

**Title:** A Sustainability Rating Framework For Road Infrastructure Development Projects

**Author:** David Holguin-Mejia

**Abstract:**

As road infrastructure development continues to expand globally, the integration of sustainability into decision-making processes has become both a necessity and a challenge. Road Infrastructure Development Projects (RIDPs) significantly influence economic growth and social connectivity but also contribute to environmental degradation and resource depletion. While sustainability has gained increased attention in transportation planning, its implementation in infrastructure evaluation remains fragmented, inconsistent, and often secondary to traditional performance metrics such as cost, safety, and travel time. This thesis addresses this gap by developing the Road Infrastructure Sustainability Evaluation (RISE) framework—a structured, flexible, and stakeholder-informed framework to assess sustainability performance in RIDPs across all phases of the project lifecycle. A systematic literature review was conducted, from which 34 publications were identified and analyzed in depth to extract and classify sustainability indicators applicable to RIDPs. This process yielded 31 indicators and 96 evaluation criteria, encompassing environmental, social, and economic dimensions. To ensure practical relevance and alignment with industry priorities, a structured survey was conducted with 19 professionals from a transportation agency (Indiana Department of Transportation (INDOT)). Survey responses were analyzed using the Relative Importance Index (RII), enabling the assignment of context-sensitive weights to each indicator across the four key phases of RIDPs: Planning & Design, Construction, Operations, Monitoring & Maintenance, and End-of-Life. The indicators were then operationalized through structured rating scales, using five defined achievement levels (0–100%) to standardize scoring and enhance interpretability across project contexts.

The RISE framework was then applied to the I-69 Finish Line project in Indiana as a case study. Based on publicly available documentation and project reports, the tool evaluated the project’s sustainability performance during the Construction phase. The resulting RISE score of 45% placed the project in the “Good Practice” category, indicating a solid foundation in sustainability while identifying opportunities for improvement—particularly in renewable energy integration, material reuse, and economic evaluation practices. Overall, RISE offers a valuable and adaptable methodology to support sustainable infrastructure. The tool’s transparency, phase sensitivity, and flexibility make it a practical decision-support system for advancing more resilient, equitable, and environmentally responsible RIDPs.