FHWA PL0159: Methods for Gauging Livability Improvements
Literature and Best Practices Review

CONTENTS

1.0 EXECUTIVE SUMMARY OF FINDINGS 2

2.0 BACKGROUND 4

2.1 Emerging Needs in Performance Measurement 4

2.2 Current Effort 5

2.3 Project Definitions 5

2.3.1 Livability Indicator Types 6

2.4 Literature Review Purpose and Outcomes 7

3.0 METHODOLOGY 7

3.1 Methods of Obtaining Resources and Expert Input 7

3.1.1 Resource documentation 7

3.1.2 Academic focus group 8

3.1.3 Practitioner interviews 8

3.1.4 Outreach presentations 8

3.1.5 FHWA consultations 8

3.2 Creation of Inventory and Categorization of Resources 9

4.0 LITERATURE REVIEW FINDINGS 10

4.1 Current and Emerging Trends 10

4.2 Data and Knowledge Gaps 12

4.3 Best Practices 15

5.0 CONCLUSIONS AND NEXT STEPS 18

6.0 APPENDICES 19

1.0 EXECUTIVE SUMMARY OF FINDINGS

This report presents the findings from a review of literature and best practices related to livability performance measurement. Through a comprehensive methodology featuring resource documentation, academic engagement, practitioner interviews, and agency coordination, the project team has identified and reviewed more than 100 resources relevant to this important, evolving field. The information derived from these resources—as well as from outreach to academics, practitioners, and FHWA representatives—has been synthesized into a set of key findings regarding current and emerging trends, data and knowledge gaps, and best practices. These findings are summarized below, with more detailed information provided in the body and appendices of this report.

Current and Emerging Trends

- Existing resources most frequently address the economic, mobility, accessibility, safety, and natural resource dimensions of livability. Fewer address community, socio-cultural, and aesthetic components.
- While many performance measurement efforts continue to be framed in terms of sustainability, the components of livability are generally encompassed within this framework.
- Transportation agencies are using indicators and measures to manage performance and to evaluate and prioritize transportation projects.
- There is a growing interest in equity considerations, including the distributional impacts of transportation decisions across various population and demographic groups.
- Several resources demonstrate an interest in measuring positive contributions to livability, rather than only measuring decreases in negative impacts.
- Indicators and measures are increasingly seen as tools to communicate with various audiences and to help stakeholders understand the value of livability strategies.
- While some resources continue to advocate for national, universal measures/standards, emphasis on place-based measures is increasing.

Data and Knowledge Gaps

Data Gaps

- While data availability is often noted as a limiting factor in the collection and use of livability performance measures, availability issues often result from a lack of dissemination and awareness of where to find data.
- Development of improved methods and/or dissemination of existing data and methods are necessary in the areas of qualitative measurement, social capital, internal and external costs, non-motorized transportation, demand estimation, and travel by children and persons with disabilities.
- Measures for equity, including the distribution of transportation costs and benefits, are currently limited in number, scope, and application.
- Data to reflect *contributions* to livability (rather than reductions in negative components) are in need of further development and emphasis.
- Appropriate data for a variety of livability types and issues are currently limited.
- Expanded performance measurement in the area of aesthetics is needed to address the prominence of aesthetics in agencies' pursuit of livability.

Data challenges

- Key challenges include: data collection costs and limited prioritization of funding for data; time investment; methodological intensity; data format and consistency; use of data that have been collected for other purposes; lack of rural, regional travel demand models; issues related to geographic and temporal scale; and the need for multidisciplinary collaboration due to the cross-cutting nature of livability.

Knowledge gaps

- Cross-disciplinary awareness and information sharing is often rare, leading to a limited understanding of the range of data sources and methods available.
- The synergistic effects of combined planning decisions are not fully understood.
- Difficulties are evident in determining the spatial and temporal boundaries of impact assessment.
- Standard methodologies have yet to be developed for a number of livability analyses.
- Individual measures are generally not comprehensive enough to address the full scope of livability.
- Interest exists for finding measures that translate across functional areas and sectors—as well as to external stakeholders—but knowledge of how to accomplish this is currently limited.
- Understanding of the role of context in livability performance measurement needs further refinement. Resources have advocated for both national and place-based measures, reflecting a need for greater investigation and research in this area.
- Questions regarding the varying scales of impacts are prominent.

Best Practices

- Livability efforts are initiated at the national and statewide policy levels; translated into practice through plans and processes; and implemented through the use of tools, applications, and data.
- There is a growing emphasis on the use of tools and technologies not only to analyze livability needs and outcomes, but also to convey this information to a broad audience.
- While some resources advocate for universal measures that can be applied to any state, region, or locality across the nation, the literature and state of the practice more strongly show a growing recognition of the role of context in defining the appropriateness and applicability of various measures.
- While agency and organizational approaches have tended to focus on individual components of livability, the best practices are those that integrate various disciplines and bring them together under a single policy, planning, and implementation framework. Livability is a multidimensional concept that cannot be adequately approached through segmented activities.

Next Steps

These findings will be used to inform the development of Phase Two project activities, including the development of a user-friendly, searchable database of indicators and measures. This tool will facilitate performance measurement with an emphasis on context and multidisciplinary relevance.

2.0 BACKGROUND

The movement to plan and design transportation infrastructure in a way that supports livable and sustainable outcomes has gained the attention of elected officials and transportation professionals at the local, state, and national levels. The reasons for the attraction to sustainability and livability goals may vary across geographies, but one common theme is the desire to create built environments that people want to live in. While there are differences between the concepts of livability and sustainability, both support a variety of common outcomes. For example, both address issues of social equity and human health, including development of more environmentally sustainable mobility options and promotion of community economic development opportunities. Alternatively, one of the key differences between the two concepts is the time horizon and global environmental focus of sustainability: livability is derived from a focus on improving individual and community quality of life, while sustainability has a wider emphasis on planetary sustainability, including natural resource protection, human health, and economic opportunity. For most transportation practitioners charged to plan, design, construct, operate, and maintain transportation infrastructure, these differences are nuances.

In response to growing recognition of the need to create more livable and sustainable outcomes, the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Transportation (DOT), and the U.S. Environmental Protection Agency (EPA) formed in 2009 the Partnership for Sustainable Communities. The founding purpose of this ongoing Partnership was "to help improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide"[1]. In effect, the Partnership served to break down barriers to integrated planning and project development such that decisions fully leverage all three agencies' funds, expertise, and resources. The guiding livability principles of the federal Partnership are shown below. Through its work and these foundational principles, the Partnership for Sustainable Communities took an important first step in defining livability and its key components.

Federal Livability Principles

- **Provide more transportation choices.** Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.
- **Promote equitable, affordable housing.** Expand location- and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- **Enhance economic competitiveness.** Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers, as well as expanded business access to markets.
- **Support existing communities.** Target federal funding toward existing communities—through strategies like transit oriented, mixed-use development, and land recycling—to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.
- **Coordinate and leverage federal policies and investment.** Align federal policies and funding to remove barriers to collaboration, leverage funding, and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy.
- **Value communities and neighborhoods.** Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods—rural, urban, or suburban.

2.1 Emerging Needs in Performance Measurement

The current economic climate and uncertainty about future federal transportation funding levels and priorities, combined with pressure to increase project delivery timelines, has placed the transportation industry in a position to prove its value and worth to its customers more than ever. Traditional performance

[1] http://www.epa.gov/smartgrowth/partnership/index.html

measures that narrowly focus on "moving more cars faster" no longer sell to policy makers. Rather, transportation investments must demonstrate a wider return on societal investment, represented by quality of life indicators related to economic, environmental, health, safety and security, education, and housing. This emphasis on understanding how transportation investment supports community quality of life and larger sustainability goals lies at the heart of why developing indicators (and associated measures) is critical to move the gauge forward in delivering livable outcomes. Consequently, practitioners need tools to more closely connect transportation decisions with outcomes. They need tools to help them demonstrate the value of transportation investments, to facilitate consensus among stakeholders that will create shared visions, and to align their activities with shifting policies and the new funding streams expected to increasingly prioritize livability and sustainability.

Much has been published in the last year to help define the concepts of sustainability and livability through examples and case studies, policy briefs, and grant opportunities. What has been missing is the ability to search easily for indicators and measures that reflect unique context attributes and help them connect livability performance measures to specific transportation goals and strategies. These tools need to reflect "real world" challenges faced by practitioners.

One of the many challenges of identifying indicators and associated measures is the recognition that no two geographic places are the same. Urban, rural, and suburban geographies can each be defined by contextual, place-based components; different communities and regions will exhibit varying social, cultural, economic, demographic, housing, education, health, and environmental dynamics; and performance measurement will be affected by data availability, regulatory requirements, legal setting, and type of effort being undertaken (e.g. plan, policy, program). The key to success in developing livability performance measures is to understand that practitioners need guidance that is flexible and adaptable to the unique context in which they plan, design, build, operate, and maintain transportation infrastructure. What works for one community does not necessarily work for another. Place-based and contextual measures are critical to "getting it right."

2.2 Current Effort

To address these emerging needs in livability performance measurement, the Federal Highway Administration (FHWA) is currently developing a resource for measuring the effects of livability improvements. The products of this effort will include a handbook and a searchable database that will allow practitioners (DOTs, MPOs, RPOs, local governments, tribal representatives, agencies, etc.) to identify livability indicators and performance measures based on their unique goals, needs, and contexts. The database will provide a user-friendly tool for practitioners to use as they pursue livable and sustainable outcomes.

This initiative has been divided into three phases, with a variety of opportunities for practitioner input into the design and content of the database. This report marks the completion of Phase One, which involved best practices research, academic engagement, and practitioner feedback to support initial database development activities. As the project proceeds into remaining phases, draft products will be created and "tested" by practitioners to further refine materials and ensure that they reflect the needs of end users.

