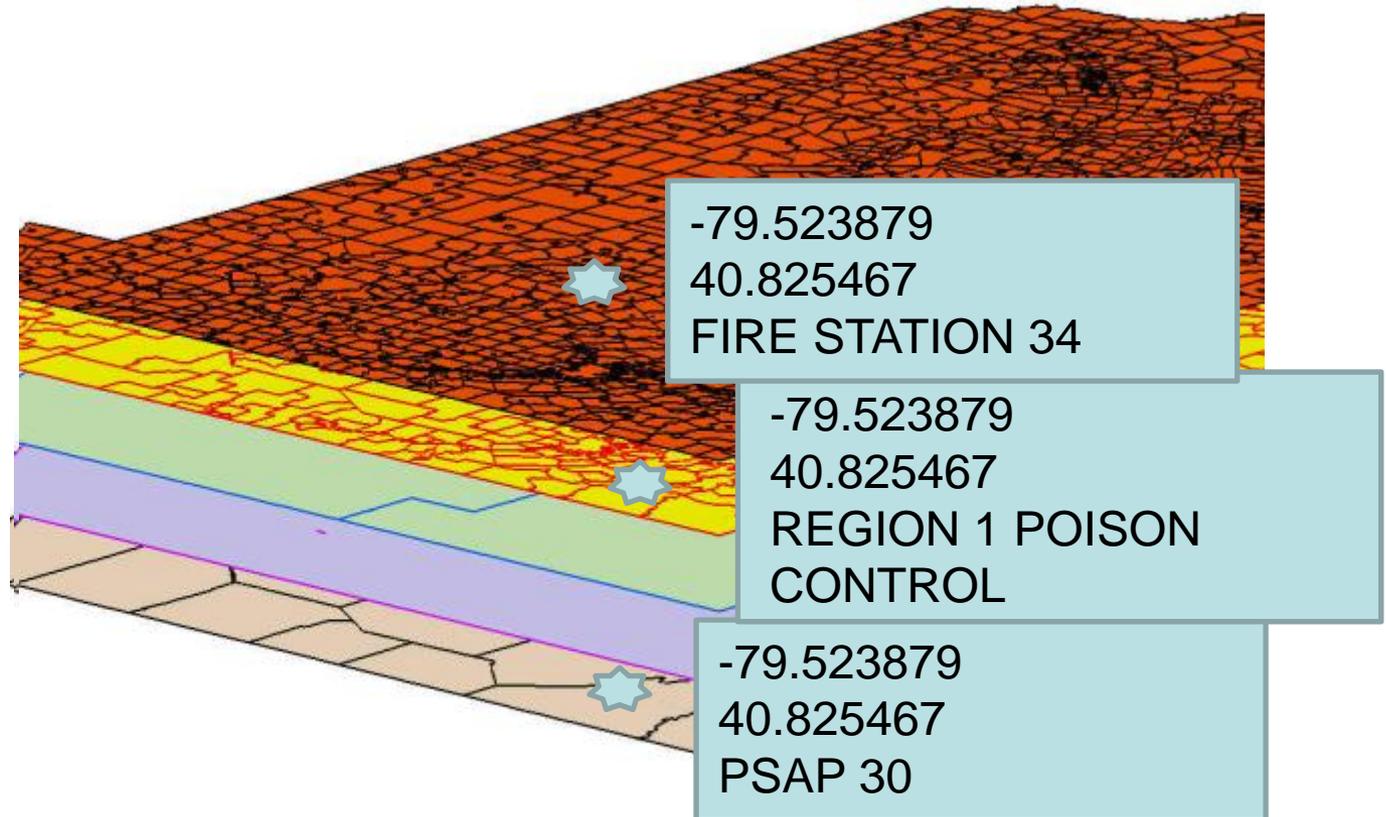
Conceptual Only

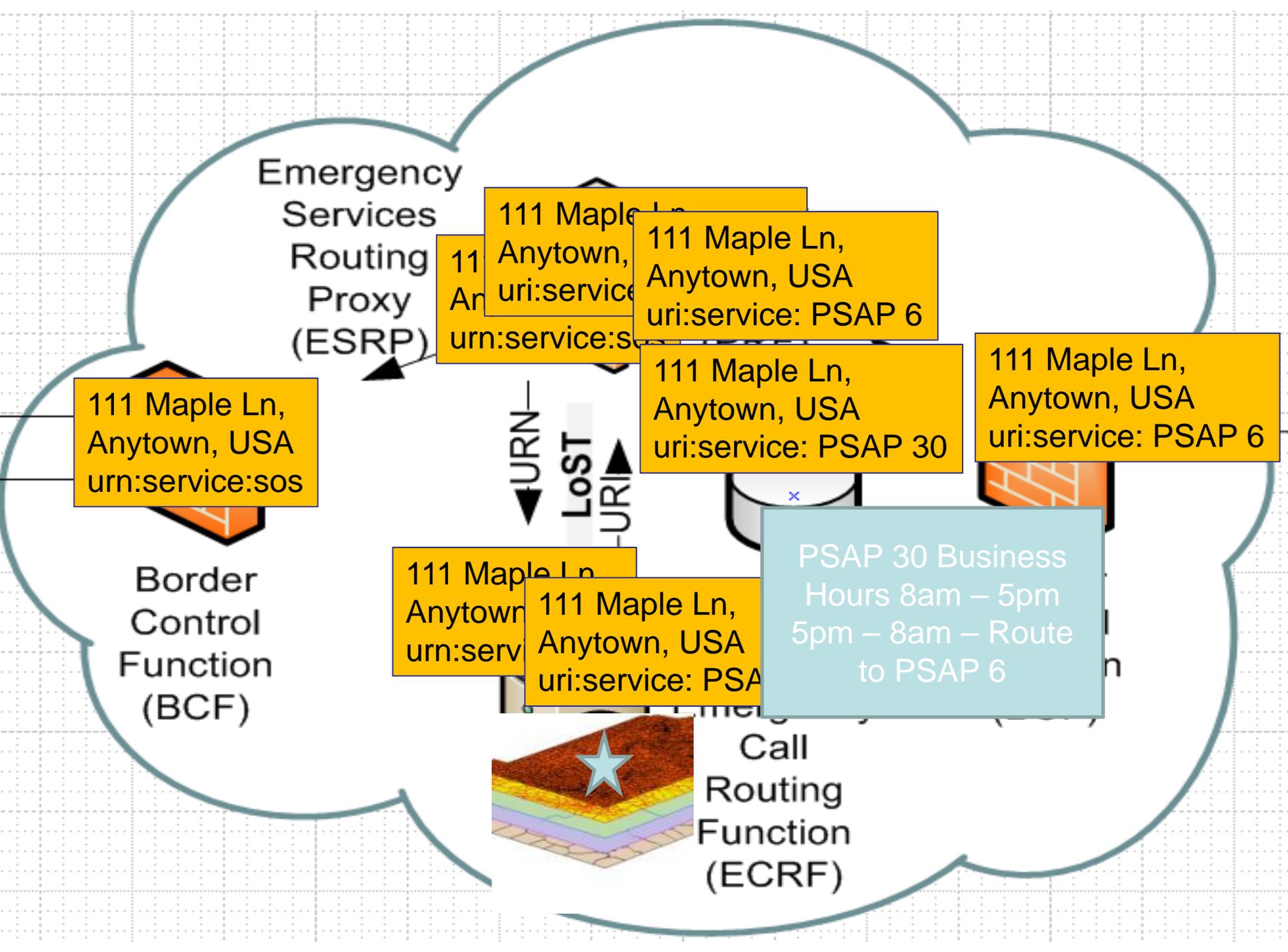


Call Routing

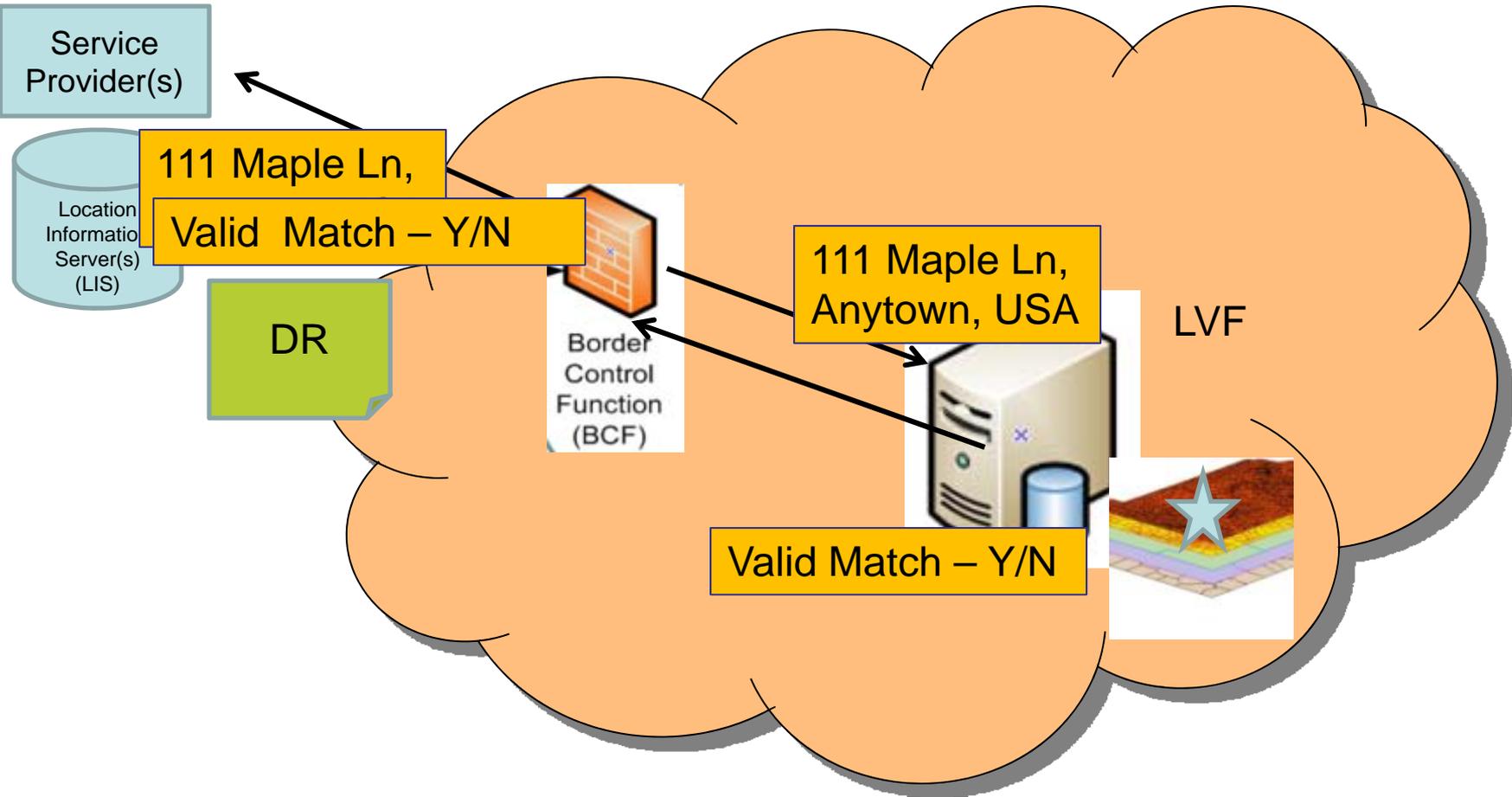


Point in Polygon Location Query





Location Validation Function (LVF)



Break

Current Relationship With GIS and 9-1-1

9-1-1 GIS Data - Focus Themes

- ◆ Accuracy
- ◆ Maintenance
- ◆ Standards
- ◆ Policy and Governance

Accuracy

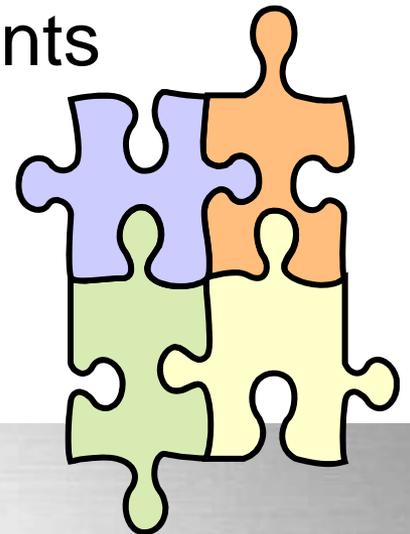
- ◆ GIS data used for call routing
 - Accuracy of data will determine correct routing of call
- ◆ GIS road centerlines, address points and jurisdictional boundaries all become focus of emergency routing databases
- ◆ What can you be doing to prepare GIS data?
 - Synchronize GIS with MSAG and ALI
 - NENA 71-501, Version 1.1, September 8, 2009
 - Completed address points layers
 - Edge-matching boundaries, centerlines

Data Integrity

- ◆ GIS topology – gaps, overlaps, connectivity
- ◆ Features delineated between community and ESN boundaries
- ◆ Complete information for each feature
 - Road names, addresses, ranges, community, ESN
- ◆ Verify for address range overlaps or gaps, parity issues
- ◆ Check for duplicate addresses, road names
- ◆ Verify addresses fall within existing street segments

Maintenance

- ◆ Data maintenance is ongoing process
- ◆ Must have maintenance plan
- ◆ Data maintenance must follow proper 9-1-1 standards
- ◆ Continue to synchronize databases/layers
- ◆ Coordination with jurisdictions/departments
 - Road names, new addresses, boundaries
- ◆ Investigate errors, make updates



Standards

- ◆ Standards become paramount with NG 9-1-1
 - Having the correct information collected in the correct format
 - To foster regionalization of data/sharing of data
 - To integrate with NG 9-1-1 databases
 - To improve accuracy/maintain integrity
 - Interoperability with other systems
