

# COLLABORATIVE DECISION-MAKING FRAMEWORK

**Focus area: Capacity (C01)**

A SYSTEM FOR  
DELIVERING  
PROJECTS  
PEOPLE WANT

**PROBLEM:** Elected officials and the public are demanding that highway projects be delivered both faster and in a more environmentally friendly manner. Transportation agencies are expected to do more than just mitigate environmental impacts; they are expected to be stewards of the environment and of the community, delivering transportation capacity in ways that support a community's vision. To meet these expectations, transportation professionals will need to change the way projects are planned and developed.

**SOLUTIONS:** To meet the public's demands for more efficient delivery of the right transportation solutions, transportation agencies need a systematic and enterprise-wide approach to collaboration that ensures that the right people are engaged at the right time with the right information. Based on research regarding projects that successfully addressed complex community and environmental issues, the Collaborative Decision-Making Framework provides a systematic approach that incorporates the keys to success learned from the research. It is delivered as a web-based resource that can be used as a trouble-shooting guide or a roadmap to changing a transportation agency's process for planning and developing highway projects.

The Framework is designed primarily for practitioners. It identifies key decision points in four phases of transportation decision-making: long-range transportation planning, corridor planning, programming, and environmental review and permitting. An Executive Guide to Collaborative Decision Making will be a companion piece, indicating when and how senior transportation and environmental officials should be personally involved.

**BENEFITS:** The Collaborative Decision-Making Framework integrates the products and outcomes of other SHRP 2 research to strengthen the basis for decisions about when, where, and how much capacity is needed; what the economic impacts will be; and how to build capacity in ways that enhance communities and the environment. These research outcomes collectively map a route to decisions that deliver highway capacity.

**STATUS AND CONTACTS:** This research for project C01 is complete and the product, *Transportation for Communities—Advancing Projects through Partnerships (TCAPP)*, is available as the beta website [www.transportationforcommunities.com](http://www.transportationforcommunities.com). For additional information, contact Spencer Stevens, [Spencer.Stevens@dot.gov](mailto:Spencer.Stevens@dot.gov); Matt Hardy, [mhardy@ashto.org](mailto:mhardy@ashto.org); or Stephen Andrie, [sandrie@nas.edu](mailto:sandrie@nas.edu). TCAPP is scheduled for implementation in 2013.



## About SHRP 2 Implementation

The second Strategic Highway Research Program is a national partnership of key transportation organizations: the Federal Highway Administration, the American Association of State Highway and Transportation Officials, and the Transportation Research Board. Together, these partners conduct research and deploy products that will help the transportation community enhance the productivity, boost the efficiency, increase the safety, and improve the reliability of the Nation's highway system.

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# PERFORMANCE MEASURES FOR HIGHWAY CAPACITY DECISION MAKING

Focus area: Capacity (C02)

**PROBLEM:** Public concerns about the impacts of adding highway capacity and how alternatives are evaluated add urgency to the need for measures of highway system impact and performance. To reach decisions with broad support, transportation agencies now need a better understanding of system-level performance in terms of economic, mobility, accessibility, safety, environmental, community, and social considerations. The data collection and analysis techniques for addressing some of these topics are not well developed. Better approaches are needed for quantifying transportation system performance in non-traditional areas.

**SOLUTIONS:** An online resource has been developed for selecting among performance measures that help evaluate major transportation projects within a system context. Organized around five broad topics and 20 performance factors (shown below), this framework helps identify the types of project impacts that are important to making informed decisions and the level of detail required at each stage of the planning process. The framework explains how the performance measures can be used in long-range planning, programming, environmental review, and permitting.

TRANSPORTATION	ENVIRONMENT	ECONOMIC	COMMUNITY	COST
Mobility	Ecosystems, Habitat, Biodiversity	Economic impact	Land use	Cost
Reliability	Water quality	Economic development	Archeological and cultural resources	Cost effectiveness
Accessibility	Wetlands		Social	
Safety	Air quality  Climate change Environmental health		Environmental justice	

**BENEFITS:** Performance measures have communication value as well as analytical value because they support better collective understanding of the transportation problem being addressed. Each constituency can see a measure that relates to its own concerns, and can better understand the concerns of others. Performance measures that speak to stakeholders' concerns establish a foundation for making the best transportation decisions, reducing delays, and speeding project delivery.

**STATUS AND CONTACTS:** Project C02 is complete and the final report, [Performance Measurement Framework for Highway Capacity Decision Making](#), is available online. The performance measurement framework is available in TCAPP at [www.transportationforcommunities.com](http://www.transportationforcommunities.com). TCAPP is scheduled for implementation in 2013.