2.3 Project Definitions

In conducting research and outreach and developing project materials, the project team will adhere to the following definitions related to livability and performance measurement:

Term	Definition	Example 1	Example 2
Indicator Type	Organizing theme or domain	Public health	Economic
Indicator	Effect, occurrence, or condition that supports or relates to a goal – *What tells us we are moving towards a goal?*	Travel by active modes (pedestrian and bicycle) within a community	Transportation costs
Measure	Specific observation, descriptive and/or quantifiable, that gauges progress towards a goal – *How do we measure or evaluate that indicator?*	Percent of trips made by biking or walking, percent of students who walk or bike to school, number of schools participating in a Safe Routes to School program, etc.	Percent of household budget spent on transportation, percent of local government budget spent on transportation, etc.
Context	Attribute describing the setting in which the measure has been or could be applied – *In what situation(s) is the measure useful?*	Density and typology, geographic scale (community-wide), built environment characteristics	Geographic scale, timeframe

2.3.1 Livability Indicator Types

To frame the discussion of livability performance measurement and to categorize indicators, the project team has developed 12 indicator types that address the various dimensions of livability. These types have been refined through an iterative process throughout the literature review, FHWA coordination, and academic and practitioner outreach efforts (see Section 3.1). The 12 livability indicator types are defined as follows:

- ***Accessibility*** – the ability to utilize a given transport mode or modes to travel between selected destinations or types of destinations (goods, services, and opportunities)
- ***Aesthetics and sensory*** – the visual, scenic and auditory elements of communities and transportation systems, including the degree to which the built and natural environments are visually pleasing to residents and users
- ***Community amenities*** – community infrastructure, facilities, and services that are provided to residents, visitors, and workers, including public services (e.g. education, police and fire protection, utilities), civic opportunities, recreation, community centers, and other features
- ***Community engagement*** – the degree to which community members are actively involved in community life, including civic outlets and opportunities to influence public decision-making
- ***Economic*** – the financial state of a community including local and regional levels of business activity, government fiscal conditions, affordability (cost of living), and employment opportunities
- ***Housing*** – residential infrastructure, considering housing type, form, affordability and availability of housing opportunities across a variety of demographic characteristics
- ***Land use*** – the physical form and function of a community including the distribution of activities, land cover, geographic distribution of land uses, etc.; and management of land use, if applicable
- ***Mobility*** – the quality of the experience of moving from place to place by a given mode or group of modes
- ***Natural resources*** – the environmental conditions, including ecosystem health, open space, air and water quality, natural habitats, preservation areas, and other resources

- ***Public health*** – the physical, mental, and social well-being of communities, including built environment characteristics that facilitate physical activity and protection of air and water quality
- ***Safety*** – the physical safety and personal security of individuals and communities
- ***Socio-cultural*** – the social and cultural elements of a community—including community/social networks, heritage, religion, spirituality, community cohesion, and sense of community—and opportunities/outlets for expression of these elements

In addition to these areas, the themes of equity, infrastructure, and political/regulatory environment will be included to cut across all indicator types.

2.4 Literature Review Purpose and Outcomes

To initiate the project and to ensure that deliverables are guided by best practices in the field, Phase One involved a review of existing literature and resources—including academic research, transportation agency plans and guidance, tools, and other sources—related to livability performance measurement. The purposes of this review are as follows:

- Assess the current state of the literature and practice with regards to livability performance measurement
- Evaluate current and emerging trends
- Identify data and knowledge gaps
- Develop best practices and major conclusions/recommendations
- Identify potential indicators and measures to incorporate into the handbook and searchable database

The methodology and major findings of this review are documented in the remaining sections of this report. Through this approach, the project team will more fully understand the role of the handbook and database in the field of livability performance measurement and ensure that these end products reflect best practices while responding to identified needs.

3.0 METHODOLOGY

This section presents the methodology used to obtain, document, and analyze resources related to livability performance measurement. Following this description, the major findings of the analysis are documented.

3.1 Methods of Obtaining Resources and Expert Input

Resources for the literature/best practices review were obtained through four major approaches:

- Resource documentation
- Academic focus group
- Practitioner interviews
- FHWA consultation

3.1.1 Resource documentation

The project team collected resources from related research efforts while simultaneously searching for new resources, primarily via agency and organization websites. Resource types obtained through these methods include the following:

- Agency/government guidance documents
- Agency/government plans and policy documents
- Case studies
- Journal/periodical articles
- Online tools and websites
- Presentations (conferences, webinars, etc.)
- University thesis papers and independent research

3.1.2 Academic focus group

To engage academic researchers in the identification of resources and best practices, the project team conducted an academic focus group session on October 26, 2011. The purpose of this session was to identify livability performance measures and indicators that are either currently available or emerging through ongoing research initiatives. Input on the categorization of indicators and measures was also sought from participants as well as identification of data needs and other challenges associated with utilizing livability performance measures. This academic input ensured that the handbook and database will reflect the most current and innovative information in the field.

3.1.3 Practitioner interviews

Interviews were conducted with representatives of 20 organizations—including state DOTs, MPOs, RPOs, local governments, agencies, and consultants—to ensure that the handbook and database will respond to the needs of the practitioners who will be using them. These interviews were conducted between October and November 2011. In addition to soliciting input regarding the structure and content of the handbook and database, the practitioner interviews served to obtain information on livability performance measurement efforts currently taking place in the field.

3.1.4 Outreach presentations

Team members presented project information and solicited academic and practitioner input at several conferences, including the following:

- Conference on Performance Measures for Transportation and Livable Communities (Austin, TX; September 7-8)
- Tribal Transportation Summit (Tulsa, OK; October 3-5)
- 14th Annual National Tribal Transportation Conference (Nashville, TN; November 14-15)

By leveraging their participation in these conferences, team members were able to communicate project objectives and activities; identify resources; obtain expert input on livability performance measurement; and encourage involvement in project feedback opportunities, including the academic focus group, practitioner interviews, and future beta testing.

3.1.5 FHWA consultations

During Phase One, the project team conducted regular teleconferences and an in-person, full-day interview series (November 8, 2011) with FHWA representatives. Through these consultation methods, the project team obtained input on project materials and relevant resources/initiatives. Coordination and consultation with FHWA representatives added a number of valuable resources to the literature review effort.

3.2 Creation of Inventory and Categorization of Resources

As resources were obtained, they were evaluated and categorized as either “key” or “additional” based on their contribution to an understanding of current best practices. Factors considered in this determination included topical relevance, date, comprehensiveness, and extent of indicators and measures offered. A general summary/abstract was prepared for all resources, while a more detailed profile was created to document each *key* resource. This profile was designed to communicate the following key information:

- Title, author, date, publication details, and web link
- Livability indicator type(s) addressed
- Context(s) and geographic scale(s) addressed
- Resource synopsis identifying purpose, major conclusions, data/knowledge gaps, and emerging trends

Abstracts for all resources, as well as synopsis information for all key resources, are provided in Appendices A and B of this report. This inventory and categorization provided a foundation for the analysis of existing resources, as documented in the following section.

4.0 LITERATURE REVIEW FINDINGS

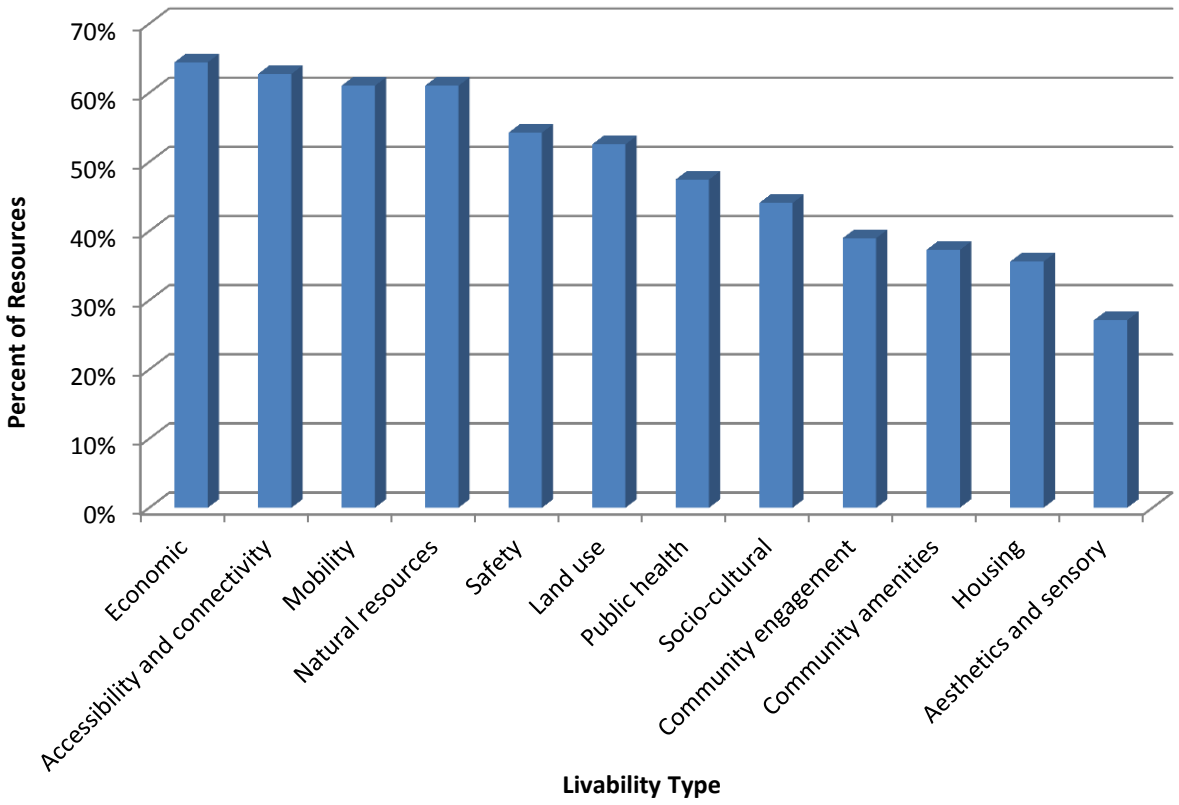
Through the collection methods described in the previous section, the project team obtained a total of 116 resources to include in the literature and best practices review. Among these, 60 were identified as key resources for detailed analysis while the remaining 56 contributed to the team's overall understanding of the state of the practice. Summary information for each resource can be found in Appendices A and B of this report. Key findings from the resource analysis—including current and emerging trends, knowledge and data gaps, and best practices—are outlined in the sections that follow.