 - Addressing standards, GIS data design standards

- ◆ *All play part in routing call to correct location*

Policy and Governance

- ◆ Who is maintaining data – GIS dept./9-1-1?
- ◆ Local agreements for data maintenance
- ◆ Determine how updates are handled across jurisdictions – e.g. boundary changes
 - Where are QA/QC procedures handled?
 - How do vendors providing QA/QC access network?
- ◆ How is GIS data pushed up to ECRF within State level and regional ESInet?
- ◆ How are NRFs sent back to GIS staff for resolution?

ENHANCE 9-1-1 Grant

ENHANCE 9-1-1 Grant

- ◆ History
- ◆ Background
 - Act in place in 2004
 - Funds authorized, but not appropriated until 2009
- ◆ June 2009 announcement
- ◆ June 2009 SNC approval of application
- ◆ August 2009 application due
- ◆ Sept 2009 award announced of \$1,699,999
 - \$1,108,704 base
 - \$591,295 supplemental

ENHANCE 9-1-1 Grant

- ◆ Terms of the grants:
 - Must be for wireless or NG9-1-1 project
 - Awards only given to states for state coordination/oversight/distribution
 - Projects must have broad impact
 - Cannot use state or locally collected 9-1-1 funds for non-911 purposes
 - 50/50 matching funds, match cannot be federal dollars
 - Match came from CMRS funds under HB 5622, enacted in December 2010.
 - Must be completed by September 30, 2012

Why GIS?

- ◆ Broad proposal that met with grant criteria:
 - Some states already had projects to propose
 - Feasibility studies
 - Phase II completion
 - Regional IP-911 projects
 - Addressing/Mapping
 - Some states didn't qualify for funding or have resources to manage a project.
 - Looked for a project that had potential to benefit all PSAPs.
 - Michigan already had feasibility study underway and would tie in with work we already doing
 - Met with criteria of state 9-1-1 plan to move towards NG-911

What is the project NOT about?

