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Strategies for a Comprehensive Inventory and Management of Real Property Assets: White Paper

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16. Abstract The Texas Department of Transportation (TxDOT) manages a significant amount of right-of-way (ROW) assets—around 1.1 million acres of land that provide ROW for nearly 80,000 centerline miles. Management of these ROW assets is crucial, as ROW issues often create a bottleneck during construction projects. The ROW portfolio also represents a significant revenue-generation opportunity, in terms of excess ROW assets. The challenge is to ensure that TxDOT is using current ROW assets as effectively as possible. Currently, effective ROW administration is hampered by the lack of a comprehensive, reliable inventory of excess parcels. Even if the inventory existed, a robust methodology for valuing those excess parcels is not in place. TxDOT has begun investing in a GIS-based system to catalog its ROW assets. This white paper outlines specific steps TxDOT can take to increase the capabilities of its information systems in order to automate ROW asset evaluation and identification of alternative uses, thus maximizing the public benefit.		
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The Challenge and Opportunity

The Texas Department of Transportation (TxDOT) manages a significant amount of right-of-way (ROW) assets—around 1.1 million acres of land that provide ROW for nearly 80,000 centerline miles. Management of these ROW assets is crucial, as ROW issues often create a bottleneck during construction projects. The ROW portfolio also represents a significant revenue-generation opportunity, in terms of excess ROW assets. The challenge is to ensure that TxDOT is using current ROW assets as effectively as possible. Currently, effective ROW administration is hampered by the lack of a comprehensive, reliable inventory of excess parcels. Even if the inventory existed, a robust methodology for valuing those excess parcels is not in place. Fortunately, TxDOT and other DOTs have been undertaking considerable research and development in recent years regarding asset valuation and management along with manipulation of geospatial information via GIS systems. TxDOT in particular has been investing in a GIS-based system to catalog its ROW assets. Collectively, these initiatives provide the building blocks for new approaches to a comprehensive inventory and management of real property assets. This white paper outlines specific steps TxDOT can take to increase the capabilities of its information systems in order to automate ROW asset evaluation and identification of alternative uses, thus maximizing the public benefit.

TxDOT Current Efforts

TxDOT currently has a large inventory of ROW parcels and limited ability to automatically review them for potential sale or alternative usages. To address this need, TxDOT is investing in a Real Property Delineation and Asset Management System, which has a GIS-centered core for visualization and data access. Figure 1 provides a system flowchart.

TxDOT's current systems will allow full inventory of ROW parcels in a central, easily accessed manner. However, the system does not currently have provisions for automated review and assessment of these parcels for alternative uses, whether that is disposition through sale or alternative use such as revenue generation. As such, the challenge for this research is to better understand the ability to use information systems data and software to (semi-) automatically assess each parcel for use. This is a challenging and pressing problem given the significant amount of assets that TxDOT currently controls, which makes manual review time consuming and potentially inconsistent.

