



Pipeline Mapping & GIS Services

Tetra Tech Rooney (REI) has extensive expertise in providing superior Pipeline Mapping & GIS Services along with innovative WebMap solutions within the Oil & Gas industry. REI has a proven track record of supplying high quality engineering-based pipeline routing, along with environmental permitting, survey, right-of-way, and land acquisition support for major linear and gathering pipeline projects across the nation. Our project experience covers a wide range of route conditions, from rural landscapes to highly congested urban settings that include diverse terrain and design challenges, such as densely populated areas, rugged mountain ranges, and lowland wetlands, which require critical thinking and experience to traverse. REI's mapping team overcomes these challenges with innovation and practical problem solving to complete projects of varying complexity. Our mapping team utilizes CAD, GIS, and other industry leading software packages to provide drawings, customized databases, and other mapping solutions to fit the ever-changing needs and data requirements of our clients.



Pipeline Mapping and GIS Services

- Innovative WebMap solutions
- Engineering based pipeline routing and design
- Integration of comprehensive databases for project management and control
- Drastic time and expense reduction through use of digital platforms
- Extensive knowledge of construction operations including bored crossing methods and Horizontal Directional Drills (HDD)
- Ortho-rectification of aerial photography
- Integration of LIDAR and ground-based survey
- Expertise in GIS and multiple CAD platforms, providing flexibility to the client

Industry-leading Project Experience

20" & 16" Interstate Liquid Pipelines

Designed and permitted a 200 mile 16" and a 350 mile 20" parallel pipeline project. The pipeline routing included 655 conventionally bored road crossings in addition to 244 HDD. The project terrain included forested mountains to highly populated urban areas. REI's mapping team created all pipeline construction drawings including alignment sheets, crossing drawings, and detailed HDD design drawings. REI also implemented and maintained a customized WebMap application, which was utilized project wide from the feed and bid phases through active construction with real-time asbuilt progress tracking including multiple asbuilt databases for use in the operator's UPDM system.

16" Crude Oil Pipeline

Designed and permitted a 93 mile 16" pipeline with strategic placement within UDOT's corridor to minimize the construction impact on the surrounding urban environment and aided in significantly reducing the number of private landowner conflicts. The project terrain included forested mountain landscapes to working in a crowded highway corridor. REI's mapping team created all pipeline construction drawings including alignment sheets, crossing drawings, and detailed HDD design drawings. Utilizing our engineering-based routing expertise this project was constructed and completed on schedule.

20" & 24" Crude Pipelines

Designed and permitted a 60 mile 20" and a 280 mile 24" pipeline project. The pipeline route included more than 2,000 permit and landowner tracts and a total of 30 HDD. REI's mapping team provided land acquisition and permitting support including a full Environmental Impact Study. Our team created all pipeline construction drawings including alignment sheets, crossing drawings, and detailed HDD design drawings, additionally provided support during construction all the way through project close out by creating the asbuilt drawings and delivering a complete asbuilt database for use in the operator's PODS system.

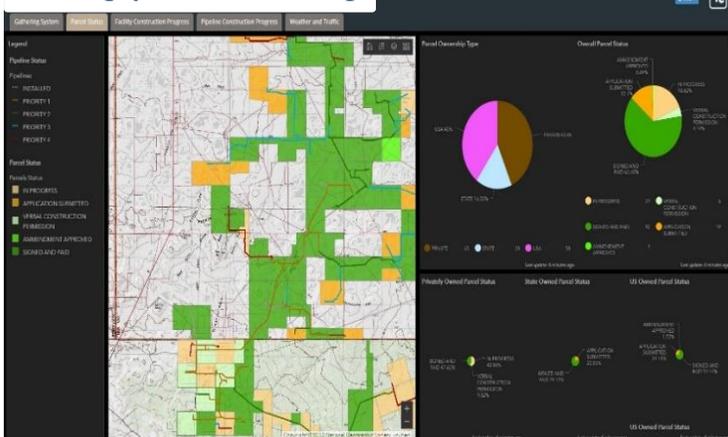
Innovative WebMap Solutions

What is a WebMap? A WebMap is an internet-based map viewer and document interface that allows users to easily view project related features such as the latest pipeline routes, ROW, survey line work, parcel tracts, and all other features in one location without having to download and store large datasets or manage multiple files and drawings associated with pipeline and gathering projects.

Is it Difficult to Use? The WebMap is easily accessible from an internet browser on a desktop, laptop, or mobile device such as smart phones and tablets, allowing users the ability and freedom to access and view the project data from anywhere with an internet connection. The interactive geo-location tool enables users to pin-point their real-world location in relation to the project. Many users utilize the geo-location function while working on-site along the ROW of a project.

All data stored on the WebMap server is available as layers that can be turned on and off. The layers are selectable, which enables the user to access stored attribute data associated within each feature such as land owner information pertaining to a specific parcel or the individual restrictions of environmentally sensitive areas. The WebMap viewer is not limited to a set scale, it can be viewed as an overall project all at once or can be zoomed in to a level of detail not available on alignment sheets.

Gathering System - Parcel Tracking



Will it Benefit My Project? Our current clients have found their WebMap applications to be a vital service and tool during contractor bidding and pre-construction, by providing a full project overview and access to important documents and drawings in one place. During construction the WebMap services are being used in daily operations for planning meetings, annotating, and printing scatter reports for field crews, on-site referencing and geo-location, and up to date document access and printing for inspections and audits. The WebMap also has the capability to function as a progress tracking tool, showing near real-time status of important pre-construction and construction activities such as parcel acquisition, survey permissions and progress, grading, ditching, welding, pipe-in-ditch, and restoration status.



How Does It Work? The WebMap functions as a centralized data management system or dashboard for all project information by providing a direct link to documents and drawings available on the project SharePoint site or any document management system. The WebMap significantly minimizes the risk of the client and any contractors and sub-contractors using out of date information by utilizing real-time server updates and by providing direct hyperlinks to the latest versions of drawings and documents available.

Approved edits are updated on the secure WebMap server and the associated drawings are then revised and uploaded to SharePoint. Users can quickly view the changes in the WebMap viewer, access the newly revised drawings via the SharePoint links, and monitor the progress of pre-construction and construction activity in real time without costly delays in transmitting and delivery of drawings. The WebMap is a user-friendly interface allowing the entire project team to locate and access documents from anywhere, improving sustainability and avoiding extensive document printing and shipping costs.

Is My Data Secure and Protected? Tetra Tech has a dedicated GIS development group that allows REI the ability to function as administrators with direct access to manage the data and customize the WebMap for any unique requirement of the client. Use of the WebMap is password protected with user specific login credentials and all data is stored on Tetra Tech's secured Azure servers located in a hardened data center.

What Happens After A Project? The data that drives the WebMap can be carried through the entire life cycle of the project from feed through construction to the operator's internal data model (such as PODS or UPDM) for utilization in daily operations, while maintaining continuity and accuracy, making it easily accessible to all approved personnel.



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