- ◆ Replacing the local 9-1-1 GIS data systems and making the state responsible for all PSAP GIS data
- ◆ Collecting data for the state to resell to other parties to generate revenue
- ◆ For use to create a single statewide CAD or PSAP
- ◆ Creating a platform for non-public safety purposes

If NG-911 is not here yet, why are we spending all this time and money now?

- ◆ The project can be used for wireless 9-1-1 now.
- ◆ Virtual 9-1-1 projects and PSAP back-up systems can utilize this info prior to NG-911
- ◆ The grant will pay for something now that will need to be done, grants may not be there in the future
- ◆ Help with some costs for counties that may not have systems in place
- ◆ Prepare Michigan for future NG-911
- ◆ Facilitates collaborative ownership, rather than islands of independently purchased systems

Formation of the TAC:

- ◆ Established as a technical advisory committee to the Local and State Cross Boundary Technology Steering Committee
 - Local representation from the 9-1-1, IT, and GIS communities to provide first hand knowledge and experience to the 9-1-1 GIS Grant Project
 - Will make recommendations on project direction to the Local and State Cross Boundary Technology Steering Committee

Project Organization Overview

- ◆ Project Sponsor

Harriet Miller-Brown – Michigan 9-1-1 State Administrator

- ◆ DTMB Project Staff (CSSTP)

Eric Swanson - CSSTP, Project Sponsor, Director

Laura Blastic – CSSTP, Project Manager, Geo-Framework
Services Manager

Paul Harmon – CSSTP, Communications Liaison

Mathi Ramachandran – CSSTP, Data Architect

John Clark – CSSTP, GIS Solutions Architect

Mark Holmes - L.R. Kimball

Project Organization Overview

Technical Advisory Committee (TAC)

➤ 9-1-1

- Mike Muskovin, Ottawa County
- Mike Szor, Alpena County
- Phyllis Fuller, Barry County
- Harriet Miller-Brown, State 9-1-1 Office

➤ IT

- Ron Plamondon, Leelanau County
- Dawn Siegel, Oakland County
- Tom Shewchuk, Ingham County

➤ GIS

- Scott Ambs, Jackson County
- Chris Cantrell, Midland County
- Nathan Fazer, Eastern UP Planning Region
- Eric Swanson, CSSTP

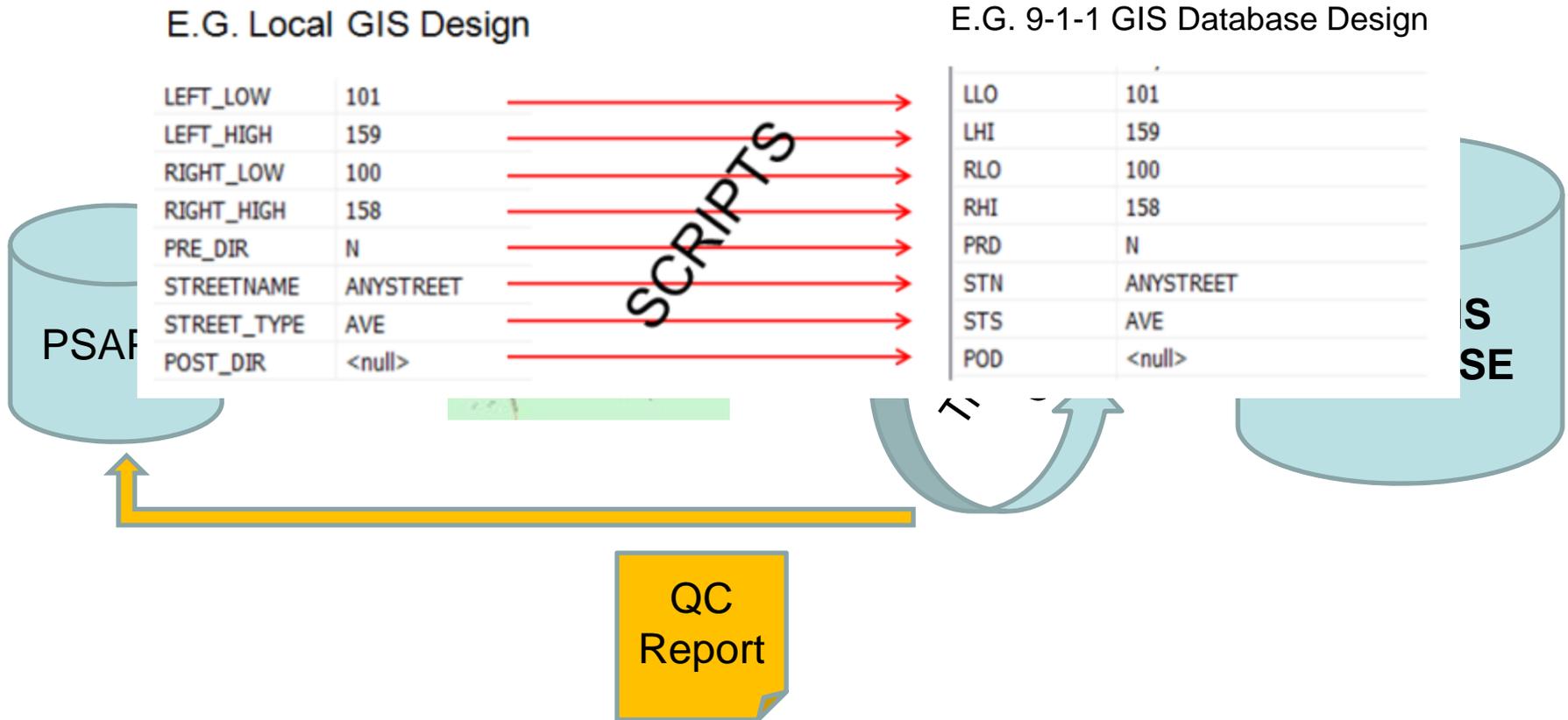
Role of the TAC:

- ◆ Provide local insight and collaboration as project develops
 - Project documents (e.g. Charter, MOA's)
 - Develop technical standards
 - Develop communication and outreach plan
 - Initial data assessments