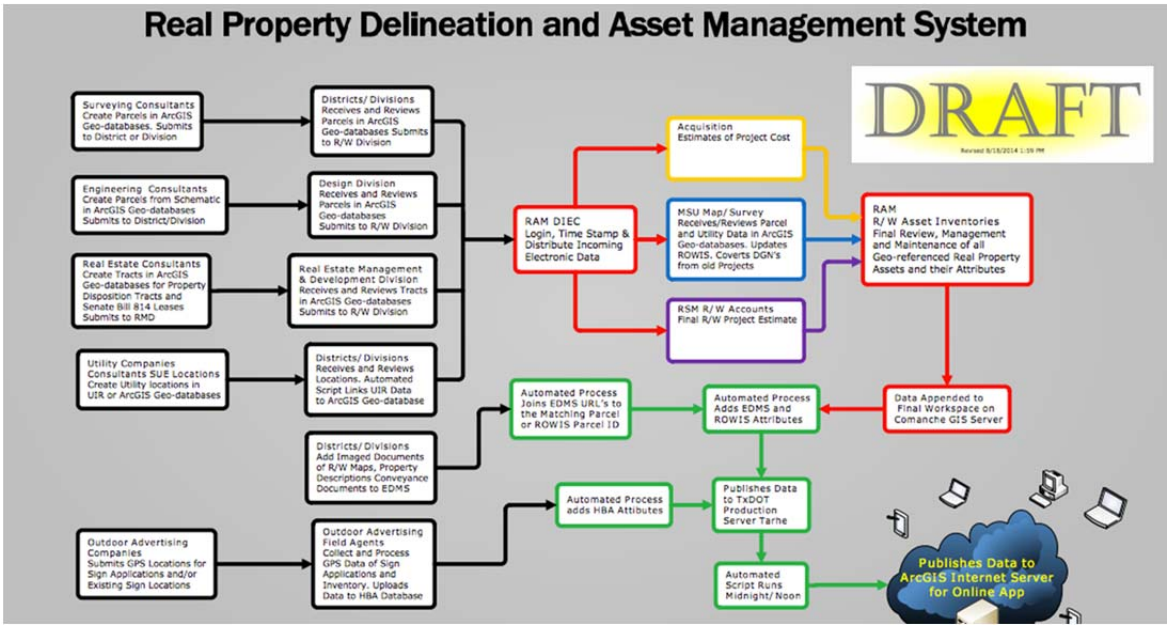

Figure 1: Real Property Delineation and Asset Management System flowchart (Source: TxDOT)

Next Steps – Research Findings to Enhance Current Approaches

To better allow TxDOT to further develop its systems for automatic review of ROW parcels, two questions require further investigation. First, to what extent is it possible to discern from the broad literature and practices on asset valuation some specific, routine rules that can be translated to computer form and used repeatedly for asset evaluation? Second, assuming the answer to the first question is positive, to what extent do existing data sources support the rules? (In other words, does the data exist to support computerized analysis using the rules?) To address these questions, the Center for Transportation Research (CTR) undertook a limited duration study to review the current literature and existing approaches to electronic asset valuation and management, define decision rules for asset evaluation, and review available data sources to support automatic evaluation.

Prior research has found the following alternative uses of ROW apart from sale:

- Property management (leasing)
- Telecommunications infrastructure (leasing)
- Outdoor advertising
- Renewable energy (generation)

The primary categories above have subcategories (e.g., solar and wind power are subcategories of renewable energy). Fortunately, findings of the research review suggest that standard decision rules and conditions for each of the alternative uses can be generated to support automatic review of ROW parcels. An example is shown in Table 1, which outlines the applicable categories and conditions for property management (leasing) use of a parcel.

Table 1: Decision Rules – Property Management (Leasing)

Categories	Conditions Favoring Leasing
Future Transportation Needs	• Will not be used as ROW for a considerable time
Location	• Prime real estate location
Accessibility	• Easy access
Geographical Characteristics	• Sufficient parcel size • Appropriate parcel shape • Sufficiently flat slope
Environmental Considerations	• No endangered fauna or flora on the site • No historical or cultural artifacts on the site • Little danger of flooding • High density forest should be avoided

A further finding of the research is that existing data sources can supply the data that makes possible the automatic evaluation of ROW parcels for alternative uses. Most of these data sources are compatible with a GIS-based system, and so can be directly integrated into TxDOT's current GIS-centric Real Property Delineation and Asset Management System. A list of data sources and brief assessment is shown in Figure 2. Note that some of the data sources are not GIS-compatible; this lack of compatibility does not necessarily mean that these sources cannot be used. Rather, considerable processing of the data in those sources may be needed to make them available to a GIS-based data system.

Category	Attribute	Data Source	GIS compatible?
Future Transportation Needs	Transportation Forecasts	24 Month Letting Plan - DCIS	Y
		Four Year Work Plan	Y
		Long Range Needs Assessment	N
Location	Location in high land value area	County Appraisal District	Y
	Parking demand and lot location	City Govt., NCTCOG	Y
	High Traffic Volume locations	Traffic Maps TxDOT	N
	Federal Network location	National Highway Planning Network	Y
	Utilities Location	UIR - TxDOT	Y
	Oil and Gas Installations	General Land Office	
Accessibility	Location of businesses	City Govt, Dunn & Bradstreet	Y
	Distance to nearest roadway	City Govt, TxDOT roadway maps, NCTCO(	Y
	Presence of transit access points	City Govt, TxDOT roadway maps, NCTCO(	Y
Geog. Characteristics	Parcel shape	ROWIS	Y
	Parcel size	ROWIS	Y
	Slope of the land area	DEM - USGS, LIDAR-TNRIS	Y
Environmental	Presence of Historical atrifacts	Texas Historical Overlay (THO)	Y
	Presence of Endangered species	Texas Natural Diversity Database	Y
	Flood hazard Information	FEMA - DFIRM	Y
	Forest Density	USGS - NLCD	Y
Weather	Solar Exposure	NREL Solar Maps	Y
	Wind Energy	NREL Wind Maps	Y
	Precipitation	NOAA - NWS	Y