For more information, contact Harlan Miller, [Harlan.Miller@dot.gov](mailto:Harlan.Miller@dot.gov); Matt Hardy, [mhardy@ashto.org](mailto:mhardy@ashto.org); or Steve Andrie, [sandrie@nas.org](mailto:sandrie@nas.org).



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**T-PICS:** A tool to estimate the economic impact of transportation projects

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**Focus area: Capacity (C03)**

**PROBLEM:** Strengthening the economic vitality of a region (jobs and income) is one of the primary reasons for investing in highway capacity. Better access to markets and labor force, reduced cost of delay, reduced congestion, improved safety, reduced pollution, and a better quality of life are all elements of improving economic vitality. However, the ways in which new and improved highway capacity influences economic vitality are complex and often indirect, which complicates decisions about transportation projects.

**SOLUTION:** Transportation Project Impact Case Studies (T-PICS) is a web tool that planners can use to quickly see the range of economic development impacts that occur as a result of different types of projects in different settings. T-PICS includes 100 case studies of already-built highway capacity projects and their economic development impacts. Each case study includes pre- and post-project economic and land development data and local interviews that together portray the actual, observed economic development impacts of those projects, as measured at least five years after project completion.

Estimates for traffic and project costs and complementary regional economic development factors can be adjusted to account for local conditions. In turn, these adjustments will drive changes in the T-PICS output. Case study projects can be viewed through Google Earth. T-PICS is available at <http://transportationforcommunities.com/t-pics>.

**BENEFITS:** T-PICS results can help refine public debate about highway projects by establishing boundaries of the likely positive and negative impacts that typically occur from such projects. Economic development impacts include changes in employment, income, business output and associated changes in land values and land development and short-term construction spending and dislocation effects. Understanding what changes in productivity result from improvements in market accessibility, intermodal connectivity, scheduling, logistics and international competitiveness helps communities and transportation agencies identify transportation options to meet their goals.

**SCHEDULE AND CONTACT:** Research reports will be online in the fall of 2012 at [www.TRB.org/SHRP2](http://www.TRB.org/SHRP2) under Publications. Pilot tests to validate results and refine usability to be completed late 2013. For more information, contact Stefan Natzke, [Stefan.Natzke@dot.gov](mailto:Stefan.Natzke@dot.gov); Matt Hardy, [mhardy@ashto.org](mailto:mhardy@ashto.org); or David Plazak, [dplazak@nas.edu](mailto:dplazak@nas.edu). The products are scheduled for implementation in 2014.



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# AN ECOLOGICAL APPROACH TO HIGHWAY PLANNING

Focus area: Capacity (C06)

## A PRACTICAL GUIDE TO MEETING ECOLOGICAL PRIORITIES

**PROBLEM:** Transportation agencies recognize the ecological and economic benefits of integrating landscape-scale environmental considerations into highway planning, but the barriers to achieving the goal are high. Ecosystem-based approaches need to be easier, more practical, and a management priority if they are going to be widely implemented.

**SOLUTION:** The Integrated Ecological Framework (IEF) is a nine-step, science-based process that helps practitioners identify ecological priorities within a region and make timely decisions about transportation capacity enhancements, thus enabling win-win solutions for both transportation and the environment. The IEF provides clear and feasible steps that advance integration and it links to a business model that helps support the ecological approach to environmental stewardship.

The IEF includes tools to overcome important obstacles to integrating highway planning and ecological considerations, such as the need to analyze alternatives and cumulative effects, and to develop regulatory assurances and ecosystem crediting strategies.

**BENEFITS:** The long-term benefit of applying the IEF process is better environmental outcomes and lowered costs associated with planning and regulatory decision making. In the short term, the IEF provides practical guidance on the most appropriate and effective data, methods, tools, and processes to achieve an integrated, landscape-scale approach to transportation decision making.

**SCHEDULE AND CONTACTS:** The research in Capacity projects C06-A and C06-B is complete. The research reports will be available online in mid-2012. The IEF and related tools are being integrated into the web-based resource [www.TransportationforCommunities.com](http://www.TransportationforCommunities.com). These tools are scheduled for implementation in 2012. For more information, contact Shari Schaftlein, [Shari.Schaftlein@dot.gov](mailto:Shari.Schaftlein@dot.gov); Shannon Eggleston, [seggleston@aathto.org](mailto:seggleston@aathto.org); or Stephen Andrie, [sandrie@nas.edu](mailto:sandrie@nas.edu).

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## Next Generation Transportation Modeling for Better Decisions and Targeted Investments

*New models allow transportation agencies to estimate travel demand by integrating travel activities and behaviors, transportation network conditions, and mode options—all in a single package that can more effectively test alternatives.*

For the first time, transportation agencies will be able to estimate travel demand in a way that integrates activities, networks, and environment. Transportation agencies have often faced challenges based on the results of traditional travel-demand modeling.