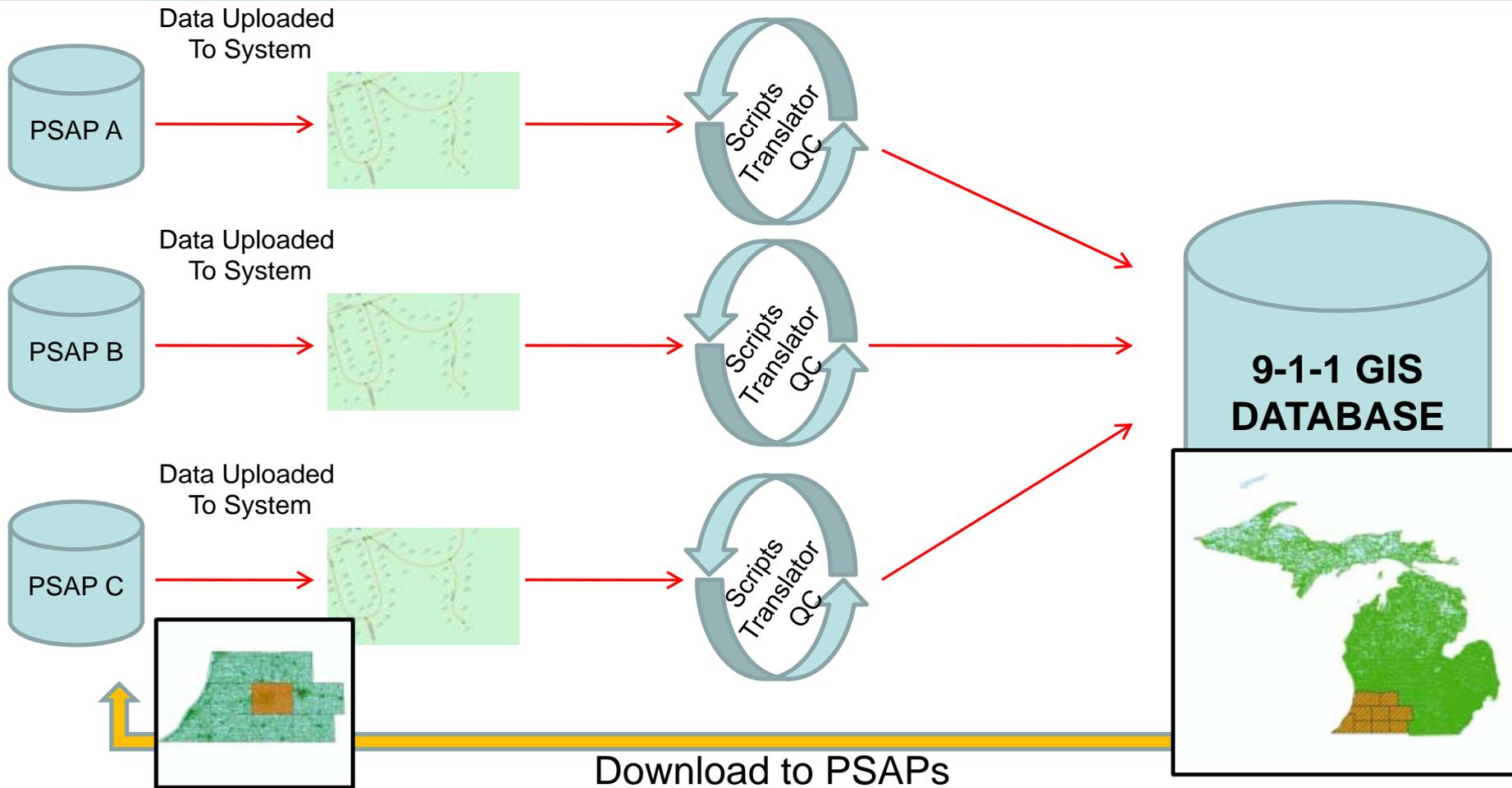
Project Tasks Overview

- ◆ Initial Assessment and Data Development Plan
- ◆ Community Outreach
- ◆ Statewide 9-1-1 Database Design
- ◆ Develop and Implement Database and Application Architecture
- ◆ Develop Statewide PSAP Boundary Layer
- ◆ Develop Complete Statewide GIS Road Centerline and an Initial Point Address Layers
- ◆ Maintenance Plan and Workflows Implementation

