Innovation Drives Stakeholder Involvement in Legacy Parkway & Preserve (Using Mobile GIS/GPS)

By Bryan Adams and Shawn Frye

New roadway projects often receive much opposition. Bringing out the positives of a controversial project has been the focus for the Utah Department of Transportation (UDOT) as the Legacy Parkway EIS release and public hearings rapidly approach.

One way to show the positive aspects of the project is to provide tours of the project area to government officials, opposition groups, media agencies, consultants and other stakeholders. To increase the effectiveness of the tour, a UDOT van was equipped with a 17-inch flat-screen high-definition television linked to a tablet PC running ArcGIS with project components, hotlinked photos and aerial photography and enabled with a Bluetooth Trimble GeoXT GPS unit.

Displaying the actual location of the van with respect to project components was a primary feature of the tour. The proposed right-of-way line work overlaid on the aerials gave participants a visual impression of the project that was not possible without this technology.

Legacy Parkway & Preserve

Interstate 15 is the only freeway connecting Salt Lake City with areas to the north such as Davis County. The proposed Legacy Parkway, which would be paralleled by a multi-use trail, is one element of northern Utah's "Shared Solution." This transportation plan includes mass transit (commuter rail, etc.), expansion of I-15 and other improvements to meet anticipated traffic needs.

The area north of Salt Lake City is constrained by mountains to the east and the Great Salt Lake to the west. I-15 runs through the middle of the corridor, and surrounding developments make it difficult to route another major freeway through the area.

Environmental scientists collect field data for Legacy Nature Preserve (Scot Zimmerman)

Therefore, finding a balance among various stakeholders needs required justifying the decision to forgo an alternative that impacted fewer wetlands in exchange for avoiding more than 120 business and residential relocations. The 2,098-acre Legacy Nature Preserve was proposed to help mitigate the impacts of the preferred alternative on wetlands and wildlife.

Stakeholder Concerns

The main stakeholders for the Legacy Parkway & Preserve are citizens, local governments and

environmental groups. Opinion polls show that many residents who live north of Salt Lake City are tired of sitting in traffic and want the project to get underway. Many also voiced frustration over the amount of taxpayer money being spent to respond to a lawsuit brought by several environmental groups that want to protect open land and wetlands. These environmental groups believe traffic issues can be solved by implementing mass transit and widening arterial streets. Local governments want to alleviate the traffic problem but also are concerned the nature preserve will cause them to lose developable land that could contribute to their tax base.

With conflicts and opinions surrounding the Legacy Parkway project, UDOT needed to highlight positive aspects of the project and help stakeholders understand the exact location of various alignments in relation to important resources such as the Great Salt Lake, wetlands, relocations and Section 4(f) sites.

UDOT's Solution: A Mobile GIS/GPS Van

UDOT's first approach was to take project stakeholders on a tour of the project area using an agency van. The UDOT project team initially used hard copies of maps, but it was difficult to view the large scroll maps and even harder for tour participants to fully understand where they were. Consequently, the team brought a tablet PC along to display GIS maps and show stakeholders the location of the van relative to displayed resources. However, the screen on the tablet PC was too small to be very useful, and the project team could not always pinpoint the location of the van along the alignment shown on the GIS map.

The next idea was to add a GPS unit (Trimble GeoExplorer XT) and connect it to the tablet PC so the van's precise location would display on the map in real time. To connect the units, the project team first tried two cables joined by a serial-to-USB adapter, but this connection was temperamental and didn't always work. HDR then suggested using wireless Bluetooth technology, which allowed the GPS unit and the tablet PC to "talk" without cables or wires.

A 17-inch high-definition television screen was mounted to the van's ceiling and connected to the tablet PC via a VGA cable. Combined data from the GIS maps and GPS unit could now be viewed clearly by tour participants. If tour participants want to get out of the van and walk through the project area, the VGA cable can be disconnected from the tablet PC, and the PC and GPS unit can be taken out into the field.

