

WASHTO QUALITY AWARD PROGRAM

UDOT QUALITY IMPROVEMENT COMPETITION

Team Name: UDOT GIS

Team Members: David Alger, Kelli Bacon, Adrian Welsh, Kaitlin Barklow, Paul Damron, Ed Graves, Kory Iman, Linda Massie, Chris Meredith, Aaron Pinkerton, Sarah Rigard, Ruben Schoenefeld, and Corey Unger.

*Please provide a summary of you/your team's quality efforts **and** how it helped UDOT meet one of our strategic goals:*

The Utah Department of Transportation (UDOT) Geographic Information Systems (GIS) team is a newly formed matrix organization within UDOT. UDOT has always strongly embraced GIS; however, now its influence and structure is more formalized throughout the department. The UDOT GIS matrix includes several analysts within Central as well as analysts in each region. Through this structure GIS is able to execute a high degree of collaboration both internal and external to UDOT. This collaboration helps the department creatively meet its strategic goals through streamlining work processes, improving data quality, and supporting data driven decision making in a web environment. GIS is known as a visualization tool that brings disparate data together, the GIS team at UDOT is bringing the various groups of UDOT together in new ways. The GIS team does not support one strategic goal but support s all three goals by working across the department to pull data and people together to provide relevant information for completion of work tasks. This team is changing business processes at UDOT. Below are some examples of how each part of the matrix is strengthening GIS in the department as well meeting UDOT's goals to zero crashes, injuries, and fatalities, to preserve infrastructure, and to optimize mobility.

Region 1 – Region 1 has worked to better disseminate GIS throughout its Region the past year. Through that work it was identified that Region GIS users would benefit from adding mileposts to the interstate ramps. By collaborating with Central and the mileposts data steward the mileposts layer was modified to provide greater use to all. Region 1 also developed a weed spraying application to track areas where herbicide was applied along UDOT's right-of-way (ROW). This application is shared with the Division of Natural Resources (DNR) to prevent duplication of efforts which ultimately saves the State of Utah money.

Region 2 – Region 2 worked on several critical applications this past year to better communicate project and planning efforts within the Region. Region 2's project applications for STIP Workshop, Engineers, and their Maintenance 3 Year Plan (non-STIP projects) helped to communicate the Region's activities to the public and its program managers and engineers at the Region.

Region 3 – Region 3 also worked on several critical project applications to communicate project and planning efforts within the region to the public. Region 3 is also working with UDOT Central GIS to improve the STIP workshop process for the upcoming STIP planning cycle. This effort is improving data quality control within ePM. Each year UDOT GIS's involvement in the STIP grows and must be flexible to meet the current year's demands.

Region 4 – Region 4, has a strong GIS presence. This past year to improve project communication, Region 4 has been converting design data to GIS for all major reconstruction projects to produce a webmap for each milestone (Geometry Review - Plan in Hand - PS& E - Final). These visual representations of engineered drawings are accessible to stake holders, transportation commissioners, region leadership, project managers and the public virtually anywhere and anytime. Region 4 also continues to spear-head the transfer of ROW information to GIS. Moving this data to spatial and online format has saved the department money in the past and will continue to save the department money as it becomes more comprehensive in the future.

Asset Management – The analysts at UDOT Central working in Asset Management manage a large suite of important data for UDOT. Asset Management is responsible for all of the Mandli data layers that depict the location of assets such as signs, pavement messages, shoulder types, medians, traffic islands, lane characteristics, etc. This information helps project managers and engineers answer baseline questions about UDOT-owned features throughout Utah. Over the last year, Asset Management has conducted many training sessions throughout the department on how to use the feature inventory data and the GIS tools available from UDOT’s Data Portal such as UPlan, Open Data and Linear Bench Explorer. Asset Management also maintains the UDOT Linear Referencing System (LRS) and the milepost data. These layers support the spatial location of a multitude of data at UDOT.

Planning – The Planning Department at UDOT has deep roots in GIS. UPlan and UPEL were initiated by UDOT planning years ago. This year, the analyst in planning used GIS to communicate transportation planning activities such as the Long-Range Plan, the Unified Plan, the Statewide Bike Plan, and the Road Respect tour, an annual bicycle program to improve Utah’s overall active transportation system. Many of these maps were used in meetings with city and local governments and are available to the public to communicate planning activities.

