

Cost to Implement a MLLRS



Benefits & Cost Savings



Multi-Level Linear Referencing System (MLLRS)

Capital Costs

- Baseline System - \$2 million
- Optional Functional Elements
 - * Manage Change - \$2K
 - * Model Connectivity - \$493K
 - * LRM Development - \$40K each
- Maintenance Costs
 - * Baseline - \$252K
 - * Optional Functional Elements
 - * Minor adjustments only

Cost/Benefit Analysis

- Based on a 5-year period
3% escalation rate, constant dollar approach
- * Baseline System - \$2.5 million in savings
 - * Cost/Benefit Ratio = 2:1
- * Optional Functional Elements - \$10 million in savings
 - * Benefit/Cost Ratio = 21:1

Quantitative Benefits

- Ease of use and accessibility
- Flexibility and integration
- Quality of data
- Internal and external collaboration
- Data-driven decision support

Cost Savings

- Business/Operational Unit Improvements
 - * Sample Business Units Used
 - * Safety improvements
 - * Reduced level of risk for litigation
 - * Reduced impacts to projects
 - * Reduced maintenance
- Baseline Savings
 - * \$1.1 million
- Optional Functional Elements Savings
 - * \$2.5 million

The Costs & Benefits of Implementing a MLLRS
 (Synopses from the NCHRP Project 20-07, Task 302 Report)

ACKNOWLEDGEMENT OF SPONSORSHIP Work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies. **DISCLAIMER** The opinions and conclusions expressed or implied in reports are those of the research agencies. They are not necessarily those of the Transportation Research Board, the National Research Council, or the program sponsors.

What is a MLLRS?

Why Implement ML into LRS?

Assumptions



Efficient planning, design, construction, and maintenance operations requires accurate, dependable and electronically based methods of positioning and locating specific facilities, operations, and needs. These methods must be logically linked with other organizational electronic management systems to optimize overall operational efficiency. The MLLRS is essentially the multi-dimensional LRS (MDLRS) defined in the NCHRP Report 460. To sum it up it:

- Meets the NCHRP 20-27 data model
- Meets the needs of integrating increasing amounts of linearly referenced data
- Logically links with other organizational electronic management systems
- Includes multiple linear referencing methods, multiple cartographic representations and multiple network representations
- Associates through a central object referred to as a "linear datum"

- 
- More readily available data and information from different sources
 - Improvements in quality, timeliness, and efficiency for reporting
 - Improved analysis leading to more data-driven decision support
 - Improved communication by being able to more readily share information in a timely manner
 - Desire to improve customer service
 - Integrates with legacy systems and ultimately eliminates dependencies on obsolete technology
 - Establishes standards to increase LRS consistency throughout the agency and industry-wide
 - Lowers the life cycle cost impacts of system ownership

- 
- A LRS already exists with at least one LRM
 - A good existing primary road network exists
 - Includes a spatial representation
 - 25,000 miles of centerline roadway
 - Base hardware and software currently exists
 - Baseline = The minimum requirements to implement and maintain a MLLRS
 - Optional Functional Elements = Additional elements added to the baseline to improve the overall function of the MLLRS