Developed through the second Strategic Highway Research Program, this new approach dynamically evaluates the interplay of traveler behavior and transportation network conditions, including more mode options. The models support more informed decisions for adding highway and transit capacity, improving traffic operations, introducing priced roads, and improving traveler information.

### **Integrated Advanced Travel Demand Model with Mode Choice Capacity and Finely Grained, Time-Sensitive Networks**

## The Solution

The *Dynamic Integrated Travel Demand Model and Time Sensitive Network* link travel behavior choices such as departure time or route with congested network conditions to better reflect real-world dynamics in the model. Planners can then more directly test the effects for various alternatives on congestion. A shortcut tool for assessing the effects of smart growth on congestion is also available.

The software is available via an open-source license and includes manuals and application documentation.

Developed through the second Strategic Highway Research Program, this SHRP2 solution advances existing modeling applications to include sensitivities for traffic shifts by time of day or route in response to capacity increases, operation or management actions. It can also dynamically integrate travel-time reliability, greenhouse gas emissions, road pricing, mode shifts, and non-travel choices such as work/shop at home or flex-time policies.

**More precise modeling supports defensible decisions and targeted investments**

### **Focus Area: Capacity (C10 A&B)**

By integrating activities, networks, and the environment, this approach takes transport modeling to the next level.

#### **Save Lives**

- Better-informed decisions lead to improved, safer traffic conditions.

#### **Save Money**

- With improved modeling accuracy, agencies can better target transportation investments that will provide the greatest benefit.

#### **Save Time**

- More defensible NEPA documents reduce delays and costs of legal challenges.

## The Benefits

The immediate **benefit of the models** is that they address the essential question of how travel behavior responds to network conditions and the network conditions respond to behavior. The result is a dynamic model that better analyzes transportation alternatives and provides more defensible documentation of transportation planning decisions. Ultimately, the benefits of more effective and defensible modeling include:

- Time and cost savings from reduced delays related to legal challenges in NEPA and similar processes—and the resulting inflationary cost of these delays.
- Better-informed planning decisions resulting in better projects.
- Safety benefits resulting from more accurate predictions of impacts on traffic conditions and traveler behavior for different alternatives.

## How to learn more

Implementation for this product is expected in 2014. To have a SHRP2 representative contact you about technical assistance or other opportunities to use these new models, contact Brian Gardner, [Brian.Gardner@dot.gov](mailto:Brian.Gardner@dot.gov); Matt Hardy, [mhardy@ashto.org](mailto:mhardy@ashto.org); or Stephen J. Andrle, [sandrle@nas.edu](mailto:sandrle@nas.edu).



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# IMPROVED ECONOMIC ANALYSIS TOOLS

MORE COMPLETE  
ECONOMIC  
ANALYSIS WITH  
EASIER-TO-USE  
TOOLS

## Focus area: Capacity (C11)

**PROBLEM:** Governments and taxpayers need to know whether a region will be better off economically as a result of proposed transportation investment. Current tools for estimating economic impacts of highway capacity enhancement projects are often complex and their outcomes can be difficult to explain to decision-makers and the public. Planners need forecasting models that are more transparent and that provide decision makers with more complete understanding of the economic impacts of highway projects.

**SOLUTION:** SHRP 2 is developing a suite of new analysis tools and statistical models that will provide the range of reasonable economic impact expectations for a proposed highway project. The new tools also enable a wider economic analysis by integrating four components: reliability of travel time, connectivity to intermodal facilities for freight and passengers, access to labor and product markets, and an accounting tool that integrates the other three components and creates benchmarks to the local area. The outcome of this process describes the project's ultimate economic impact in terms of direct effect, total local effect, and total national effect.

**BENEFITS:** A convincing economic analysis should include both gains and losses. Planners need to consider the net impact of both primary and secondary project effects. These vary by region of the country, whether the region is urban or rural, political attitudes, land use and development policies, major economic drivers, economic growth forces, the nature of capacity problems, and the solutions proposed. Secondary effects, such as environmental justice factors and the value of environmental resources lost or degraded due to a project are also important to achieving a balanced impact estimate. By considering net effects, the SHRP 2 tools provide decision makers with better information for answering the question of whether a region will be economically better off because of a transportation investment, and if so, by how much.

**SCHEDULE AND CONTACT:** The analysis tools from project C11 are in development and will be downloadable from the [T-PICs web site](#) in 2013. The tools are scheduled for implementation in 2014. For more information, contact Stefan Natzke, [Stefan.natzke@dot.gov](mailto:Stefan.natzke@dot.gov); Matt Hardy, [mhardy@aaashto.org](mailto:mhardy@aaashto.org); or David Plazak, [dplazak@nas.edu](mailto:dplazak@nas.edu).

