BRIDGE TO THE FUTURE
State-of-the-Art Pedestrian Bridge and Gateway to Columbia

STATEMENT OF THE PROBLEM AND SCOPE OF REPORT

A pedestrian bridge linking two sides of a presently disconnected community in Columbia, South Carolina has been proposed. This bridge will span Highway 277 (1277), a major connecting route into the downtown Columbia area, and will provide an impressive “Gateway to Columbia”.

The proposed bridge is intended to reflect the dynamic nature of Columbia and of South Carolina. It is intended that the bridge be a high performance structure that demonstrates the state-of-the-art in bridge construction. The bridge may incorporate state-of-the-art materials, fabrication and erection methods and long-term monitoring technology. Long-term, low maintenance durability is a specific goal of this bridge project.

This report is intended to provide an overview of the proposed project and act as a feasibility study for various material selection, design and construction alternatives.

Alternative concepts are evaluated with reference to the following criteria:

i) Aesthetics of the bridge and of the bridge within its environment.

ii) Initial cost – it is intended to demonstrate that state-of-the-art technologies can, in fact, reduce total initial costs.

iii) Long-term low maintenance durability of the structure – this will be reflected in low life-cycle costs for the bridge.

iv) Expected behavior of the structure in situ – this will include such issues as the expected dynamic and fatigue performance of the bridge. Both of these issues are particularly important for long-span, lighter-weight bridge structures.

v) Relationship of the state-of-the-art technologies involved to South Carolina industry interests – will a useful technology transfer be facilitated?

vi) Constructability – state-of-the-art erection methods will be investigated with the intent of minimizing or eliminating any need to close any lanes of 1277.
A number of state-of-the-art bridge forms are reviewed in addition to conventional pedestrian bridge forms. The use of various high-performance materials for bridges and bridge components are also reviewed.

**SUMMARY OF CONCLUSIONS**

Based on presented information, there are two options for building the pedestrian bridge spanning I277:

**Option 1:** Build a conventional bridge utilizing high performance materials for only some elements of the structure. The main advantages of this option are that the projected cost may be within the current budget and design may start immediately.

**Option 2:** Build a state-of-the-art “signature” bridge adopting one of the designs presented. This option requires additional funding and time. The main advantage of this option is that the bridge will be more aesthetically pleasing than a conventional bridge.

It is recommended that a design team be formed including engineers/architects from SCDOT, industry, and USC. Such team will guarantee the best outcome for either option.

This research project was conducted at the University of South Carolina by Kent A. Harries, Ph.D. and Michael F. Petrou, Ph.D.

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