GIS AND Right of Way

Keeping our country connected and resilient

BY LINDA FOSTER, PLS, GISP

When considering land records management in our country, the local tax assessor's office usually comes to mind first. Responsible for collecting taxes in their communities, assessors are stewards of important land information and property characteristics and often maintain a map of the parcels that make up their jurisdictions. But what about the strips of land that lie between each taxable parcel? Often void of information or nonexistent in tax maps, this seemingly nondescript land to many is the focus of right of way and land professionals and houses some of our nation's most critical infrastructure. Hidden in plain sight, these ribbons of land weave the web of access that keeps our country connected. Transportation systems, electrical networks, communication, water distribution, sanitary sewer systems and other infrastructure depend on ROW to keep supplies and services flowing to consumers.

In their 2021 Report Card for America's Infrastructure, the American Society of Civil Engineers (ASCE) assigned a grade of C- to our country's infrastructure, a clear indicator that we must take swift action to slow deterioration and meet the growing needs of our society. And it seems we are headed in the right direction. With the recent

passage of the Infrastructure Investment and Jobs Act (IIJA), the federal government authorized spending $1.2 trillion on transportation and infrastructure improvements in the United States, highlighting the need to accelerate infrastructure project delivery. Acknowledging this need, the White House released the Permitting Action Plan in May 2022 and The Biden-Harris Action Plan for Accelerating Infrastructure in October 2022.

To further address our country's infrastructure needs and ability to be more resilient in the face of mounting climate extremes, agencies are turning to geographic information systems (GIS) to manage their ROWs. From understanding the location, rights and extent of their ROW to planning future projects and meeting safety and regulatory compliance requirements, time and money savings are being realized.

Understanding the Value of Existing ROW with GIS

According to the Federal Highway Administration (FHWA, 2023), there are approximately 4.19 million miles of highway in the U.S. Decades and, in some instances, even centuries of land transactions are what carved out the ROW for these highways. Likely, the real estate division of every organization responsible for managing ROW has a records room filled with documents defining where critical infrastructure can be placed. Perhaps as valuable, if not more so, than the physical land they define, these records are vulnerable to loss (e.g., fires, floods, and deterioration) and are often difficult to access. Access comes with a substantial cost. These records are not just a reminder of time gone by but are vital legal documents sought after and relied upon daily by land and other professionals. Because it is often a manual process, records research burdens agency personnel and adds cost to every infrastructure project contemplated.

Nevada DOT RWSS manager Gregorio Torres experienced this first-hand. His challenge was the vast number of documents dispersed among folders, boxes and filing systems. "Information wasn't consistent or reliable," says Torres. "It hadn't been brought together in a way that addressed all of the issues that the digitization process highlighted. We needed to change." And change, they did. They embarked on an ambitious project to digitize and map their ROW documents in a GIS, providing ready access to teams across the organization and significantly improving efficiency.

Planning with Purpose

Once existing ROW records are mapped and accessible in GIS, officials can better plan expansion and reconstruction projects and (re)build more efficiently. By understanding where existing ROW is located, potential project impacts such as environmental sensitivities, prohibitive construction conditions and access considerations can be identified early in the process, accelerating the project timeline and saving money. For example, American Electric Power (AEP), which maintains the largest electric transmission network in the U.S., has reduced its planning of transmission routes to just two weeks using real-time GIS data. Chugach Electric Association in Alaska also uses GIS to keep projects on track through a compressed construction window.

According to the National Academies of Engineering (NAE), there are approximately 5.5 million miles of electrical distribution lines and 600,000 miles of transmission lines in America. With the U.S. Department of Energy (DOE) making its largest-ever direct investment of $3.4B towards strengthening electrical infrastructure, the need for readily accessible ROW information for project planning will be amplified. The 58 projects identified in the funding package span nearly every state (44 out of 50) and aim to strengthen the resilience and reliability of America's power grid.

Staying Safe and Compliant

Not only is it imperative for organizations to know where their ROW is, but it is also essential to know what lies within the ROW. With a renewed focus on co-locating utilities, especially broadband infrastructure, within transportation corridors, there is an increasing need to understand the location of assets and encroachments. With 2.2 million miles of underground water infrastructure (ASCE Infrastructure Report Card), 1.2 million miles of underground sewer lines (US EPA), 2.6 million miles of natural gas/liquid petroleum pipeline (US DOT), and the electrical infrastructure referenced above, there is plenty of opportunity for conflict! Agencies are turning to GIS and its real-time capability to improve operator safety, facilitate better design decisions through system integration and ensure compliance with standards and regulations.

While overhauling our country's infrastructure is daunting, it is vital for keeping our country connected and resilient. Managing ROW with GIS is a big step towards achieving this goal and will have a lasting impact on future generations. ✪

To learn more about managing ROW with GIS, visit *https://go.esri.com/right-of-way.*

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