4.1 Current and Emerging Trends

The resource review highlighted a variety of current and emerging trends in the field of livability performance measurement.

As previously noted, resources were evaluated to identify the component(s) of livability they primarily addressed. Figure 1 shows the percentage of resources that were found to address each livability indicator type.

Figure 1: Percentage of Key Resources Addressing each Livability Indicator Type



Note: As the majority of resources addressed more than one livability type, the values above will not sum to 100%.

Likely reflecting the current economic climate, economic aspects of livability have been particularly prevalent in recent literature and initiatives. This livability type was addressed by the largest number of resources, with specific activities revolving around economic impact analysis and return on investment calculations. Economic considerations are closely followed by mobility and accessibility, potentially reflecting the traditional role of these concepts in the transportation planning field. Discussion of natural

resources and safety was also robust, perhaps demonstrating a thorough and relatively long-standing comprehension of environmental and safety concepts among transportation practitioners.

A considerable number of resources address public health, responding to an emerging understanding of and interest in the connections between public health and livability/sustainability. Indeed, the resource review indicates that public health is a growing emphasis in the field of transportation planning and performance measurement.

Alternatively, fewer resources consider socio-cultural elements, community amenities and engagement, housing, and aesthetics. Moreover, when these concepts are addressed, the discussion tends to remain general with indicators and measures infrequently offered. The data and knowledge gaps that likely drive this observation, as well as their implications, are discussed further in Section 4.2.

Beyond the analysis of predominant livability types, current and existing trends in livability performance measurement, as evidenced by the review of key resources, are listed below.

While many performance measurement efforts continue to be framed in terms of sustainability, the components of livability are generally encompassed within this framework. A number of resources and practitioner-identified initiatives do not specifically address livability as a defined concept, yet the interrelationships between livability and sustainability are fairly well understood and demonstrated.

Transportation agencies are using indicators and measures to manage performance and to evaluate and prioritize transportation projects. Performance-based management is increasingly seen as a way to establish and maintain credibility, accountability, and transparency in decision-making, and many agencies monitor performance through ongoing measurement and reporting efforts. Additionally, resources suggest that agencies are increasingly forecasting measures to demonstrate the impact of proposed policy frameworks.

There is a growing interest in equity considerations, including the distributional impacts of transportation decisions across various population and demographic groups. In several resources, economic conversations are framed in terms of equity and improved methods of assessing environmental justice and other social impacts are recommended.

Several resources demonstrate an interest in measuring* positive *contributions to livability, rather than only measuring decreases in negative impacts. Practitioners appear to have an interest in how they can proactively further livability goals in addition to minimizing their impacts. In one case, measures related to the benefits of well-designed transportation facilities are discussed.

Indicators and measures are increasingly seen as tools to communicate with various audiences—including elected officials, residents, and internal decision-makers—to help stakeholders understand the value of livability strategies. The resources reviewed for this effort suggest that stakeholder and community input are playing an increasingly important role in the transportation planning process, and that stakeholder understanding of livability concepts can be facilitated through measurement activities.

Tools and technologies, including GIS-based applications, are increasingly being used for livability purposes. Key uses of these tools, as identified through the resource review, include needs assessment, information and idea sharing, scenario evaluation, community and regional visioning, policy decision-making, and education regarding the consequences of various actions. Additionally, visualization tools are

increasingly being used to convey livability measures and concepts in a simple manner that can be easily understood by a broad audience. These areas of emphasis reflect growing recognition of the need for widely accessible information, which fosters a more collaborative and participatory planning process.

Efforts are emerging to better quantify the full costs and benefits—both internal and external—of transportation decisions. These efforts respond to a frequent lack of understanding of the full impacts of policies, programs, and actions, particularly with respect to environmental and social effects. Monetization is recommended as a way to quantify these impacts, and standardization is noted as an emerging need.

While performance measurement has traditionally focused on quantitative data, efforts are emerging to measure qualitative aspects of livability and quality of life. Frequent areas of quantitative measurement include walkability, aesthetics, and urban design.

A variety of new tools and methods are emerging in livability performance measurement. These include economic impact tools, survey and interview methods, and composite tools that capture the multidimensional nature of livability. These approaches are increasingly being used to identify needs, assess perceptions, and evaluate outcomes.

While some resources continue to advocate for national, universal measures/standards, emphasis on place-based measures is increasing. Numerous resources demonstrate a growing understanding of the role of context and place in assessing livability outcomes. Efforts to understand the differences between urban, rural, and suburban settings are underway, as are initiatives to develop and analyze "place types" for context-based performance measurement.

4.2 Data and Knowledge Gaps

As the field of livability performance measurement continues to evolve, it will be important to develop resources and methods that fill key gaps in both data and understanding. The use of incomplete or inappropriate indicators and measures can obscure problems and misguide decision-makers, resulting in policies and actions that do not support a sustained approach to livability. To ensure that the products developed as part of this project will contribute to better practices in livability performance measurement, the project team reviewed resources through the lens of existing limitations and emerging needs. Through this scan, a number of data gaps, data challenges, and knowledge gaps were identified, as outlined below.

Data gaps

Not surprisingly, the resources analyzed for this process indicate that data availability is a key limiting factor in the collection and use of livability performance measures. A tension exists between using data that are *available* and those that are *appropriate*, leading to difficulties in application and proper use in the decision-making process. While the resource review suggested several real data gaps, it also indicated that data availability issues often result from a lack of dissemination and awareness of where to find resources. This finding reflects the multidisciplinary nature of livability and demonstrates the importance of coordination and information sharing across disciplines.

Other key findings related to data gaps are as follows:

- While quantitative measures have been emphasized in the past, additional data and methods are needed to adequately capture the full range of qualitative measurement opportunities. Additionally, broader awareness and dissemination of existing qualitative data and methods are needed.

- Although methods of measuring social capital exist, dissemination and awareness of these tools, and thus measurement of social capital, has been limited in the transportation industry.
- Methods and tools for measuring non-motorized transportation (use and facilities) are historically limited, as are those for gauging travel by children and persons with disabilities. Those methods that are available are limited in use.
- The internal (user) and external (societal) costs of transportation are not fully understood, and methods of quantifying them are underused by agencies and continuing to evolve in complexity and accuracy.
- Methods are needed for full-costing of policies and actions, including comparison of business-as-usual vs. sustainable growth approaches.
- Better demand estimation tools are needed to reflect the benefits of compact design on trip chaining, parking policies, non-motorized transportation facilities, and transit-oriented development.
- Traditional data sources do not consistently indicate the severity and magnitude of consequences.
- Data to reflect *contributions* to livability (rather than reductions in negative components) are in need of further development and emphasis.
- Measures for equity, including the distribution of transportation costs and benefits, are currently limited in number and scope (as well as application).
- Practitioners expressed that they would like to see improved data and measurement methodologies for a variety of livability types and issues, including accessibility, walkability, active travel, bicycle and pedestrian safety, bicycle parking, public health, the aging population, social and regional equity, economic hardship, affordable housing, economic development, education, smart growth, infrastructure security, water and energy consumption, the natural environment, transportation-land use linkage, and infill development.

Interestingly, while the aesthetic aspects of livability do not have a strong presence in the existing literature, the practitioner interviews conducted for this project (see Appendix D) indicate that aesthetics and design are a large component of the livability work currently being undertaken by transportation agencies. This suggests the need for expanded performance measurement in the area of aesthetics to address a key component of current work in the field.

Data challenges

When data are available, agencies and organizations face a variety of challenges in using this information for performance measurement purposes. The reviewed resources highlight a number of traditional data challenges, including the following:

- Data collection costs and limited prioritization of funding for data
- Time investment
- Storage and organization
- Methodological intensity (particularly for complex tools and indices)
- Data format and consistency
- Use of data that have been collected for other purposes
- Lack of rural, regional travel demand models

In addition to these more common challenges, issues related to geographic and temporal scale are identified as limitations in the existing literature. The nature and results of performance measurement are strongly

influenced by the geographic scale and unit of time selected, leading to challenges in choosing appropriate data types. Furthermore, given the cross-cutting nature of livability, data interpretation is often a challenge and multidisciplinary collaboration may be needed to understand the results and implications of livability performance measurement.