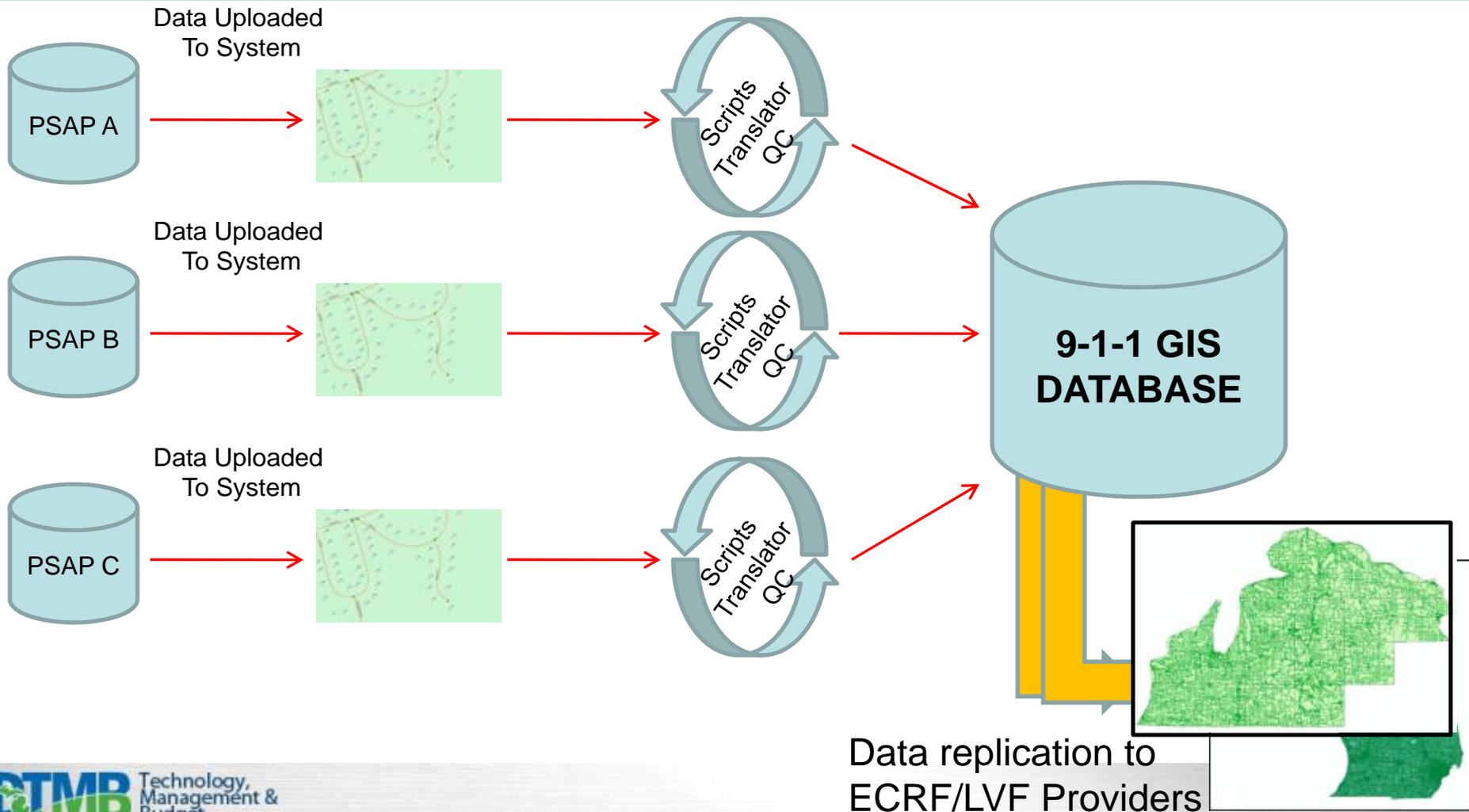
Data Flow to 9-1-1 GIS Database



Data Interoperability



Data Provisioning for NG 9-1-1

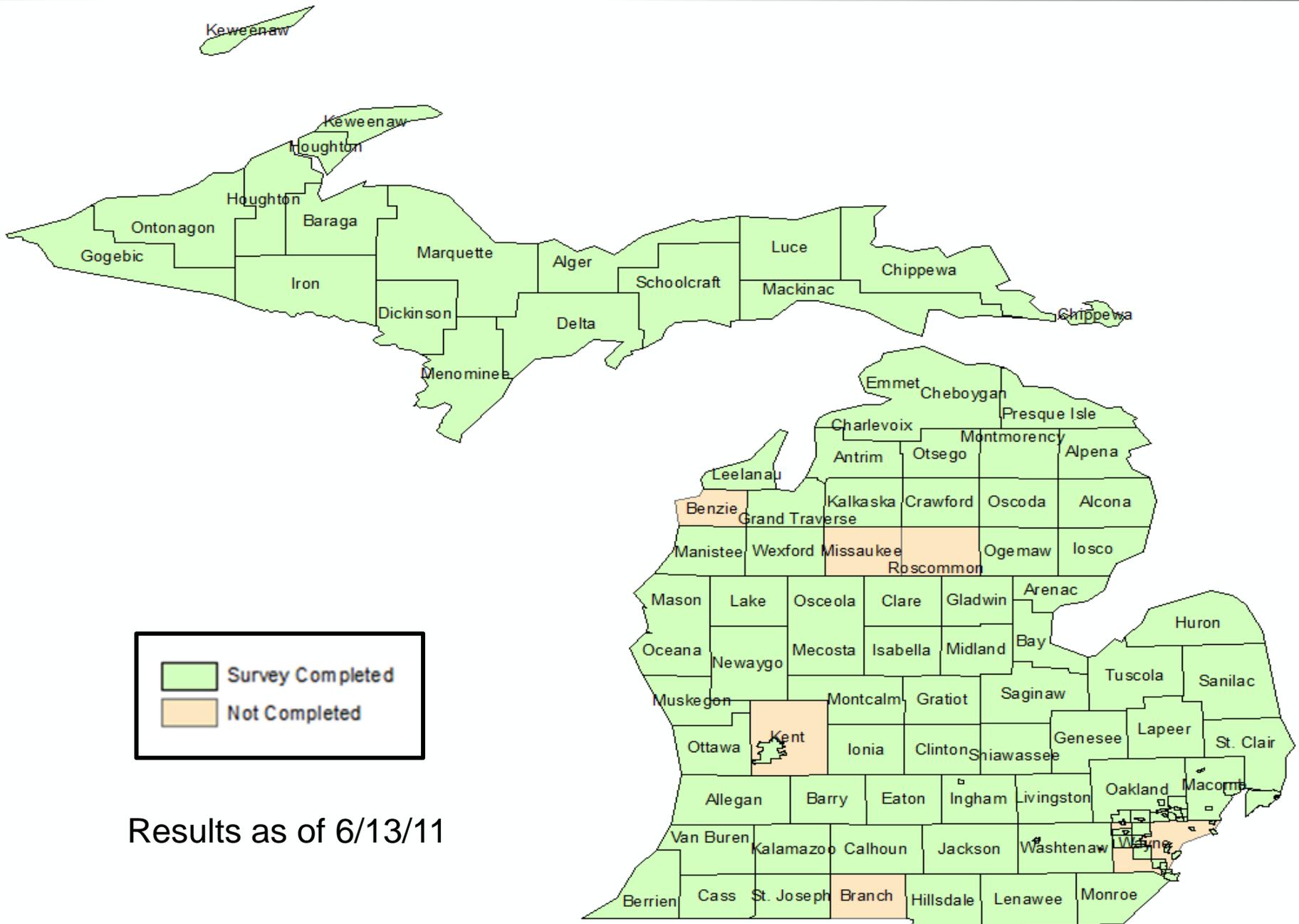


Project Update

- ◆ Developed Project Charter
- ◆ Conducted a GIS Assessment for each PSAP
- ◆ Developing Memorandum of Agreements (MOA) and Data Sharing Agreements
- ◆ Drafting Initial Database Standards
- ◆ Forming Initial System Requirements
- ◆ Conducting and Scheduling Community Outreach

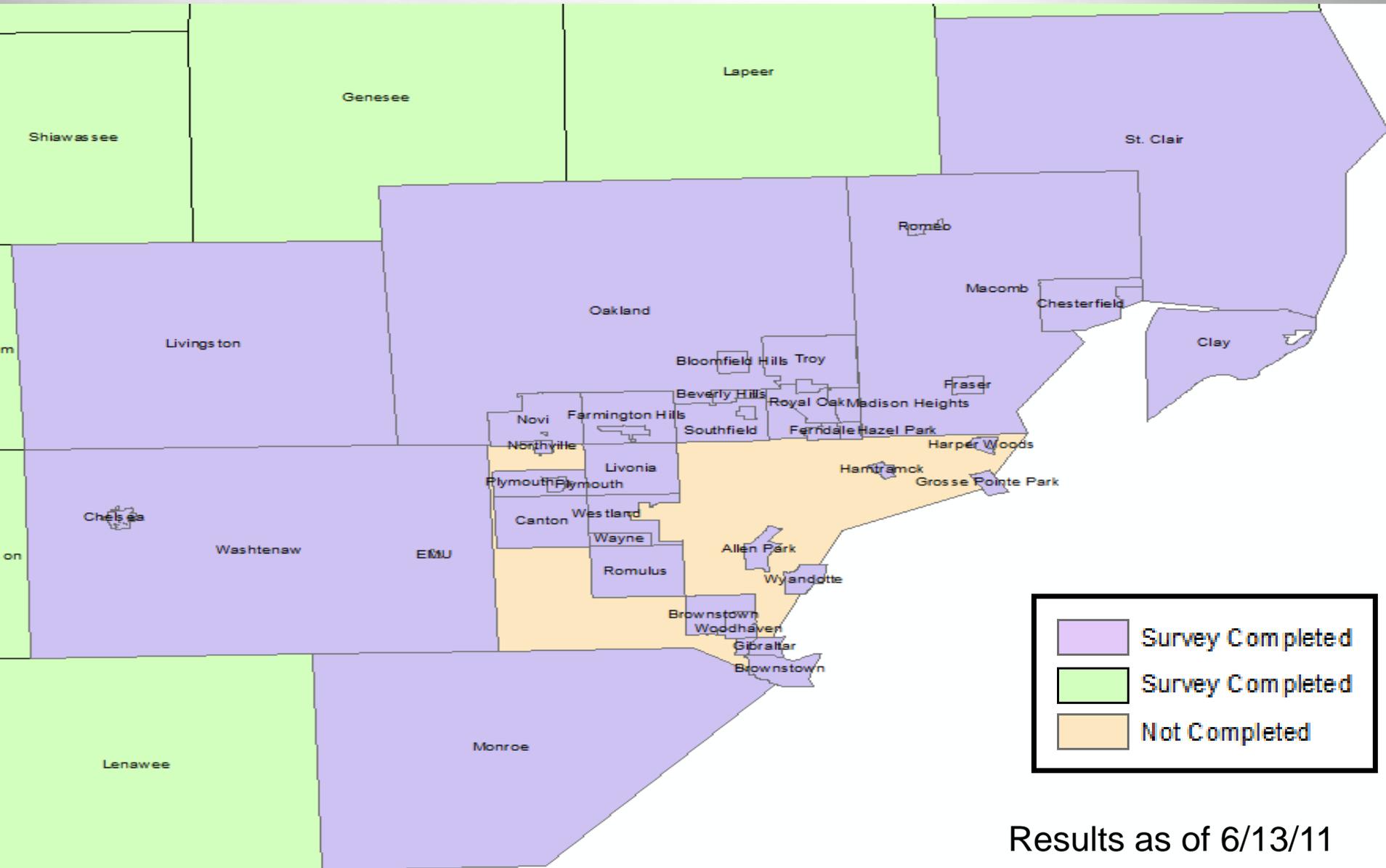
9-1-1 GIS Survey

- ◆ Get a current snapshot of GIS/9-1-1 systems today
- ◆ Sent to PSAP Managers/Directors and County 9-1-1 Coordinators
- ◆ Collaborate with GIS resources to fill out survey
- ◆ Survey will guide the planning of the project



