

Multi-Criteria Decision Making for Transportation Corridor Alignment Evaluation Using Analytic Hierarchy Process: A Case Study of Segment of Independent Utility-9 for the Proposed Interstate-69

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ABSTRACT

Evaluating alignments for a transportation corridor is a complex process that involves many decision makers and stakeholders. Capturing input about important considerations is vital to the process of alignment selection and is an iterative process. Multi-Criteria Decision Making (MCDM) provides a systematic methodology to compare, select, and rank multiple alternatives using disparate data sources and attributes. MCDM enables the application and modeling of stakeholder preferences and offers the opportunity to improve the coordination and collaboration among planning organizations, resources agencies, transportation practitioners, and affected citizens. A form of MCDM is Analytical Hierarchy Process (AHP). AHP, when used with geographic Information systems (GIS), provides a powerful tool for transportation corridor planning. A study using Multi-Criteria Decision Making involves many decision factors, criteria, and attributes used to rank the alternative segments. AHP enables assessing each attribute related or derived from the environmental variables as criterion map layers with relative influence on the outcome. This is done by construction of pair-wise comparison matrices that reflect locally obtained values and priorities. Global priority is obtained by weighing each element in the local priorities and its below levels on the AHP ratio scale. The AHP analysis and synthesis of results could deliver supportive insight for selecting the ideal alignment. This paper addresses how AHP could be integrated in GIS to select SIU-9 alignments of interest with respect to environment impacts. The model offers analytical approaches that interactively examine the affected variables and transportation interaction at stakeholders' level.

Keywords: multi-criteria decision making, analytical hierarchy Planning, multi-criteria decision, transportation corridor...