Knowledge gaps

Livability is a complex concept that has largely defied development of a formal, standard definition. Given this complexity, performance measurement efforts are affected by a variety of knowledge gaps that should be addressed as the concept continues to evolve. Knowledge limitations and key areas for future research include the following:

- As a multidimensional concept, livability involves a number of diverse disciplines. Cross-disciplinary awareness and information sharing is often rare, leading to a limited understanding of the range of data sources and methods available. This gap in knowledge, often attributed to a gap in data, can be overcome through increased collaboration and information dissemination across disciplines.
- The basic dimensions of livability are not completely separable or mutually compensatory. This cross-cutting nature of livability must be more fully understood in order to develop measures that reflect the interdependence of livability goals.
- Furthermore, livability issues cut across various geographic scales and timeframes. A thorough knowledge of these complexities will support the development of indicators and measures that respond to multiple spatial and temporal contexts.
- Greater understanding is needed of how to address the varying livability values and priorities of diverse communities, as well as how to incorporate community values/community context into the selection of measures.
- Practitioners and researchers often struggle with selecting appropriate impacts to measure. Principles and methods for choosing impacts and indicators are needed to support consistent, effective performance measurement.
- Difficulties are evident in determining the spatial and temporal boundaries of impact assessment. Research in this area could improve performance measurement and, ultimately, decision-making.
- Standard methodologies have yet to be developed or widely used for a number of livability analyses, leading to inconsistency and the introduction of bias. Community and social impact assessment methodologies may be helpful in providing processes to address this gap.
- Interest exists for finding measures that translate across functional areas and sectors—as well as to external stakeholders—but knowledge of how to accomplish this is currently limited.
- Understanding of the role of context in livability performance measurement needs further refinement. Numerous measures have not been tested beyond the urban context, and questions about local vs. regional sensitivity are emerging. Resources have advocated for both national and place-based measures, reflecting a need for greater investigation and research in this area.
- Additionally, questions regarding the varying scales of impacts are prominent. For instance, social impacts may be relevant at the project or community level, while economic impacts are often assessed at the regional level. Methods are also needed to incorporate the impacts on a community of decisions made outside of its boundaries.

These knowledge gaps represent opportunities for future research and evaluation. Addressing these gaps will improve the practice of livability performance measurement while clarifying the role of context, multidisciplinary relationships, and spatial relationships in defining an approach to livability evaluation.

4.3 Best Practices

Through extensive resource documentation, practitioner and academic outreach, and agency coordination, the project team has identified a set of best practices that are currently informing, or have the potential to inform, the overall pursuit and measurement of livability outcomes. State DOTs, MPOs, RPOs, agencies, and local governments are approaching livability through a wide variety of mechanisms and initiatives, including the following:

- Programs
- Plans
- Policies
- Projects
- Investment strategies
- Case studies
- Charrettes
- Partnerships
- Research
- Grants
- Tools
- Guidance
- Small area studies

These efforts tend to be initiated by a combination of plans, legislation, policies, community and grassroots organizations, local government requests, individual champions, grants, and other incentives. The source and degree of motivation is strongly tied to the political climate surrounding the organization

As outlined below, livability efforts are generally initiated at the national and statewide policy levels; translated into practice through plans and processes; and implemented through the use of tools, applications, and data.

Policy

Livability efforts are undertaken within a high-level policy framework established at the national, and sometimes state, level. The HUD/DOT/EPA Partnership for Sustainable Communities creates a policy setting within which other entities operate, guided by a series of principles that seek to define the components of livability. While this framework does not provide a “how-to” approach to performance measurement, it guides the adoption of indicators and measures at the level of plans and processes.

Plans and processes may also be informed by state-level policy, as exemplified through interviews with agencies in Washington State and California. The Washington State Legislature has adopted a formal definition and policy framework for livability, creating a guide for regions and localities as they pursue livability efforts and track their performance. While the California General Assembly has not adopted a formal livability policy, legislation in areas such as climate change has effectively established a policy impetus for livability efforts among California agencies and organizations.

Plans and Processes

Within the context of national and state policy frameworks, livability is pursued through plans and processes at the state, regional, and local levels. While many of these plans are framed in terms of sustainability, their goals frequently encompass livability principles. A number of state Departments of Transportation have adopted plans that address livability, either explicitly or under the heading of related terms and concepts.

For instance, Caltrans' "Smart Mobility 2010" plan guides agency processes and actions through a framework that reflects several aspects of the six federal guiding livability principles. Livability plans and processes are more common, and perhaps more focused, at the regional level.

Several organizations have created detailed frameworks to tie performance measurement to goals, objectives, and outcomes. In its Plan Bay Area and Transportation 2035 documents, the San Francisco Metropolitan Transportation Commission (MTC) presents a framework of adopted targets and qualitative assessment criteria related to climate protection, adequate housing, healthy and safe communities, open space and agricultural preservation, equitable access, economic vitality, and transportation system effectiveness. The Mid-America Regional Council links specific performance measures to more general factors (indicators) and broad goals including accessibility, economic vitality, climate change/energy use, environment, place making, public health, safety and security, system condition, and system performance. By connecting livability-oriented goals to objectives, actions, indicators, and measures, these plans can create a framework that reflects the influence of larger-level policy in addition to local issues and needs.

Approaches to livability also include agency and organizational decision-making processes. The literature and best practices review for this project indicates that a number of organizations are incorporating livability standards and measures into the prioritization of investments and projects. These efforts, even when not guided by formal plans, generally reflect the standards established at higher levels of policy.

Tools, Applications, and Data

While livability approaches are originated and defined by policy, plans, and processes, implementation occurs through the use of tools, applications, and data. The literature and best practices review reveals a growing emphasis on the use of tools and technologies not only to analyze livability needs and outcomes, but also to convey this information to a broad audience.

Existing tools and applications vary greatly in terms of sophistication, although their underlying purpose is to improve communication and decision-making. THRIVE (Tool for Health and Resilience in Vulnerable Environments) makes health and equity information more accessible to communities and decision-makers, while more complex indices and impact tools such as the Economic Impact Tool and the Sustainable Streets Index represent methods of synthesizing large amounts of information to derive manageable results. GIS and other visualization tools are becoming increasingly prevalent as ways to assess livability needs, inform policy and project decisions, build consensus among stakeholders, and encourage communities to understand the consequences of their actions with respect to transportation.

In addition to formal tools and applications, livability implementation and performance measurement is supported through the use of more straightforward data organization techniques. State departments of transportation tend to track performance through internal and external facing "dashboards" that measure key indicators over time. For instance, the North Carolina Department of Transportation maintains an extensive internal spreadsheet of performance measures and presents a select number of these to the public through a user-friendly online

NCDOT Performance Dashboard
https://apps.dot.state.nc.us/dot/dashboard/

application. However, these types of dashboards do not generally capture the social and economic development components of livability, instead tending to focus on traditional transportation indicators such as vehicular safety, travel time, and project delivery. A number of regional organizations and agencies maintain datasets and tracking mechanisms that quantify the pursuit of livability and sustainability outcomes over time.

The Importance of Context and Integration

While some resources advocate for universal measures that can be applied to any state, region, or locality across the nation, the literature and state of the practice more strongly show a growing recognition of the role of context in defining the appropriateness and applicability of various measures. Geographic scale and position along the urban-rural transect are frequently noted as factors that affect the usefulness of indicators and measures in tracking livability outcomes.

Additionally, while agency and organizational approaches have tended to focus on individual components of livability, the best practices are those that integrate various disciplines and bring them together under a single policy, planning, and implementation framework. Livability is a multidimensional concept that cannot be adequately approached through segmented activities. The measure of success in future livability efforts will be the degree to which various agencies and disciplines share information and collaboratively make decisions in support of livability principles.

5.0 CONCLUSIONS AND NEXT STEPS

The multifaceted approach taken for this review has led to new ideas and insights regarding livability practice, policy, and performance measurement. A variety of livability approaches are currently being undertaken at the local, regional, state, and national levels, with implications for a thorough understanding of the field and best practices in moving forward.

Both the literature and practice reveal that while livability continues to defy a formal, standard definition, its components are addressed through a variety of actions across agencies and disciplines. Best practices are informed by policy at the national level, translated into guidance through plans and practices, and implemented using tools, applications, and data. Tools are increasingly being used to make information more accessible to a broad audience in support of a more participatory, collaborative planning process.

This review indicates that to fully gauge the effects of livability improvements, methods and data will need to cross discipline boundaries, package diverse information, and lend themselves to ease of use by a wide audience of practitioners and citizens. As data technologies and the understanding of livability continue to evolve, user-friendly tools and applications will be essential to adequately measure the outcomes of investments, plans, and projects with respect to livability.

Finally, the literature and best practices review indicates that performance measurement should respond to context. While demand may continue for national measures that can be applied universally, emphasis must be placed on the use of context-based metrics if livability performance measurement is to suit the needs of diverse communities and regions across the nation.

The information obtained through this review will be used during Phase Two of the project to develop a searchable database of livability indicators and performance measures. The input and insights gained through this process will inform the categorization of indicators and measures, the selection of searchable attributes, and the tiering structure of the database. Based on feedback during this review, potential attributes that may be used to categorize and filter indicators include the following:

- Livability indicator types
- Data intensity/data capabilities
- Geographic scale
- Data characteristics (e.g. availability, source, type, cost, frequency of collection, methodology)
- Population size
- Geography type (e.g. local, regional, state)
- Primary user (e.g. government vs. civic)
- Program area (e.g. public health, transportation) with sub-areas (e.g. transit, highway)
- Timeframe (e.g. near-term vs. long-term impacts and measurement)

These and other recommendations and issues will be used by the project team to create an organizational structure/tiering for the searchable database.

This literature and best practices review has identified the need for a centralized source of multidisciplinary measures that allows users to easily search for resources based on their unique needs, goals, and contexts. By developing a user-friendly database that incorporates community values and context into the selection of measures, the project team will respond to existing literature and best practices in support of more effective measurement of livability outcomes.

6.0 APPENDICES

Appendix A: Key Resource Abstracts and Synopses

Appendix B: Additional Resource Abstracts

Appendix C: Focus Group Session Summary

Appendix D: Practitioner Interview Summary and Documentation

Appendix A:
Key Resource Abstracts and Synopses

2011

Applications of Geographic Information Systems (GIS) for Livability: Case Studies of Select Transportation Agencies	
Author(s):	John A. Volpe National Transportation Center
Year:	2011
Source info:	Prepared for the FHWA Office of Planning
Web link:	http://www.gis.fhwa.dot.gov/documents/Livability_Report_030811.pdf

Abstract
This report synthesizes the findings from four case studies that assess how select organizations (the City of Boulder, Colorado's Transportation Division, the Center for Neighborhood Technology, the University of Oregon and the Oregon Transportation Research and Education Consortium, and the Southern California Association of Governments) are developing and applying GIS tools to support livability goals from a transportation point of view. The report identifies important trends and factors that encourage the use of these tools and provides examples of additional tools beyond those referenced in the case studies. Finally, it describes successes and challenges experienced in developing and utilizing the tools as well as factors that transportation organizations might consider as they engage in similar efforts.

