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## Capacity Research in SHRP 2

Capacity research within SHRP 2 focuses on the strategies and tools needed to systematically integrate environmental, economic, and community requirements into the planning and design of new highway capacity. The core of the research program is a framework for collaborative decision making, aimed at solving capacity problems in a context-sensitive manner. Supporting the framework are projects that focus on system-based performance measures, the regional economic impact of new highway capacity, reflecting the capacity gains from highway management in the planning process, and assessing the effect of congestion and pricing on highway users' behavior. As the early projects produce results and insights, tools will be developed and the most critical barriers to success will be targeted.

### Research Questions

The research questions that comprise the Capacity focus area address the need for practical applications to enable collaborative planning decisions. Collaborative decisions require that a broad array of information be assessed by a host of stakeholders who must consider the range of possible solutions to ultimately achieve a balanced outcome. A systems-based analysis method is needed to assess the transportation capacity problem, screen the range of solutions, and establish convincing economic justification for projects that reflect a culture of environmental stewardship. These challenges require data collection and integration, analysis tools, and effective communication methods. The following sections describe the status of projects in the Capacity Research Plan and how they address the stated challenges.

#### ***C01: A Framework for Collaborative Decision Making on Additions to Highway Capacity***

The objective is to improve collaborative decision making and the process for selecting solutions to capacity problems. The project scope includes at least these elements: Existing processes that influence or are influenced by transportation planning and project development; decision points that may be external to transportation planning but can influence the outcome; the relationships among stakeholders; strategies for interactive communication; supporting information technology, analysis tools, and data.

A contract in the amount of \$2.6 million was awarded to ICF International in January 2007. Work on this project is expected to yield a tested decision making framework and decision support systems by 2010.

***C02: Systems-Based Performance Measurement Framework for Highway Capacity Decision Making***

The objective is to develop a performance measurement framework that supports a collaborative decision making process. The measures will reflect mobility, accessibility, economic, safety, environmental, watershed, habitat, community, and social considerations. The framework will become an integral component of collaborative decision making and decision support tools.

A proposal by Cambridge Systematics was selected for the \$825,000 project, which is expected to produce the performance measures framework and the template for a Web-based resource that provides: a performance measures library and classification system; examples of best practice that can be augmented by users; and a plan for short- and long-term location and maintenance of the resource. The project is expected to be completed in 2009.

***C03: Interactions among Transportation Capacity, Economic Systems, and Land Use/ Integrating Economic Considerations in Project Development***

The objectives of this project are to better understand the contribution of highway capacity improvements to regional economic vitality and land value; to develop methods to convincingly describe the regional economic effects of additions to highway capacity; and to develop institutional mechanisms and frameworks for ensuring that capacity enhancement decisions reflect economic development considerations.

An RFP for this project will be released in July 2007, with the following results expected in 2010: A critique of the methods and results of economic impact analysis for new highway capacity; a typology of conditions affecting the economic impact of highway capacity; improved methods and tools to better represent the primary, secondary, and cumulative contributions of highway capacity to the economic vitality of different types of regions, including the impact on land values; guidelines for convincingly communicating economic impacts; recommendations for better integrating economic development impacts into systems planning, project development and the collaborative decision making framework being developed in C01.

***C04: Improving Our Understanding of Highway Users and the Factors Affecting Travel Demand***

The objective of this project is to fill information gaps on critical relationships defining the demand for passenger travel, with particular emphasis on congestion and pricing, so that travel demand models can reflect the system-wide effects of highway capacity expansion decisions. Predicting a response to congestion or tolls requires knowledge of many factors: traveler characteristics (income, age, gender, etc.); trip purpose; time of day; travel time for the trip; reliability of that travel time; travel time on alternative routes; actual price of a trip (if a toll is in place); other modes available and their price, travel time, etc. Mining this data from existing data sets can be the basis for developing reliable descriptions of travel behavior.

Proposals for this project are due in May and contractor selection will likely be finalized in July. Work under this contract should be completed in 2010. The product will document how passenger and commercial travelers react to congestion delays and pricing. The documentation will be formatted so that it can be incorporated into travel demand models to better support decision making on highway capacity.

***C05: Understanding the Contribution of Operations, Technology, and Design to Meeting Highway Capacity Needs***

The objective of this project is to re-define highway capacity given improvements in operations, vehicle technology, design, and other innovations, so realistic highway capacity is reflected in system planning. One of the key considerations in planning new highway capacity must be demonstrating that existing capacity has been fully used by deploying these innovations and then reflecting operational capacity in planning for expansions.

This project is expected to begin in 2008 and be completed by 2010. The expected product will be documentation of the capacity gains that can be expected through management, design, and technology, and guidelines for incorporating this information into the planning process.

***C07: Development of High-Priority Products to Support Collaborative Decision Making***

The objective of this project is to develop specific products that will make the maximum contributions to the state of the practice in delivering highway capacity. The nature and type of these products will be determined by the findings and recommendations of Project C01 and others.

The expected schedule for Capacity research is shown in Table 1.

**Table 1 SHRP 2 Capacity Project Schedule**

SHRP 2 Capacity Projects	2007	2008	2009	2010	2011
<b>C01 Collaborative Decision Making</b>					
Phase I Case Studies in Decision Making					
Phase II Needs Analysis for Solution Screening					
Phase III Decision Making Framework					
Phase IV Dissemination					
<b>C02 Systems-Based Performance Measurement Framework</b>					
<b>C03/C06 Relationship Between Capacity, Economic Systems and Land Use and Integrating Economic Considerations into Project Development</b>					
<b>C04 Travel Demand Factors, Especially Congestion and Pricing</b>					
<b>C05 Contribution of Operations and Technology to Capacity</b>					
<b>C08 Integrating Watersheds and Habitats</b>	Contingent				
<b>C07 Decision Support Modules</b>					
Module A					
Module B					
Module C					
Module D					
Module E					

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