Central – Much like the Regions who must collaborate with all departments in their Region and the public; Central GIS must collaborate with all departments located at Central as well as the Regions and the public. The role of Central GIS is to provide guidance and structure for the organized implementation of GIS statewide, provide customer service to all analysts and GIS-users, maintain GIS software and hardware, identify GIS needs at UDOT, bridge data owners and data users, and develop mapping solutions for business questions. With a small staff, Central GIS completed or expanded the following important projects this year:

- **UDOT ROW**
 - **Corridor Preservation Parcels** - The Corridor Preservation parcel layer provides a view of properties under UDOT’s Corridor Preservation Fund. It is intended as a reference for use in the early stages of a project, allowing the user to identify properties that may show UDOT ownership in researching the property, but for which the project needs to reimburse the Corridor Preservation Fund.
 - **Map** - The UDOT ROW Map is the result of a collaborative effort between the different divisions of Right-of-Way (ROW) within UDOT – Central and Regions. The effort included developing a process of capturing project-based right-of-way information from design drawings and populating a GIS-layer that is served in UPlan. Region ROW staff have access to the GIS layer and a set of tools that import the appropriate lines from CAD to GIS. The resulting layer provides not only a depiction of known ROW for reference purposes, but also includes links to the source ROW design files in ProjectWise, UDOT’s file management system, for more detailed review and use.

- **ROW Parcel Acquisition** - These maps and datasets are the first steps toward developing a more robust and informative resource for UDOT ROW to use in their management process. The goal is to develop a layer that is integrated with the ROW database. This will provide a resource moving forward to aid the different steps of the ROW process, including tracking stages of acquisition, processing, and disposal of real property.
- **UPEL** – The Utah Planning and Environmental Linkages (UPEL) application was developed years ago by an initiative of UDOT Planning and was finally brought in-house by UDOT GIS this past year completing the project. UPEL is a spatial analysis tool that summarizes the potential environmental and socio-economic impacts of a user-defined location. UDOT GIS is a critical component to the final deliverable for all spatial products.
- **EPM and STIP Data Layers** – Project maps are critical to communicating with all at UDOT and the public. Central GIS has worked closely with Electronic Program Management (EPM) administrators to improve the GIS data that is publicly available and used by all at UDOT to develop maps.
- **Open Data** – Central GIS has worked to configure a new Open Data portal that provides spatial data downloads to the public. This new portal allows for tabular downloads of the data fulfilling an American’s with Disabilities Act (ADA) requirement. This portal also improves UDOT’s data transparency.
- **Safety Layers** – Central GIS helps make the crash analysis data available from UPlan and is working with the Safety group to provide access to important safety layers, like ADA Pedestrian Ramps and Speed Limits.
- **Utilities** – Central GIS is collaborating with the Utilities Director and other UDOT group on two projects. One is building a repository for utilities data collected during UDOT projects and the other is a pilot project with a local utility company to share data using secure map services for better project synchronization.
- **Drainage Data** – Central GIS is supporting the Hydraulics group on a project to develop a statewide drainage layer in GIS. This data will help UDOT hydrologists meet mandates set by the federal government as well as UDOT engineers in the development of projects.
- **Structures** – Central GIS has supported the Structures group with several mapping efforts. These maps help to improve their data records as well as identify potential bridge hazards and inefficiencies in statewide inspections.
- **Outdoor Advertising Control** – Central GIS and GIS Analysts in Asset Management continue to work with the Outdoor Advertising group to improve the map they use to track Billboards. Continued use and support of this map allows employee time to be spent on other permit related tasks.
- **UPlan Administration** – UPlan is the central clearinghouse for UDOT’s GIS data. Through UPlan users can view hundreds of datasets online. Central GIS is responsible for maintaining UPlan and works to develop better searching and organization strategies throughout the year.

This is just a sample of the key projects that UDOT GIS has been involved in over the past year. The use and demand of GIS continues to grow each year. GIS touches every department in UDOT, and many projects that involve GIS are focused on UDOT’s goals to zero crashes, injuries, and fatalities, to preserve infrastructure, and to optimize mobility. In addition, using GIS to streamline work processes helps save department time and money by providing quick answers to business questions.