Synopsis
Purpose: The purpose of this effort is to determine how GIS tools can be applied in the transportation field to identify and analyze livability issues. The report provides examples of how GIS tools are used for livability purposes and describes challenges and lessons learned from four case studies.
Major conclusions: GIS applications that support livability are generally used for decision-making (helping users to make more informed transportation choices, such as mode and route), highlighting connections (helping users to comprehend linkages between transportation, the built environment, and other factors), and consensus building (collecting and sharing information among different parties). Although these efforts support livability, they are not always framed specifically as livability efforts. Key benefits of the use of GIS include accessibility of information to a broader audience and more transparent, collaborative, and participatory planning.
Data/knowledge gaps: Noted challenges in applying GIS tools for livability include data costs, storage/organization issues, time investment, and determining how to present information.
Existing/emerging trends: Newer technologies are making it increasingly possible to manipulate, analyze, and convey livability data in the transportation context. GIS tools are commonly used to improve decision-making, illustrate linkages, and build consensus among stakeholders. As geospatial technologies continue to evolve, it is likely that GIS will become a more prevalent tool for assessing livability outcomes and conveying this information to a broad audience.

An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy	
Author(s):	Frank, L. D., Greenwald, M. J., Kavage, S., and Devlin, A.
Year:	2011
Source info:	City of Seattle and WSDOT (Washington State DOT)
Web link:	http://www.wsdot.wa.gov/NR/rdonlyres/476AE40D-53B2-42D4-93D2-6EB14284EEFB/0/ResearchNote_7651_Redo81611.pdf

Abstract
This is a summary of a study done by WSDOT and the City of Seattle to test the effects of sidewalks and pedestrian crossings on travel patterns and sidewalk availability with Vehicle Miles Travelled (VMT) and greenhouse gas emissions. The research indicates potential of pedestrian infrastructure to reduce CO2 and VMT. There is further testing needed on the framework developed.

Synopsis
Purpose: The purpose of this effort is to determine if higher densities of sidewalk and street crossings contributes to lower vehicle-miles traveled and CO2/Greenhouse gases. Initiated by the City of Seattle, the geographic scope of the

study is limited to three urban neighborhoods. A scenario planning tool was created. The tool includes urban form and transit service as input variables. As this is just a summary, details are not included.
Major conclusions: The current Seattle policy toward investing in sidewalks and transit service resulted in small decreases in VMT and CO2. More testing is recommended. The study acknowledges that other factors are just as important as sidewalks and street crossings, including but not limited to mixing land uses, investing in transit, and charging more for parking.
Data/knowledge gaps: The geographic scope of this study is very limited. Testing in suburban, rural and other regions is needed.
Existing/emerging trends: No existing or emerging trends are evident.

Byway Awareness and Impact on Livability and Economy: Applications, Perspective, and Discussion	
Author(s):	Tuck, B.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Tuck.pdf

Abstract
This presentation discusses the importance of byways in Minnesota and their impacts on livability, particularly in terms of their contributions to community pride and economic activity. Surveys and interviews were administered to residents and travelers along two scenic byways, and input was processed using SPSS and IMPLAN. Resident questions addressed quality of life perceptions, while questions posed to travelers addressed how the byway affected their travel and spending. Resident quality of life perceptions revolved around cultural and historic preservation, natural resources, community beauty, recreation, and community amenities. The presenters note that baseline measures for these perceptions should be developed and tracked over time through longitudinal studies. Visitors were asked whether they visited due to the byway; whether the byway prompted them to alter their route or their length of stay; and how much they spent during their visit on lodging, dining out, food stores, and fuel. The economic impact of the byways based on this information was estimated to be between $12 million and $38 million.

Synopsis
Purpose: The purpose of this presentation is to explore the impacts of scenic byways on livability and economic vitality. Through an analysis of survey and interview input along two scenic byways in Minnesota, these impacts are identified and, when possible, quantified.
Major conclusions: Based on resident input, the presenters conclude that byway impacts on quality of life involve cultural and historic preservation, natural resources, community beauty, recreation, and community amenities. While these livability concepts are identified by type, the presenters note that longitudinal studies are needed to measure these factors and monitor changes over time. Traveler input suggests that scenic byways have a considerable impacts—direct, indirect, and induced—on local and regional economies.
Data/knowledge gaps: The presentation suggests that future research should focus on developing measures that can quantify livability perceptions, to be tracked and analyzed over time through longitudinal studies.
Existing/emerging trends: This study exemplifies the use survey and interview data to analyze livability outcomes. This approach may become more prevalent as attempts are made to assess livability through qualitative measures. Additionally, the study emphasizes economic vitality, perhaps reflecting the current economic climate.

Creating Places for People - An Urban Design Protocol for Australia's Cities (FINAL Draft)	
Author(s):	Australian Government Department of Infrastructure and Transport
Year:	2011
Source info:	Partnership: community and industry organizations, States, Territories, Local Governments, and the Australian Government
Web link:	http://www.urbandesign.gov.au/ http://www.infrastructure.gov.au/infrastructure/mcu/urbandesign/index.aspx

Abstract
Includes good discussion of design principles and how livability and sustainability should influence urban design. It includes some very intuitive graphics to distinguish among sustainability and livability and principles of leadership and governance. Also includes outcomes and attributes for achieving a "world-class urban design".

Synopsis
Purpose: The purpose of this effort is to make the case that good urban design contributes to livability and place-sustainability.
Major conclusions: The study determines that well-designed places can only be achieved by adopting an integrated design approach where multi-disciplinary teams work collaboratively at all stages of a project from design through to procurement, implementation, operation and maintenance. Good model processes prioritize design excellence through leadership, teamwork, and integrated processes.
Data/knowledge gaps: Livability indicators include comfort, welcoming, vibrancy with people around, feels safe, easy to walk and bicycle around, enjoyable to walk. It does not appear to be based on a robust set of performance measures.
Existing/emerging trends: No existing or emerging trends are evident.

Data Points for Measuring Livability	
Author(s):	Voights, B.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Voights.pdf

Abstract
This presentation discusses data sources and indicators that could be used to calculate livability. Key areas of analysis include aging, migration patterns, job growth, commute patterns, economic trends and talent, and access to education. Specific measures include percentage of workers employed within their county of residence; ratio of median home value to median household income; means of transportation to work (mode shares); and changes in air quality standards. The study concludes that "troublesome" trends in the Austin region continue, including out-of-county commute patterns, decline in housing affordability, and the predominance of single-occupancy vehicle travel. The presenter notes that these measures represent an opportunity to blend data and education in order to change regional development patterns in support of livable outcomes. Future measures may include proximity of transit to employment centers; housing choices and cost of all services to residential consumers; mobility options' impacts on post-secondary education; and ROI on public sector investment in infrastructure.

Synopsis
Purpose: The purpose of this presentation is to discuss data sources, indicators, and measures that can be used to gauge livability, using the Austin, TX region as a case study.
Major conclusions: The presenter concludes that troubling trends continue in Austin with respect to livability, but offers a variety of new measures that could contribute to more thorough measurement in the future.
Data/knowledge gaps: No specific knowledge or data gaps are discussed.
Existing/emerging trends: The presenter notes that future measurement efforts may combine data and education in support of livability outcomes.

An Evaluation of Automobile Use, Parking Provision, and Urban Activity	
Author(s):	McCahill, C. and Garrick, N.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/McCahill.pdf

Abstract
McCahill and Garrick address parking as a livability indicator in a case study on Nantucket Island. The investigation includes a summary of parking demand based on a land use study and local zoning codes, as well as a theoretical model of land consumption that indicates a positive association between the amount of land used for transportation and the automobile mode share. Measures used for this investigation include employees per square mile, automobile commute shares, residents plus employees per square mile (activity density), and square feet of parking per activity. These measures are evaluated over a number of cities to draw conclusions about the connection between parking provision, automobile use, and urban activity. The presentation concludes that (1) high levels of automobile use (and parking) correspond with fewer activities and that (2) cities with the most activities have preserved their urban fabric and provide a range of transportation options.

Synopsis
Purpose: The purpose of this presentation is to describe the connections between automobile use, parking provision, and "urban activity" (residential and employment density) based on an investigation of eleven smaller cities across the U.S.
Major conclusions: The presentation concludes that (1) high levels of automobile use (and parking) correspond with fewer activities and that (2) cities with the most activities have preserved their urban fabric and provide a range of transportation options.
Data/knowledge gaps: Absent a direct measure for "urban activity," the researchers use residential and employment density as proxies.
Existing/emerging trends: The presentation reflects an emphasis on the relationship between transportation and land use. Urban vitality is measured through proxy measures such as residential and employment density, indicating that researchers are developing innovative ways to quantify difficult-to-measure livability concepts.

FHWA Scenario Planning Guidebook	
Author(s):	John A. Volpe National Transportation Systems Center
Year:	2011
Source info:	Prepared for the FHWA Office of Planning
Web link:	http://www.fhwa.dot.gov/planning/scenario_and_visualization/scenario_planning/scenario_planning_guidebook/

Abstract
This guidebook serves to assist transportation agencies with carrying out a scenario planning process from start to finish at a regional scale. Transportation agencies can use the guidebook as a framework to develop a scenario planning approach tailored to their needs. The guidebook outlines the six key phases that agencies are likely to encounter when implementing the scenario planning process. For each phase, the guidebook provides questions, considerations, steps, and strategies to help guide agencies in managing and implementing a comprehensive scenario planning effort and describes potential outputs.