Figure 2: Data sources and assessment for use in supporting GIS-based information systems

Recommendations

The availability of data and associated decision rules for automatic review of ROW parcels indicates that TxDOT can reliably invest in future development of its Real Property Delineation and Asset Management System to make such automated review possible. The GIS-based system can be expanded using the decision rules and available data identified in this project. It is important to note that parcel evaluation can never be fully automatic, but rather automated review can occur that will find likely parcels and provide a preliminary evaluation for final review by experts. However, the research findings do suggest that such automatic review is technically feasible and investment in enhanced information systems can be made as an addition to TxDOT's current initiatives.

Figure 3 outlines potential enhancements to TxDOT's current Real Property Delineation and Asset Management System. Figure 3 shows the current system in the upper left box titled "Integrated GIS ROW Database Development." Adding additional resources based on the research will allow automatic analysis to identify excess parcels (i.e., those not needed or those parcels that can accommodate alternative uses). Such parcels can then be further analyzed with respect to specific attributes or conditions that support decision rules for alternative uses. The research findings on decision rules and conditions as well as available data sets enable additional capabilities, illustrated in Figure 3 as the box labeled "Identify Possible Alternative Uses." From there, experts can finalize valuation, include additional considerations (such as legal, public, and

safety issues), and make recommendations on the specific parcel. In this way, fully automatic recommendations for each ROW parcel are not practical. It is possible to automate review of parcels and make initial assessments of alternative uses and highlight parcels for further examination. Such a system can leverage the use of experts and focus their work on the highest value parcels.

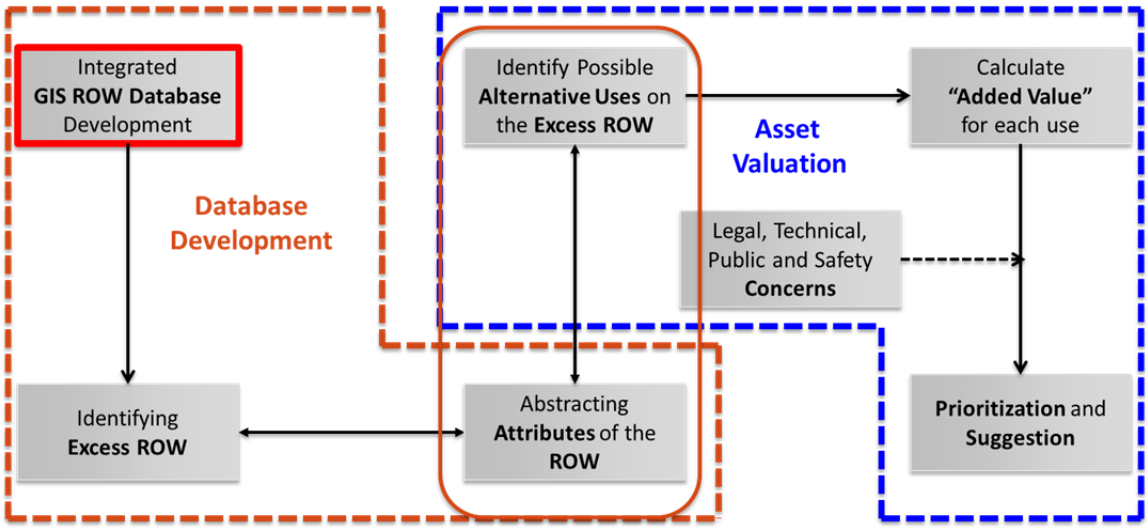

Figure 3: Future structure of a ROW parcel valuation system

Based on the research, the research team developed the following three recommendations to TxDOT:

1. TxDOT should continue to invest in its current Real Property Delineation and Asset Management System, as the GIS-centered interface can be expanded to include further analysis of ROW parcels for alternate uses.
2. TxDOT should begin to make provisions for access to the data sources identified in the research and listed in Figure 2, including appropriate partnerships with agencies that are custodians of that data.
3. TxDOT should begin planning to extend the capabilities of its GIS-based ROW management system to include analysis capabilities for asset disposition. The tech memos submitted as part of this project provide a starting point for such a system design.

Attention to these recommendations will increase TxDOT's ability to analyze its real assets in a consistent, transparent manner to maximize the benefit to the public.