Results as of 6/13/11

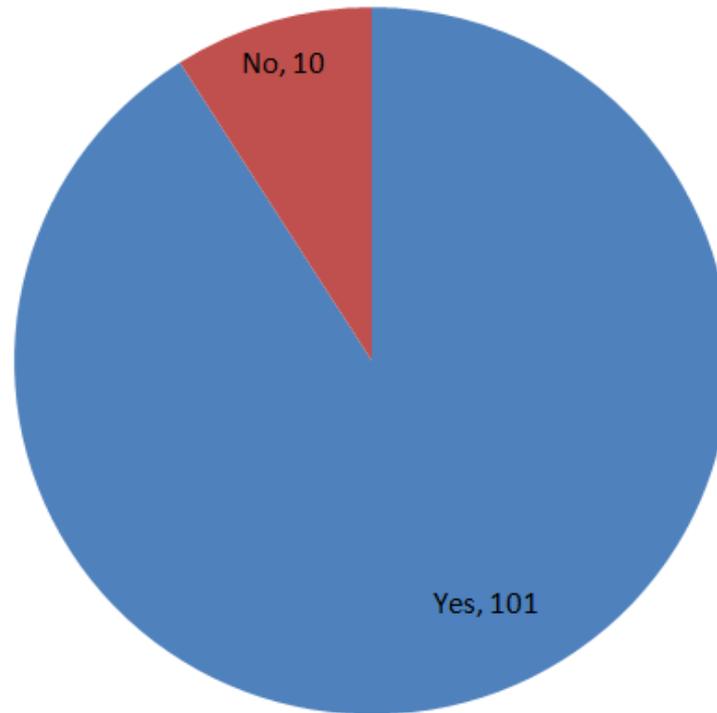
SEMCOG



Results as of 6/13/11

9-1-1 GIS Survey

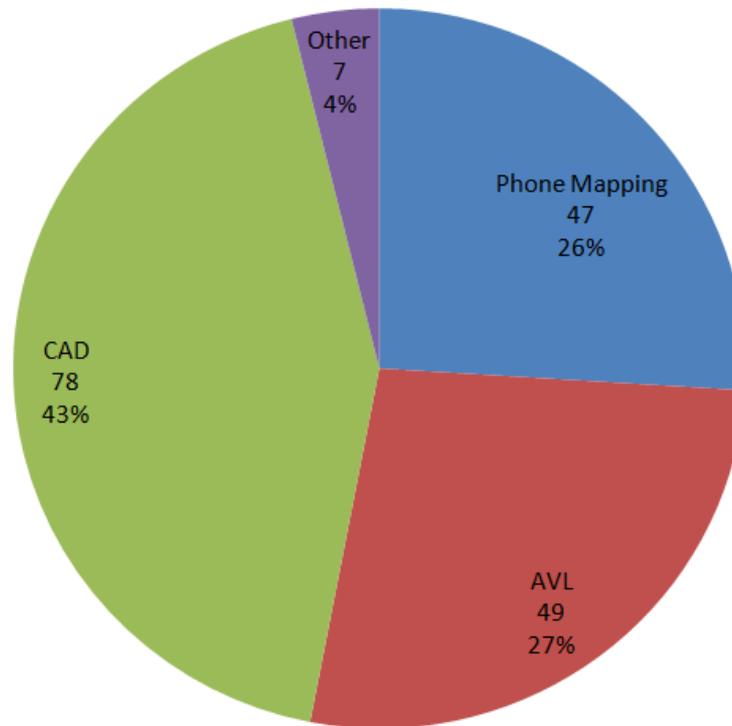
Does Your PSAP Utilize GIS Data for Location Purposes?



Results as of 6/13/11

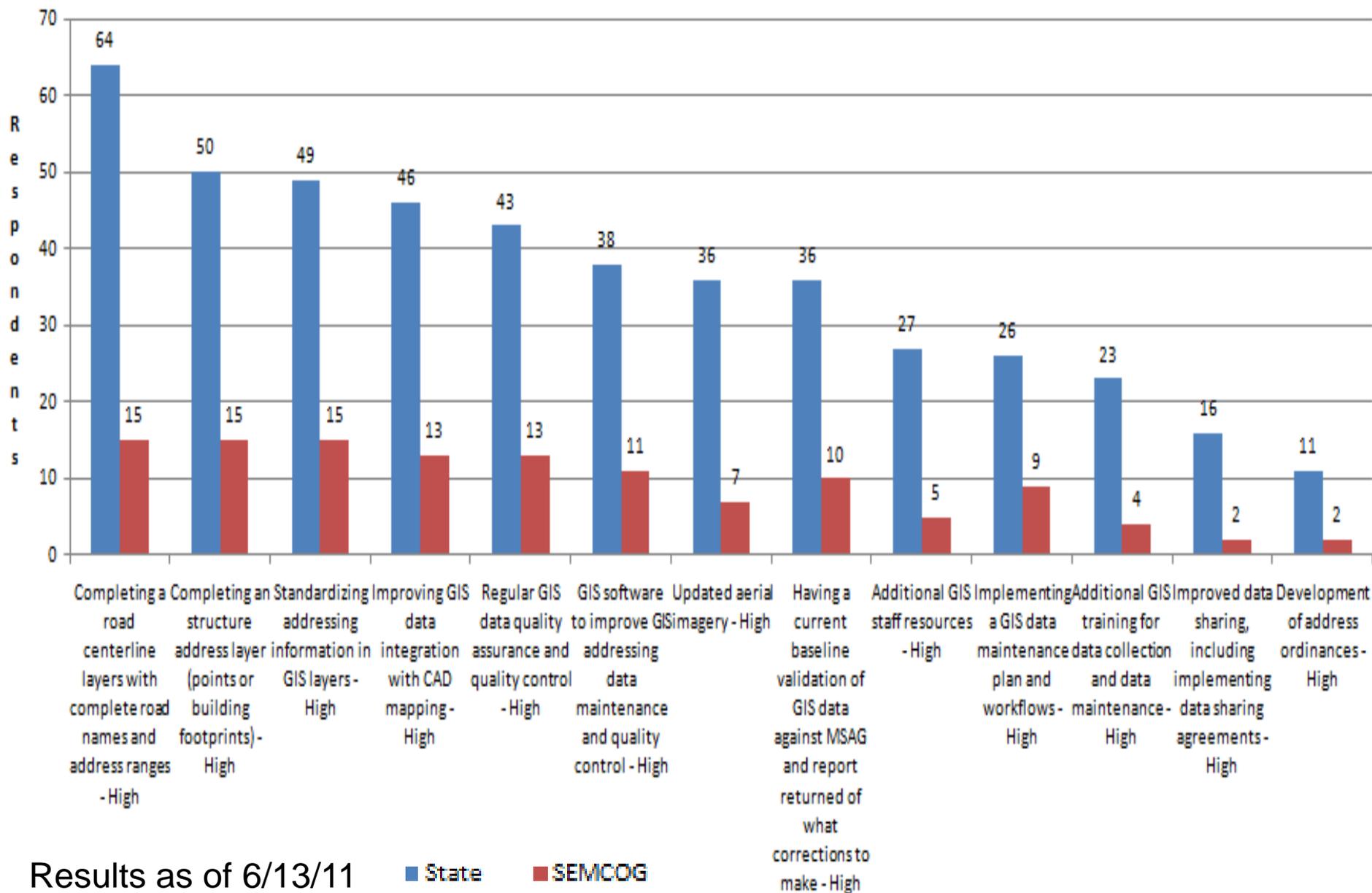
9-1-1 GIS Survey

What 9-1-1 systems in your organization utilize GIS data?