Synopsis
Purpose: Scenario planning is a process that can help transportation professionals to prepare for what lies ahead. It provides a framework for developing a shared vision for the future by analyzing various forces that affect communities (e.g., health, transportation, livability, economic, environmental, land use). Key to scenario planning is identifying land-use patterns as variables that could affect transportation networks, investments, and operations. Other variables might include demographic, economic, political, and environmental trends. Stakeholders, including the public, compare scenarios, using either qualitative or quantitative methods, creating a shared future vision.
Major conclusions: Phase 5 of the process focuses on analyzing scenarios, which involves assessing impacts and effects of scenarios on the selected indicators. Indicators are defined as statistical values (e.g., level of employment) that allow comparison of scenarios. Indicators should be discrete, measureable, and describable (quantitative or qualitative). Some indicator examples are listed (acres of non-urbanized land, % population living in clustered

communities, number of jobs located near affordable housing, GHG emissions dues to vehicle miles traveled, etc.). A comparison matrix is used to compare scenario performance on each indicator.
Data/knowledge gaps: When collecting data, the authors note to ensure that all data are in appropriate format.
Existing/emerging trends: As is true in many planning processes, each scenario planning process is unique and specific issues with depend on the resources available and other factors.

Freight, Economic, and Global Competitiveness Performance Measures	
Author(s):	Turnball, K.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Turnbull.pdf

Abstract
Turnball discusses freight transport and its importance to livability, with special consideration given to economic issues. Transportation is noted as playing a supportive role in a broader range of goals, including the following: promote places to live with easy access to jobs and services; identify innovative approaches to economic recovery and long-term prosperity; expand connections to global economy; increase gross regional product; and improve tourist access and movement. Indicators and specific performance measures are offered for truck freight performance, economic viability, economic growth (business, jobs, education, and trade), and environmental/human health.

Synopsis
Purpose: The purpose of this presentation is to evaluate the role of transportation in general, and freight transport in particular, in supporting livable and sustainable outcomes.
Major conclusions: After presenting a variety of transportation indicators and performance measures (including those related to freight transport and global economic competitiveness), the presentation concludes that opportunities and challenges exist related to cooperation/coordination, private sector involvement, and potential expansion of transportation's leadership role in promoting livable and sustainable outcomes.
Data/knowledge gaps: Data needs are noted as a challenge.
Existing/emerging trends: This study is unique in its emphasis not only on regional, but also global economic competitiveness. Like many current initiatives, the study has a strong economic emphasis, including concerns related to transportation affordability. Additionally, the study reflects an ongoing and prevalent emphasis on mobility.

The Federal Transit Administration and Livable Communities	
Author(s):	Gates, K.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Gates.pdf

Abstract
This presentation details the role of the Federal Transit Administration in fostering livable communities through infrastructure investment, capacity building, policy/guidance, and research. In line with this role, Gates notes a variety of trends affecting infrastructure investment, as well as the effects that infrastructure investment decisions have on household and local government budgets. The presenter notes that federal attempts to more broadly define transportation and community development objectives allow different types of communities to devise varying solutions. Regarding the role of performance measurement, the speaker suggests that metrics should help communities and regions to identify issues, establish a baseline and track trends over time, inform policy decision-making, evaluate program effectiveness, be cost-effective, and focus on key issues. Metrics should also address real social issues including increasing urbanization, air quality, greenhouse gas emissions, obesity, loss of community identity, public program effectiveness, economic competition, unemployment, safety, reliance on imported oil, and

the needs of an aging population. Key questions for transportation performance measurement include the following: Can we get people where they need to go safely, quickly, and without using too much gas? Do older people, people with disabilities, economically disadvantaged people, and people in dense urban environments have access to public transportation and other options? What community (transportation) features promote health and minimize environmental impact? The speaker concludes by introducing several ongoing FTA livability performance measurement efforts.

Synopsis

Purpose: The purpose of this presentation is to outline FTA's role in the Partnership for Sustainable Communities and to recommend a strategy for livability performance measurement.
Major conclusions: The speaker notes that performance measures should facilitate decision-making, issue identification, and evaluation of outcomes over time. Additionally, measures should be designed to address the key issues that society now faces, including public health, an aging population, reliance on foreign oil, equity, and economic competitiveness.
Knowledge/data gaps: No specific knowledge or data gaps are identified.
Existing/emerging trends: Livability performance measurement must address a broad array of emerging social, economic, and environmental issues. The presentation suggests an increasing emphasis on equity and multimodalism.

Guide to Sustainable Transportation Performance Measures	
Author(s):	U.S. Environmental Protection Agency
Year:	2011
Source info:	EPA Office of Smart Growth, for Caltrans (Calif. DOT)
Web link:	www.epa.gov/smartgrowth/transpo_performance.html www.epa.gov/smartgrowth/pdf/Sustainable_Transpo_Performance.pdf

Abstract

This document discusses opportunities to incorporate environmental, economic, and social sustainability into the transportation decision-making process using performance measures. It describes 12 measures that have been profiled for this purpose. The examples used are indicative of the growing interest in sustainability.

Synopsis

Purpose: The purpose of this effort is to recommend specific indicators and metrics that are easy and meaningful to transportation decision-makers.
Major conclusions: Agencies using performance measures report that stakeholders quickly see their value and then come to expect regular reporting of measures and a more explicit link between the measures and public agency decisions. Sample measures include: Transit Accessibility (distance to transit stops and/or destinations accessible by transit), Bicycle and Pedestrian Mode Share (% mode share), VMT per Capita, Carbon Intensity ((CO2 per capita), Mixed Land Uses (an index equation is suggested), Transportation Affordability (ratio of annual cost of transportation to annual income), Benefits by Income Group, Land Consumption, Bicycle and Pedestrian Activity and Safety, Bicycle and Pedestrian Level of Service, Average Vehicle Occupancy, Transit Productivity ((average number of passengers per vehicle revenue-hour or revenue-mile).
Data/knowledge gaps: Specific data gaps for each performance measure and metric are identified in the report.
Existing/emerging trends: No existing or emerging trends are evident.

Leading Health Indicators for Healthy People 2020: Letter Report	
Author(s):	National Academy of Sciences - Committee on Leading Health Indicators for Healthy People 2020 et al
Year:	2011
Source info:	
Web link:	http://www.nap.edu/catalog.php?record_id=13088

Abstract
For the past three decades, the Department of Health and Human Services (HHS) has issued a national agenda aimed at improving the health of all Americans over each 10-year span. Under each of these Healthy People initiatives, HHS established health targets and monitored how well people were reaching them over time. In response to a request from the Department of Health and Human Services (HHS), the Institute of Medicine (IOM) established the Committee on Leading Health Indicators for Healthy People 2020 to develop and recommend 12 indicators and 24 objectives for consideration by HHS for guiding a national health agenda and for consideration for inclusion in Healthy People 2020. The work of the committee built upon the 1999 IOM report, *Leading Health Indicators for Healthy People 2010*, and on the work of the Committee on the State of the USA Health Indicators. *Leading Health Indicators for Healthy People 2020* lays out the proposed agenda for the current decade, which will end in 2020. In this report, a framework of health topics and associated indicators and objectives is described.

Synopsis
Purpose: The purpose of this report is to identify a framework of topics, indicators, and objectives related to public health. Interestingly, the framework develops indicators as a precursor to objectives; for example, the indicator of "prevalence and mortality of chronic disease" is accompanied by three objectives, such as "reduce coronary heart disease deaths." These objectives, when reconstructed in a neutral format, could in turn become health performance measures.
Major conclusions: The report recommends the adoption of 12 indicators (each relating to a separate topic) and a total of 24 associated objectives. To fill gaps in the existing performance measurement framework, the report recommends new indicators and measures related to social determinants (economic hardship), health-related quality of life and well-being (health-adjusted life expectancy, health-related quality of life, and quality of life or well-being), and lesbian, gay, bisexual, and transgender health.
Data/knowledge gaps: As previously noted, the report identifies and seeks to fill several data gaps.
Existing/emerging trends: The report exhibits a common framework of goals, indicators, and measures, although these are labeled with slightly different terminology. This effort reflects an emerging emphasis on public health in planning and performance measurement.

Livable Measures in Practice: Case Study Examples	
Author(s):	Tilbury, K.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Tilbury.pdf

Abstract
This session presentation describes how livability performance measures have been applied in the field by practitioners in Knoxville and Hamilton County, Tennessee. The case studies provide a variety of indicators and measures related to accessibility, land use, pedestrian and bicycle facilities, community amenities, housing, equity, economics, safety, and natural resources. The presenters emphasize the importance of connecting land use and transportation plans, stating that they must be complementary and should not be developed separately. Based on these case studies, the presentation concludes that livability measures should be community-defined and can be qualitative as well as quantitative.

Synopsis
Purpose: The purpose of this presentation is to describe how livability indicators and performance measures have been used in two locations in the Knoxville region.
Major conclusions: The two case studies offer a variety of indicators and performance measures that could be incorporated into the current effort, including those related to accessibility, land use, economics, equity, pedestrian and bicycle facilities, amenities, housing, transit facilities, and natural resources. The presenters conclude that measures can be both quantitative and qualitative and that they should be defined by the community.

Data/knowledge gaps: While the presenters advocated for qualitative measures (in addition to quantitative ones), none are offered in the case studies. This suggests a need to develop more measures that adequately capture qualitative aspects of livability.
Existing/emerging trends: The presentation makes the case for community-based measures and a mixture of qualitative and quantitative approaches. Additionally, the presentation uses visual techniques and images to convey livability information in a simple manner that can be easily understood by a broad audience.