Tour participants could walk through the project area and still access project information using this mobile tablet PC and a GPS unit. (Shawn Frye)

The mobile GIS/GPS van allowed UDOT to show tour participants many types of data, depending on their particular areas of concern, including:

- Aerial photography
- Alternative alignments
- Project design (pavement area, lanes, cut/fill slopes, etc.)
- Property parcel boundaries
- Proposed developments
- Delineated wetlands
- Wildlife habitat
- Mitigation property boundaries
- Section 4(f) properties

Helping Stakeholders Understand the Project

UDOT has taken a wide variety of people on the tour, including environmental groups that oppose the project, Boy Scouts who wanted to see the nature preserve, mayors from cities along the various alignments, UDOT and contractor employees who needed specific information about the project, and representatives from the U.S. Army Corps of Engineers (USACE),

Federal Highway Administration (FHWA) and Environmental Protection Agency (EPA).

Stakeholders view detailed site information with the aid of a GPS unit and GIS software to help them understand where they are in relation to specific geographic features. (Shawn Frye)

UDOT has found the mobile GIS/GPS van to be extremely effective for illustrating alternative alignments, delineated wetlands and platted developments. In March 2005, representatives from the USACE, FHWA and EPA attended a tour to compare impacts of two proposed alignments. During the tour, the van drove by open fields platted for development that the alignments would pass through. Using the TV display, UDOT overlaid the GIS layer for the proposed alignments onto line work for the platted developments. The agency representatives could clearly see how many new homes would be impacted. The representatives also asked to get out of the van to look at specific wetlands. UDOT brought the tablet PC and GPS unit into the field to show the agency representatives exactly which wetlands would be affected. The representatives could use attributes in the GIS to view important statistics—such as wetland quality and function rating—about the particular wetland they were standing on. They realized that the wetland areas affected by each alternative were comparable and that neither area had a higher wetland quality or function rating. As a result of this tour, the agency representatives gained knowledge of the real impacts of the alternatives.

The GIS/GPS van tours also helped many non-technical stakeholders understand that visible water isn't required for an area to be considered wetlands. Participants could see on the TV screen that the van was driving alongside a designated wetland, then look out the window and see a grassy area with no open water. This experience drove home the point that wetlands aren't always "wet."

Another use for the GIS/GPS van tours was illustrating the number of relocations required by certain alternatives. This information had already been disclosed, but for many stakeholders it was more dramatic to see it in person, out in the field. UDOT displayed an aerial photograph of the project area on the onboard TV and overlaid it with a layer of dots indicating expected relocations. Tour participants could see the van on the screen driving through clusters of dots and look out the window to see all of the homes that would need to be relocated. They also saw how neighborhoods would be divided and access restricted.

Other Uses

UDOT's GIS/GPS system has been requested for use by biologists, noise analysts and construction contractors. It might also be used when UDOT is getting the injunction against the project lifted. In the court proceedings, hard copies of maps are used and it is difficult for people to get a true understanding of the project.

In addition, during the construction bidding process, the system could help bidders better understand conditions "on the ground" and how the project design will interact with existing conditions. Another way the system could be

used during construction is locating specific features that will need to be fenced: 4(f) sites, wetlands and other features that cannot be disturbed. Locating any of these features will be easy with the mobile GIS/GPS system.

Summary

Use of the mobile GIS/GPS van helped UDOT communicate impacts of the proposed Legacy Parkway & Preserve to people with all levels of involvement in the project. Instead of looking at engineered drawings on paper, stakeholders can see an interactive electronic project map that is updated in real time and shows their physical location compared to potential relocations and wetlands. Many project stakeholders changed their opinions about the project as a result of the van tours.

Currently, the project has just finished the public comment period for the Final Supplemental EIS, which is scheduled for completion in July 2005. A Record of Decision and a 404 Permit are anticipated from FHWA and USACE in late 2005. UDOT will then go back to court to get the injunction against the project lifted. Assuming all goes well, construction is scheduled to begin in spring of 2006.

Author Information

Bryan Adams, Design Oversight Manager
Utah Department of Transportation, Legacy Parkway Team
4001 South 700 East, Suite 450
Salt Lake City, UT, 84107
Telephone (801)924-2070
Fax (801)934-2071
Email bryanadams@utah.gov

Shawn Frye, GIS Specialist
HDR Engineering Inc.
3995 South 700 East, Suite 100
Salt Lake City, UT, 84107
Telephone (801)743-7819
Fax (801)743-7878
Email sfrye@hdrinc.com