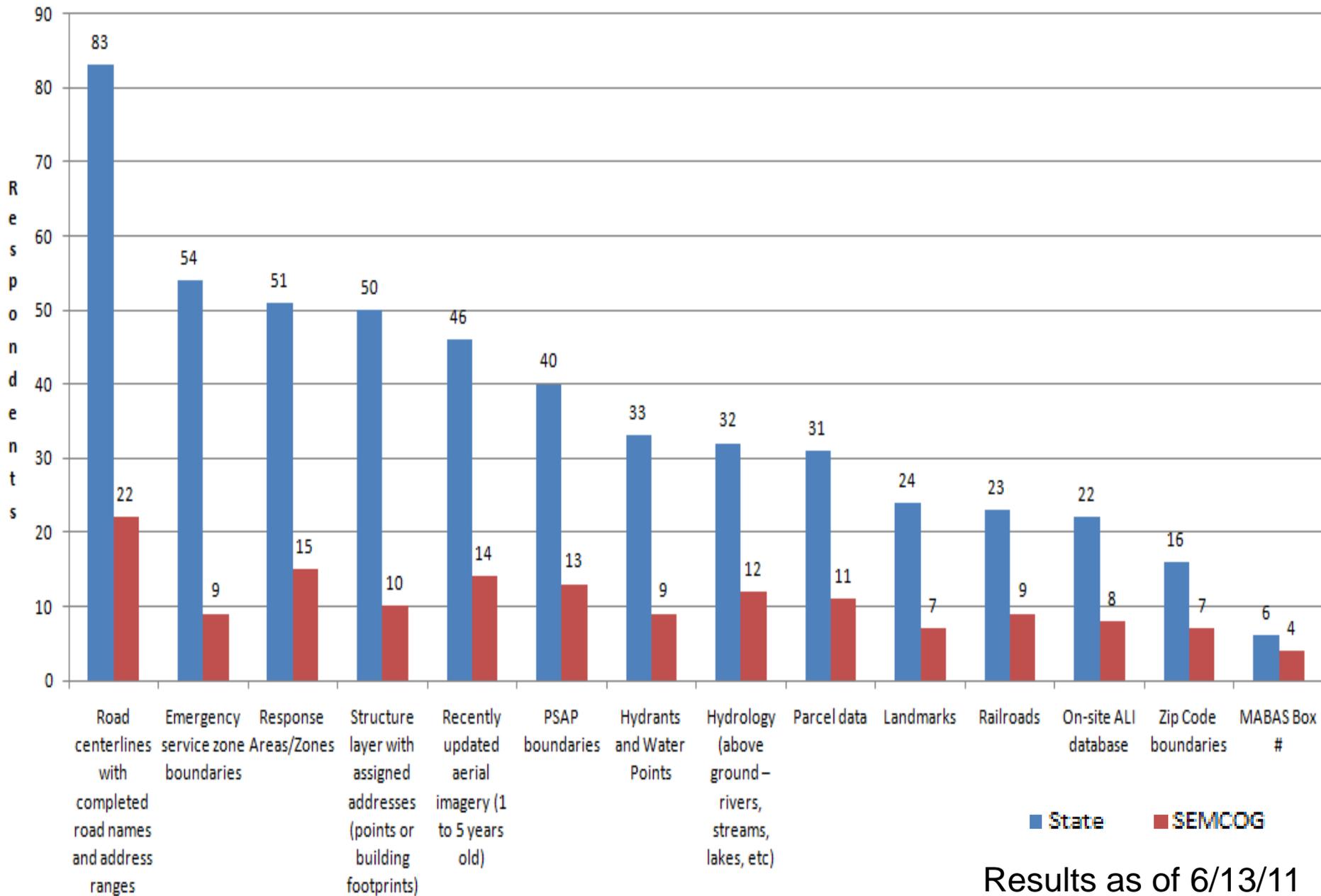


Results as of 6/13/11

Understanding you may already have some of these items within your operation, please rank the following based on what would provide you the most additional value? (Where Highest Ranking Was Selected)

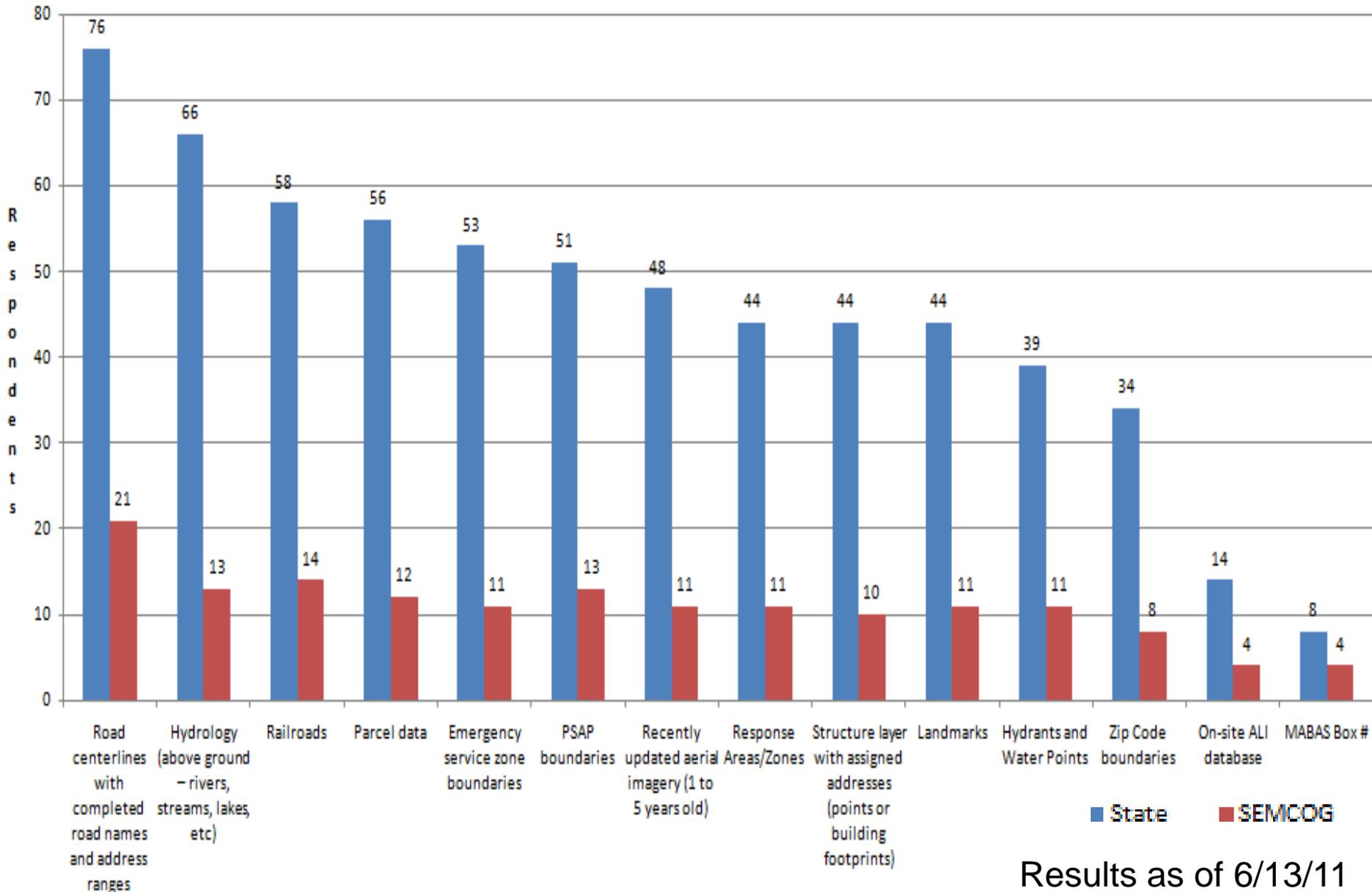


Which of the following GIS layers are the most critical for your public safety organization?