Measuring Livability in Small Urban and Rural Communities with Disaggregate Data	
Author(s):	Belz, N. and Jennings, L.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/BelzJennings.pdf

Abstract
This presentation describes a study that uses a combination of GIS and survey data to measure seven "capitals" for livable communities: infrastructure, environmental, financial, political, human, social, and cultural. Indicators for each of these capitals are offered, and the importance of geographic scale in measurement is noted. The presenter suggests that disaggregate data offer a more accurate representation of livability issues than aggregate data, which tends to obscure local conditions. Key indicators presented include sidewalk presence/adequacy, perceived safety of walking and biking, distance to amenities (groceries, hospital), and emergency response. When available, these concepts are measured through both GIS and survey (perception) data.

Synopsis
Purpose: The purposes of this presentation are to describe methods of measuring livability components through GIS and survey data and to emphasize the importance of localized, disaggregate data in representing livability outcomes.
Major conclusions: The presentation concludes that disaggregate data offer a more appropriate representation of livability components than do aggregate data sources. The study also indicates that a combination of GIS and survey data can be used to analyze livability "capitals" on a disaggregate level.
Data/knowledge gaps: The presenters note a tension in dealing with what data are *available* and what data *should be included*.
Existing/emerging trends: This study reflects a common theme of using technological applications (GIS) to identify and analyze livability conditions/trends. The resource also highlights the importance of scale and context in developing meaningful performance measures.

Measuring Transportation's Role in Supporting Quality of Life and Livable Communities	
Author(s):	McKeown, C.
Year:	2011
Source info:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/McKeown.pdf

Abstract
This presentation summarizes how the recent update of the North Central Texas Council of Governments' regional transportation plan (Mobility 2035) is contributing to quality of life and livable communities in the Dallas-Fort Worth area. Mobility 2035 provides a "blueprint" for a multimodal transportation system guided by four key goals (and associated objectives): mobility, quality of life, system sustainability, and implementation. The plan identifies policies, programs, and projects that support desired outcomes in these areas; the plan also guides state and federal expenditures to reflect the plan's approach. Mobility 2035 includes a variety of measures that are used for project evaluation and prioritization. These measures address accessibility, mobility, community amenities, bicycle and pedestrian facilities, open space, parks, safety, and government involvement in the bicycle/pedestrian planning

process. The presenter notes, “with limited financial resources, continually monitoring the performance of the transportation system is key to managing congestion.”

Synopsis

Purpose: The purpose of this presentation is to describe the “Mobility 2035” plan and how it contributes to livability and quality of life in the Dallas-Fort Worth area.
Major conclusions: The presentation offers a variety of performance measures and concludes that given limited financial resources, ongoing evaluation of system performance is essential to managing congestion.
Data/knowledge gaps: No specific knowledge/data gaps are identified.
Existing/emerging trends: Mobility 2035 reflects attempts to measure what is available, to use performance measures for project evaluation and prioritization, and to forecast indicators in support of this evaluation (facilitating a build vs. no-build decision). The plan emphasizes congestion, although other measures are offered.

Recommendations Memo #2 – Livability and Quality of Life Indicators	
Author(s):	Oregon DOT, Oregon Least Cost Planning Working Group/CH2MHILL
Year:	2011
Source info:	From CH2M Hill to ODOT
Web link:	http://www.oregon.gov/ODOT/TD/TP/docs/LCP/Livability.pdf?ga=t

Abstract

This memo discusses current application of quality of life and livability indicators for transportation systems to help facilitate a decision by ODOT regarding inclusion of these indicators in the “Least Cost Planning Tool”. The memo discusses what is known about the concepts of livability and quality of life and how both are influenced by transportation actions. It includes examples of the application of quality of life and livability indicators throughout the transportation planning process. Specifically, these examples focus on how jurisdictions use indicators to evaluate portfolios of actions during transportation system planning. The memo also includes a summary of issues related to the quantifying and monetization of quality of life and livability indicators, and recommendations regarding inclusion of indicators in the Tool.

Synopsis

Purpose: The purpose of this memo is to discuss the current application of quality of life and livability indicators to transportation. The paper discusses how the concepts of livability and quality of life have been defined in the literature and reviews several regional plans and other documents, which include indicators that forecast the impacts of transportation plan or project alternatives prior to implementation.
Major conclusions: There are many common indicators for transportation impacts on community livability and quality of life described in the memo. The memo states whether the indicator would be measures by qualitative or quantitative means, but does not include specific measurements.
Data/knowledge gaps: None of the plans reviewed by the authors included social capital as an indicator. The authors suggest that this is likely due to the difficulty in measuring social capital.
Existing/emerging trends: The authors recommended several indicators to use in the Least Cost Planning Tool, but chose not to include property value premiums. This is because property values measure the same thing as other livability and quality of life indicators (such as transportation choice) and it is preferred to measure these benefits directly to avoid issues of double counting.

Pathways to Urban Sustainability: The Atlanta Metropolitan Region - Summary of a Workshop	
Author(s):	National Academy of Sciences - Committee on Regional Approaches to Urban Sustainability (D. Vollmer et al)
Year:	2011
Source info:	
Web link:	http://www.nap.edu/catalog.php?record_id=13143

Abstract

An expert planning committee was appointed by the National Research Council to organize a workshop in Atlanta, Georgia, that would explore the region's approach to urban sustainability, with an emphasis on building the evidence base upon which policies and programs might be developed. On September 30 and October 1, 2010, an ad hoc committee on behalf of the National Academies' Science and Technology for Sustainability Program hosted the workshop, and participants examined how the interaction of various systems (natural and human systems; energy, water, and transportation systems) affected the region's social, economic, and environmental conditions (see Appendix A). The four objectives of the workshop were as follows: (1) Discuss the ways that regional actors are approaching sustainability—specifically, how they are attempting to merge environmental, social, and economic objectives, (2) Share information about ongoing activities and strategic planning efforts, including lessons learned, (3) Examine the role that science, technology, and research can play in supporting efforts to make the region more sustainable, and (4) Explore how federal agency efforts, particularly interagency partnerships, can complement or leverage the efforts of other key stakeholders. The workshop was designed to allow discussion of challenges faced by the Atlanta metropolitan region regarding sustainability efforts and to explore innovative approaches to addressing these complex challenges, performance measures to gauge success, and opportunities to link knowledge with on-the-ground action.

Synopsis

Purpose: The purpose of this report was to document a two-day expert discussion on sustainability in the Atlanta metropolitan region. The workshop was intended to discuss how regional sustainability is being addressed, share information and lessons learned, and explore partnerships for the implementation of sustainable practices.
Major conclusions: The discussion of sustainability performance measurement revolved primarily around the natural environment (reduction of carbon footprint) and public health. One participant described the STAR Community Index, which contains 81 metrics under 10 goal areas.
Data/knowledge gaps: When asked to identify knowledge gaps and research needs, participants noted that natural assets are undervalued and public understanding of their role in the urban environment is low. Methods are also needed to monetize health benefits (e.g. reduced medical expenditures) and to facilitate full costing for a business-as-usual vs. a sustainable growth approach, as local and state governments constantly struggle to evaluate the full costs and benefits of their actions. Research into visualization and simulation tools was also noted as a research need.
Existing/emerging trends: Participants noted that public health goals are increasingly being connected to sustainability goals, reflecting the emergence of health concepts in planning and performance measurement. Interest was expressed in measuring a range of positive possibilities for sustainability, rather than just measuring the decrease in unsustainable indicators. Participants also indicated that the input of residents will play an increasingly critical role in policy and strategy development, pointing to the increasing role of tools and technologies to convey information to a broad audience. Additionally, the workshop results highlight an emerging need to measure the degree to which all population groups benefit from improvements, including access to green space, healthy food options, and multiple transportation modes.

Promising Practices in Low-Carbon Transportation: A Resource Guide for Local Leaders Version 2.0	
Author(s):	Institute for Sustainable Communities: Climate Leadership Academy
Year:	2011
Source info:	Funding from Rockefeller Foundation and Surdna Foundation.
Web link:	www.iscvt.org/who_we_are/publications/Low_Carbon_Transportation_Resource_Guide.pdf

Abstract

The Resource Guide, a compilation of case studies and best available resources, is intended to help local, state, regional practitioners do their jobs better by showcasing effective models and strategies in reducing vehicle-miles traveled and the carbon emissions associated with motorized transportation. More specifically, the Resource Guide provides concrete examples and references to tools that can help practitioners make the case for low-carbon transportation, including the environmental, economic and equity reasons for seeking to expand transit, bicycling,

walking; improve the integration of land use and transportation planning; secure funding; and reach consensus across sectors and jurisdictions.

Synopsis

Purpose: Excellent case studies are featured across the U.S. However little or no specifics on performance measures are offered.

Major conclusions: This resource showcases promising strategies, practices and tools centered on the creation of low-carbon, multimodal transportation systems that work in concert with land-use planning and economic development.

Data/knowledge gaps: Model systems are rare in the U.S., as noted in the report. Interviews with key leaders indicated that lack of funding is the most common challenge. Dealing with public opposition to low-carbon transportation is also cited often. Many cities are pursuing a suite of modes; however, interconnections between modes are a challenge due to insufficient government coordination across departments and jurisdictional lines.

Existing/emerging trends: No existing or emerging trends are evident.

Quality of Life: Assessment for Transportation Performance Indicators	
Author(s):	Schroeder, S.L., Gustafson, K., and Schneider, I.E.
Year:	2011
Source info:	
Web link:	http://www.tourism.umn.edu/prod/groups/cfans/@pub/@cfans/@tourism/documents/asset/cfans_asset_358241.pdf

Abstract

Quality of life has multiple definitions yet specific indicators for transportation remain absent. As such, an opportunity exists for both academe and transportation professionals to better understand the relationship between quality of life and transportation. As the Minnesota Department of Transportation (Mn/DOT) seeks to align programs and services with citizen needs and expectations, evaluating what Quality of Life (QOL) means to the public and how it relates to transportation can inform Mn/DOT program and service delivery. Therefore, the purpose of this study was to assess and evaluate transportation-related quality of life indicators and the role of Mn/DOT programs and services in quality of life. Three inter-related approaches were undertaken: 1) a literature review, 2) focus groups, and 3) a questionnaire. This project reports on the 24 focus groups (each with 5-12 participants) that were conducted across the state in 2010.