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# CONSIDERING FREIGHT IN TRANSPORTATION PLANNING

Focus area: **Capacity (C15)**

PLANNING FOR  
HIGHWAY CAPACITY  
THAT SERVES GOODS  
MOVEMENT

**PROBLEM:** Freight transport will continue to use an increasing portion of highway capacity. Often when transportation agencies act to improve capacity, the economics of freight supply chains and how the movement of freight is likely to react to capacity improvements are not part of planning and engineering decision making. Freight shippers, receivers, and carriers are highway stakeholder groups whose needs and motivations are not always well understood by the public sector. This gap leaves great potential for unintended consequences, including negative impacts on economic competitiveness, activity, development, and growth.

**SOLUTIONS:** A transportation practitioner's guide is being developed regarding how to conduct market-driven freight planning. The transportation-related cost factors in supply chains include travel time, speed limits, truck size and weight, fuel cost, toll cost, and cost of delay. How changes in these elements affect decisions on freight transportation depends on the overall impact on supply chain costs and the method of payment. The practitioner's guide provides a blueprint for appropriate consideration of freight transportation, from international to local, in the highway capacity planning and project development processes, including the key decision points at which freight stakeholder participation is critical for reaching good decisions.

**BENEFITS:** Growing freight demand is a key driving factor in the need for new highway capacity. While there are many proposals for addressing this need, the planning and engineering communities need a better understanding of freight economics so they can make capacity enhancement decisions that are beneficial to goods movement and the resulting economic efficiencies. Planning for and providing highway capacity that serves economic development helps deliver highway projects with local and national benefits.

**RESEARCH OBJECTIVES:** The research is meant to provide guidance to state DOTs, MPOs, decision makers, and stakeholders on appropriate consideration of freight in planning for and providing highway capacity that serves economic development. The guidance is to include case studies and examples of successful practice and will be integrated into [www.transportationforcommunities.com](http://www.transportationforcommunities.com), the online decision guide for highway planning.

**SCHEDULE AND CONTACT:** The research for project C15 is complete and the contract is being extended to conduct pilot tests and introduce the guide to user communities. Final products are expected in the spring of 2013. For more information, contact Ed Strocko, [Ed.Strocko@dot.gov](mailto:Ed.Strocko@dot.gov); Leo Penne, [lpenne@aaashto.org](mailto:lpenne@aaashto.org); or David Plazak, [dplazak@nas.edu](mailto:dplazak@nas.edu). Implementation is scheduled for 2014.



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## EXPEDITED PROJECT DELIVERY

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### Focus area: Capacity (C19)

## AVOID DELAYS IN PLANNING TRANSPORTATION PROJECTS

**PROBLEM:** Delay in delivering new transportation projects can increase costs, prolong congestion, and deny the nation economic and mobility benefits when additional capacity is planned for the transportation network. As there is potential for delay in every phase of project delivery, a range of strategies are needed to address common problems and constraints and to provide ways to expedite project delivery.

**SOLUTIONS:** Twenty-four strategies for addressing or avoiding 16 common problems or constraints on project delivery were developed and grouped into six expediting themes: improve public involvement and support; improve resource agency involvement and collaboration; demonstrate real commitment to the project; improve internal communication and coordination; streamline decision making; and integrate across all phases of project delivery. The constraints, their potential severity, and the effect they can have on project delivery are cataloged. Since it is not always clear to practitioners that they are facing a constraint, leading and lagging indicators are provided. The likely effects of not addressing a constraint are categorized as low, medium, or high; multiple strategies are suggested for each severity category. A useful worksheet was developed for each strategy with background, case examples, links to constraints, and references. The worksheets can be pulled out of the report and used as reference materials or as stand-alone documents.

**BENEFITS:** Reducing project delays saves more than time. Project costs and road user costs can escalate while public perception of agency performance deteriorates as transportation enhancements fail to materialize. The ability to anticipate where delays are likely to occur and to select from tested strategies known to avoid or minimize delay confers benefits to transportation agencies and stakeholders in all phases of project delivery.

**SCHEDULE AND CONTACT:** The final report, [Expedited Planning and Environmental Review of Highway Projects](#), is available online and from the TRB Bookstore. The strategies and tools developed in this project have been used to create an Expediting Project Delivery Assessment tool within TCAPP, the website that houses most SHRP 2 Capacity products, available at <http://transportationforcommunities.com>. For more information, contact Anwar Ahmad, [anwar.ahmad@dot.gov](mailto:anwar.ahmad@dot.gov); Kelley Rehm, [krehm@aaashto.org](mailto:krehm@aaashto.org); or Stephen Andrie, [sandrie@nas.edu](mailto:sandrie@nas.edu). Implementation is scheduled for 2013.

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