

WASHTO QUALITY AWARD PROGRAM

UDOT QUALITY IMPROVEMENT COMPETITION

Team Name: Region 4 Preconstruction

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

The use of GIS (Geographic Information System) tools has been a remarkable breakthrough in the UDOT Region 4 (R4) Preconstruction group's effort to make better decisions while improving efficiency in delivering their program. Making better decisions and increasing efficiency directly addresses each of the UDOT's Final Four Strategic Goals and the governors SUCCESS FRAMEWORK initiative. While GIS has a sophisticated infrastructure; R4's Preconstruction department embraced the new technology to understand and develop its capabilities. The use of GIS tools has allowed the entire preconstruction group to share data and information with stakeholders both within and outside the UDOT. By increasing the usability of data and sharing findings with stakeholders and colleagues the R4 Preconstruction group has been instrumental in advancing the use of these technologies statewide. Below are some examples of how they use GIS tools to Preserve Infrastructure, Optimize Mobility, Strengthen the Economy, and pursue ZERO FATALITIES.

ROW- The R4 ROW group has been exceptionally aggressive at embracing the power of GIS tools. One of the initial break-through's came when we began to GEO-reference design files. This process takes new or existing survey and/or design files and ties them to real world coordinates instead of the arbitrary coordinate system traditionally used in roadway design. While this may sound simple, the results of this action have been fantastic as this has been the foundation for many of our new tools. Since the value of GEO-referencing has become evident, the R4 ROW department has been working diligently converting Microstation files (CAD data) to GIS. While keeping the engineered, and survey quality of the data we have been able to convert CAD data to GIS. We have also built in-house tools to help convert ROW survey files instantaneously. After each project is set up and ROW is acquired, the data is then converted from CAD to GIS within seconds. This tool is used to graphically, and accurately, display the UDOT ROW lines on a UPLAN map. This is extremely valuable to our project teams, stakeholders and a multitude of other users including commercial land surveyors, as not only are the ROW lines displayed but certified section corners, complete with tie sheets, are also linked to the map and accessible to the public. Another exciting use of GEO-referencing is the development of a pilot service that when fully implemented will display not only the graphical representation of individual parcels for a project but also the property acquisition status of each parcel. This service will pull information from ePM each evening and use color coding to graphically display the acquisition status of each parcel. We believe this service will prove invaluable in communicating ROW parcel information with project teams, landowners, contractors and stakeholders in general. Like other services it can be hosted on UPLAN and publicly available but also can have security controls to insure the integrity of the data and to regulate who views sensitive information.

Another relatively simple but very valuable tool is our ROW Type Map that displays the Region's ROW in one of three categories: ROW, Limited Access or No Access. Having this information readily available through UPLAN has proven very beneficial for multiple users. All of R4's ROW is categorized as No Access, Limited Access or regular ROW. (Further uses of Geo-referencing will be discussed in the following sections of this nomination.)

Design- With the use of UPLAN and GIS we can visualize each project design phase and milestone. As a result of GEO-referencing, and overcoming the challenge of converting CAD files to display in UPLAN via GIS tools, this process was easy to create. Just like the ROW tool, we have developed a GIS tool to help mine the design data. It was not too long ago that we were all intrigued by our ability to print a scroll plot of a project 10 miles long and lay it on a table to facilitate our discussions. While a visual representation of a project is very useful, a 10 ft scroll plot is not always the most convenient manner in which to have a display. We have developed an application that allows project teams, and a myriad of stakeholders from the average citizen to elected officials, to see a representation of the design files on a UPLAN map. As with the other services this is extremely useful in mitigating the challenges of team members and/or stakeholders in remote locations. It has been very useful and efficient in each milestone meeting to pull up the Region 4 Design UPLAN map. If designers have designed multiple options, each option can be displayed, discussed, and decisions expedited as to the direction the project should go. The second phase of this application has been developed to simultaneously view all 3 phases of a project (Concept, Plan In Hand, PS&E) simultaneously on one screen while panning and zoom in one map and watching all three windows follow suit. This Design to UPLAN application has been very useful for Project Managers to help local leaders visualize what UDOT is trying to accomplish for projects. The use of design plan mapping has no doubt helped our region teams reach for the SUCCESS FRAMEWORK goals established by the UDOT to improve our project concept and scoping process in order to reduce the cost of change orders.

Utilities- GIS Tools are being developed and used to visually manage utility conflict resolution matrices in design. This application has been made possible by utilizing the GEO-referencing and Design file mapping previously discussed. This format allows multiple organizations to share data in the UDOT's public facing online mapping application, UPLAN. By displaying utility data and infrastructure on an easy to read and understandable map, our project teams can work to resolve conflicts with respective utility companies in an expeditious manner. This tool has proven very effective as many stakeholders are challenged in reading and understanding roadway design plans. Additionally we can share our maps via the internet and have productive work sessions with participants in various remote locations. Due to the large geography of R4 this has been a very cost effective strategy. The ultimate vision is to create a database of all utilities within the ROW in our region (and UDOT as a whole) that can be viewed via GIS tools so we can actively manage utility conflicts and share data among stakeholders both public and internal.

Environmental- The benefits of GEO-referencing and displaying design files has also had a dramatic effect on how R4 completes the NEPA process for our projects. R4 is relatively unique as it contains the vast majority of Utah's cultural sites and Threatened and Endangered Species (T&E) as well as the normal environmental challenges found throughout the state. With the ability to display design files with survey grade accuracy along with resource shape files we are now able to collaborate with our environmental staff to avoid resources and minimize the effect of our projects on the various resources. This has had a significant positive impact on many of our projects by reducing the cost of mitigation and decreasing the time for consulting with resource agencies and Native American tribes. Due to the sensitive nature of some of the environmental data we are working with agencies like the State Historic

Preservation Office (SHPO) to develop protocol to ensure the secure use of data to expedite our project delivery. Another use of GIS technologies was the recent standardization of a GPS data dictionary which was implemented for use in managing mitigation for Utah Prairie Dog surveys.

As you have seen the utilization of GIS technologies by the R4 Preconstruction group has been far reaching. Each discipline has accepted the challenge to embrace the technology and seek new methods to improve efficiency. The R4 preconstruction group has exemplified the philosophy that “to do more with less you need to find better tools.” They have found better tools and learned to use them. In the process they have been a driving force that has undoubtedly changed the UDOT for the better.