

CONVERSION OF THE STATEWIDE NOISE BARRIER INVENTORY INTO A SPATIALLY REFERENCED GEODATABASE

PROBLEM STATEMENT

The Florida Department of Transportation (FDOT) maintains a complete inventory of Florida's noise abatement barriers in spreadsheets. The statewide inventory is a compilation of information about the noise barriers individually maintained by the FDOT Districts and the Turnpike Enterprise. The inventory has been useful in providing the status of noise abatement barriers built as of June 2000, although it does not include walls built since that time. Moreover, the noise barrier inventory was formatted into a spreadsheet that did not provide sufficient geographic information useful for locating a specific barrier on roadway during a new project's planning, development, and design process. Thus, what is needed is a fully integrated statewide noise barrier inventory, in the form of a personal geodatabase with the potential to be extended into an enterprise GIS database.

OBJECTIVE

The objective of this research was to create a GIS system that would provide accurate information on barrier locations within the right-of-way and with respect to other spatially referenced features or structures. The challenge in developing a statewide geographic database for noise wall barriers is to adhere to best practices that utilize a data structure that is an industry-standard, scalable for different types of uses, and based upon an object-oriented data model. Utilizing these best practices promotes interoperability and allows users to access the information based upon their current GIS and to integrate this database with other related geographic information collected by FDOT.

FINDINGS AND CONCLUSIONS

The final report describes (1) the rationale for adopting a geodatabase data model for FDOT noise barriers, (2) the design of the database schema, (3) the key identifiers found in the database and how they were identified, (4) the data acquisition methods employed, (5) the verification processes used to guarantee correct georeferenced information, (6) the object-oriented database design, and (7) the creation of the application interface. The research covers the existing inventories, procedures, datasets, and GIS capabilities, as well as various issues pertaining to noise barriers that were revealed during the survey and interview process. In addition, FDOT staff often provided suggestions for converting the inventory into a geodatabase, including additional attributes and methods for retrieving support data. Several common logical design issues were identified and can be found in Chapter Six of the final report.

Since there were numerous yet incomplete unique identifiers associated with noise barriers (e.g., RCI, Job number, FM number, WPI number or unique identifier assigned by an individual District office), the research team created a Key Identifier. The Key Identifier developed for this project is a combination of FDOT's multiple unique identifiers, including identifiers that classify the FDOT Districts and counties in which the walls are located.

To ensure that a high quality, well-documented noise barrier geodatabase is fully integrated into FDOT's existing geodatabase(s), researchers applied the spatial referencing standards utilized for FDOT layers within the Florida Geographic Data Library (FGDL). The map projection applied to the geodatabase is Albers Conical Equal Area.

The source of the data (i.e., regarding positional accuracy) played a major role in the effectiveness of "positionally" locating the noise abatement barriers. Relative scale was utilized, as opposed to field measurements that define absolute scale—this is not to say that GPS technology was excluded, however, since nearly every barrier was identified and/or verified using a Trimble GXT. To verify the correctness of the georeferenced information collected (i.e., ground truthing), the research team validated in the field nearly 70% of all noise barriers maintained by FDOT utilizing GPS technology (150 of the 217 walls). The remaining 30% of the walls were validated utilizing GlobeXplorer's high resolution imagery.

Finally, the report presents the application interface, a custom ArcGIS query tool to simplify access to specific data within the geodatabase.

BENEFITS

The benefits of a Statewide Noise Barrier Geodatabase are briefly highlighted below:

- up-to-date, accessible data for decision making purposes
- standard format for exchange of information
- virtual elimination of duplicate data
- centralized access to important data
- centralized modifications and updates capabilities
- improved data accuracy

Developing a Statewide Noise Barrier Geodatabase allows standards to be established. These standards can promote data consistency in terms of updating and sharing data. The standardized geodatabase can provide accurate information on barrier locations within the right-of-way and relative to other spatially referenced features and structures. More importantly, the Statewide Noise Barrier Geodatabase can be maintained by a central entity such as FDOT's Transportation Statistics Office or the FGDL.

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