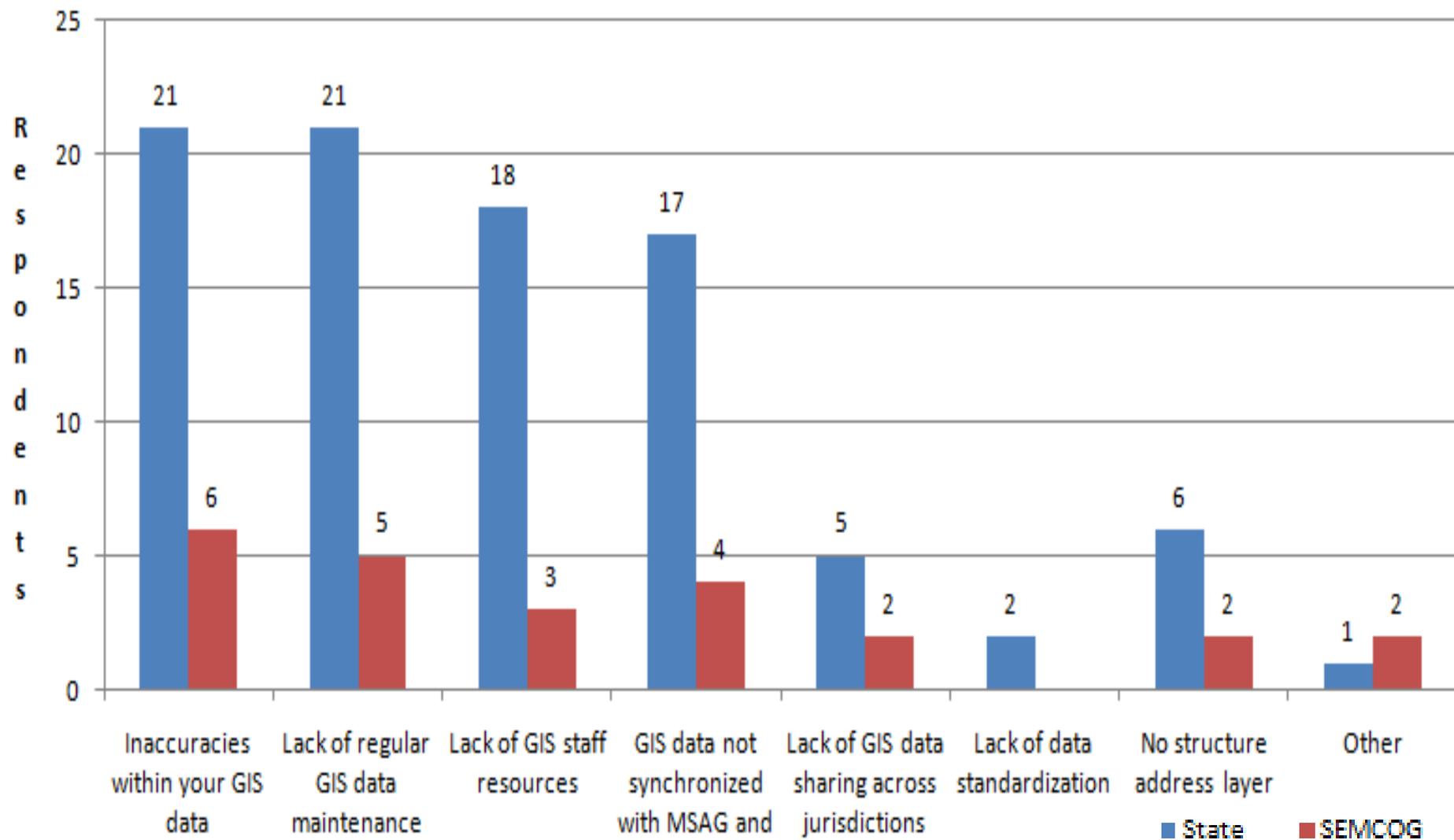
Results as of 6/13/11

Which of the following GIS layers are available to you within your jurisdiction from a GIS departments or other departments?



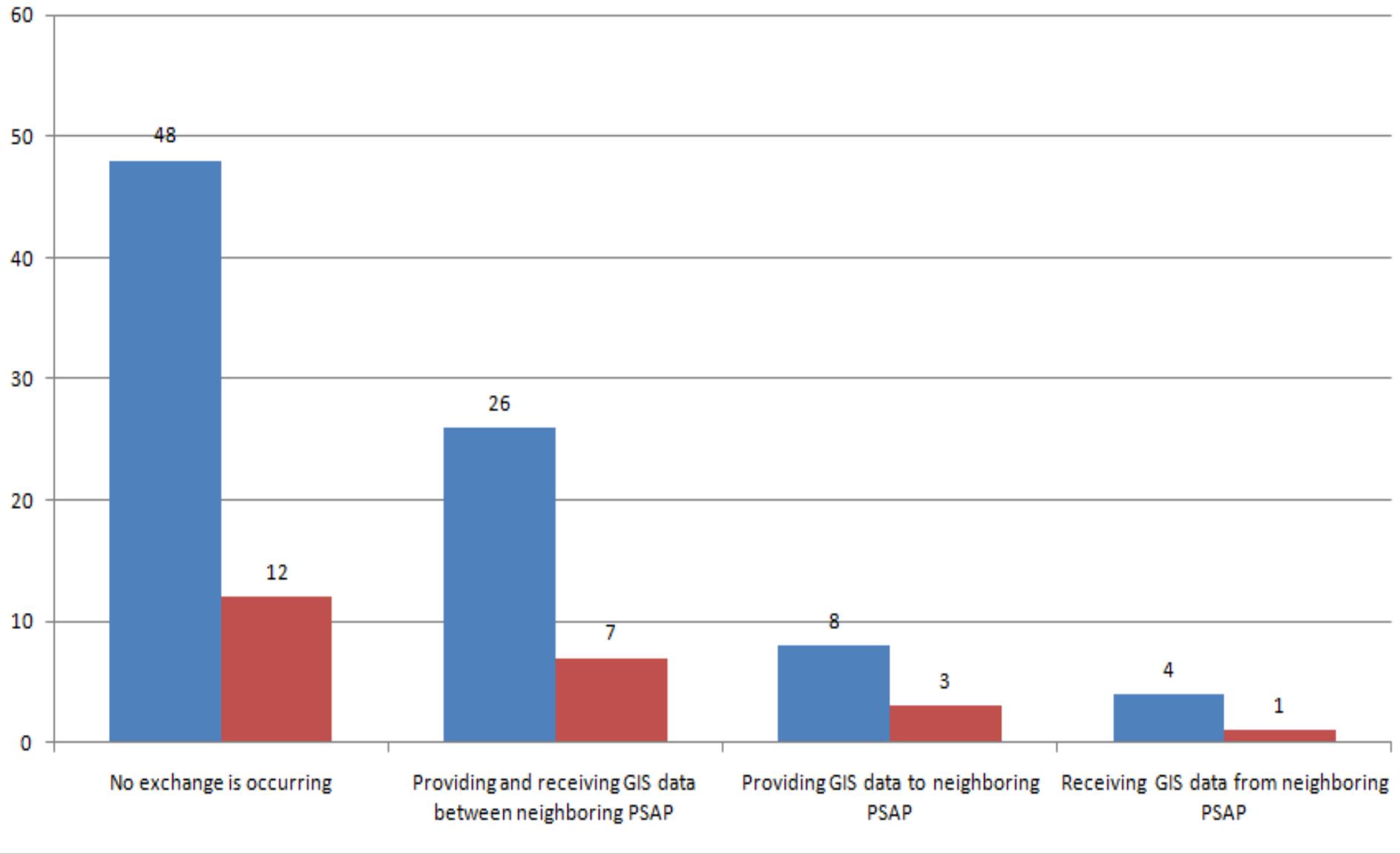
Results as of 6/13/11

Of the following potential issues with GIS data, which concerns you the most?



Results as of 6/13/11

Do you currently share GIS data with neighboring counties/PSAPs?



Project Benefits

- ◆ Enterprise system for integrated 9-1-1 GIS datasets across the state
- ◆ Data interoperability across jurisdictions – integrated datasets
 - Provide opportunity to share data today
- ◆ Additional quality control and reporting for local GIS data
- ◆ Edge-matching and discrepancy resolution of GIS data across jurisdiction boundaries
- ◆ ‘Gap-fill’ in areas to get to a baseline level of data across the State
- ◆ 9-1-1 GIS Database will provide the data to ESInet providers for ECRF/LVF in NG 9-1-1

Next Steps

- ◆ Developing Memorandum of Agreements (MOA) and Data Sharing Agreements
- ◆ Drafting Initial Database Standards
- ◆ Forming Initial System Requirements
- ◆ Conduct and Schedule Community Outreach

More Information

- ◆ www.michigan.gov/911GISGrant
- ◆ www.michigan.gov/snc
- ◆ Harriet Miller-Brown
 - MillerHR@michigan.gov
 - 517-241-0080
- ◆ Laura Blastic
 - blasticl@michigan.gov
 - 517-373-7910

Questions

Open Discussion