Synopsis

Purpose: The purpose of this report is to describe the findings of statewide (Minnesota) focus groups conducted to identify citizen perceptions and definitions of quality of life.

Major conclusions: Without being prompted by a specific definition of “quality of life,” focus group participants most commonly cited the following eleven factors when describing quality of life: education; employment and finances; environment; housing; family, friends and neighbors; health; local amenities; recreation and entertainment; safety; spirituality and individual psyche; and transportation. Additionally, the focus group process identified seven inter-related factors within the transportation system that contribute to or detract from quality of life: access, design, environment, maintenance, mobility, safety, and transparency. Connectivity and access to amenities were most commonly discussed among younger age groups, as was public transportation. The process also revealed differences in perception between metropolitan and non-metropolitan areas; for example, within metropolitan areas, accessibility was a greater quality of life contributor and mobility was frequently described as a quality of life detractor.

Data/knowledge gaps: Specific data/knowledge gaps were not identified.

Existing/emerging trends: This report identified resident perceptions of quality of life across a variety of age groups and density contexts. Although measures and indicators were not provided, the report provides a foundation for the eventual categorization of performance measures.

Regional Approaches to Sustainable Development: Linking Economic, Transportation, and Environmental Infrastructure in Rural and Small Metropolitan America	
Author(s):	National Association of Development Organizations (NADO)
Year:	2011
Source info:	Supported by FHWA, conducted by NADO Research Foundation
Web link:	http://www.nado.org/wp-content/uploads/2011/09/NADO-Sustainable-Devt-2011.pdf

Abstract
This report explores regional sustainable development initiatives in rural and small metropolitan areas. It highlights regional development organizations (RDOs) fostering resilient communities in California, Michigan, North Carolina, and Utah. The case studies illustrate opportunities available to RDOs to undertake sustainable development initiatives using a systems-based approach such as data analysis and tools, public engagement, transportation and infrastructure programs, holistic systems management of land use and infrastructure, asset-based economic development, cultural heritage and placemaking, and intergovernmental coordination.

Synopsis
Purpose: The purpose of this effort is to highlight strategies to foster resilient rural regions and small towns. Resilience is developed in all types of communities by designing and implementing strategies to create stronger, more dynamic economies that are based on quality of place.
Major conclusions: RDOs shape sustainable development and provide key services to position regions as competitive players by integrating land use and natural resource systems; transportation, infrastructure, and energy networks; local and regional governance processes; economic systems; and cultural and working landscapes.
Data/knowledge gaps: No specific data or knowledge gaps are identified.
Existing/emerging trends: This case study reflects a trend of rural and small towns competing economically with urban regions in the global economy.

Regional Livability Workshop: Executive Summary Report	
Author(s):	U.S. Federal Highway Administration
Year:	2011
Source info:	Part of "Strategies for Livable Communities" project.
Web link:	http://www.fhwa.dot.gov/livability/regional_livability_workshop/

Abstract
This is a summary report of FHWA-sponsored Regional Livability Workshops as part of its Strategies for Livable Communities project (five, one-day workshops). The work is a follow-on to a report entitled "The Role of FHWA Programs in Livability: State of the Practice Summary" which was also reviewed and summarized. The goal of the regional workshops was to raise awareness of transportation linkages to livability, and to provide resources to practitioners and the public to more effectively consider livability issues within the federal transportation planning process.

Synopsis
Purpose: The purpose of this resource is to garner input from the public on livability in transportation.
Major conclusions: A major theme from the workshops was the need to develop better methods, tools and metrics for quantifying benefits and fully considering these benefits as part of the transportation planning process. Workshop members cited the importance of new livability measures to address other community goals such as affordable housing, economic development, or smart growth. Suggestions include: triple bottom line cost-benefit analysis, tools to measure the full costs of transportation, home affordability index, direct ways to link sustainable and thriving economies with livable transportation systems, tools to illustrate tradeoffs between different community futures through transportation and land use analyses, ways to quantify long-term benefits of multimodal vs. SOV on health, economy, and job creation. Better travel demand estimation tools are recommended to accurately reflect benefits of compact design on trip chaining, park-once, walking/biking/TOD. A recommendation is made for

revised environmental impact analysis that supports the same level of long term economic sustainability but better accommodates flexibility.
Data/knowledge gaps: Numerous gaps are identified, as discussed in Section 3.3 “Creating a Livability Primer”.
Existing/emerging trends: No existing or emerging trends are evident.

RITA Online Collaborative Tool	
Author(s):	RITA
Year:	2011
Source info:	USDOT RITA Pilot Website
Web link:	www.transportationresearch.gov

Abstract
This is a pilot website being built by the USDOT Research and Innovative Technology Administration (RITA). The goal of the website is to improve the collaborative capabilities offered to transportation researchers and other related stakeholders both inside and outside DOT. The initial phase of this effort focuses on improving collaboration among the four regional networks comprising the National Transportation Knowledge Network, approximately sixty University Transportation Centers (UTCs), and the collaborative work of Position Navigation and Timing, with others entities to be added as the site develops. Livability is one of the fourteen research cluster areas.

Synopsis
Purpose: The livability research cluster supports awareness and cooperation to increase choices for transportation users, provide affordable access to employment centers and other destinations, and enhance economic opportunities and quality of life for all Americans. "Transportation for livable communities" is defined as a transportation system that works with land use to give everyone multiple travel choices for meeting their daily needs affordably, safely, conveniently and efficiently. Since the data is user generated, there is the potential to discuss information on all livability types, indicators, and measures.
Major conclusions: There are several types of online interaction, including links, documents and files, calendars, announcements, and discussions. There are several spheres of interaction: public (but free account is required to post), DOT online (DOT employees), and a federal interagency section is proposed. Users can set up email alerts and RSS feeds to stay informed.
Data/knowledge gaps: Information is user generated. There are several discussions, documents and announcements currently on the site.
Existing/emerging trends: The research cluster is a powerful way to share information and ideas among those implementing livability principles and programs.

The Role of FHWA Programs in Livability: State of the Practice Summary	
Author(s):	ICF and Renaissance Planning Group (for USDOT)
Year:	2011
Source info.:	Funded by USDOT FHWA Surface Transportation Environment and Planning Cooperative Research Program
Web link:	www.fhwa.dot.gov/livability/state_of_the_practice_summary

Abstract
The research paper highlights the current state of the practice relative to implementation of livability principles within the context of the Federal-aid highway program. It also discusses challenges facing agencies in changing traditional planning approaches and evolving institutional frameworks to more effectively incorporate livability principles. From a national literature review, the research paper offers a sample of strategies and tools for implementing livability through different programs and agencies and across various scales in highway program planning and development nationwide. Ten measures are profiled, but these are cross-referenced from EPA’s *Guide to Sustainable Transportation Performance Measures*.

Synopsis
Purpose: The purpose is to guide discussion during FHWA's planned regional livability workshops, intended to help advance livability within the transportation context which is defined as leveraging the quality, location, and type of transportation facilities and services available to help achiever broader community goals.
Major conclusions: (1) many agencies have implemented livability in transportation by creating safer, more balanced local and regional multimodal roadway networks while incorporating CSS and Complete Streets, (2) requires interdisciplinary approach (3) plans and projects are most successful when planned in support of broader community goals, (4) most occur at the local scale often with MPO and/or State funding, (5) there can be significant differences in rural applications compared with urban and suburban.
Data/knowledge gaps: No specific data or knowledge gaps are identified.
Existing/emerging trends: No existing or emerging trends are evident.

Sustainability and Livability – Summary of Definitions, Goals, Objectives, and Performance Indicators	
Author(s):	Litman, T. in cooperation with the TRB Sustainable Transportation Indicators Subcommittee
Year:	2011
Source info.:	Victoria Transport Policy Institute
Web link:	http://www.vtpi.org/sus_liv.pdf

Abstract
This paper presents an in-depth discussion of sustainability, sustainable development, and sustainable transportation. A summary of goals relevant to sustainable transportation is then presented organized by the three pillars of sustainability (social, economic, and environmental). Transportation planning objectives are then referenced to these goals. Finally, the framework is expanded to include recommended performance measures. The final section of the report presents a table linking performance measures and objectives to goals relevant to sustainable transportation, organized by the three pillars of sustainability.

Synopsis
Purpose: The paper outlines how policy and planning objectives can help achieve both sustainability and livability goals. Sustainable development indicators are specific, measurable outcomes used to evaluate progress. A performance index is a set of performance indicators in a framework designed to facilitate analysis.
Major conclusions: The paper gives twelve sustainable transport goals in the categories of economic, social, and environmental, as well as several performance indicators for these goals. Planning objectives can be used to achieve these goals, including: comprehensive analysis, transport diversity, system integration, resource conservation, affordability, efficient pricing and prioritization, land use accessibility (smart growth).
Data/knowledge gaps: The authors caution that inappropriate or incomplete indicators can misdiagnose problems and misdirect decision-makers.
Existing/emerging trends: A variety of objectives and impacts should be considered in the planning process, since transportation decisions affect people in many ways.

Supporting Sustainable Rural Communities	
Author(s):	The Partnership for Sustainable Communities (EPA, HUD, DOT) with USDA
Year:	2011
Source info.:	
Web link:	www.epa.gov/smartgrowth/pdf/2011_11_supporting-sustainable-rural-communities.pdf

Abstract
Rural communities across America are working to strengthen their economies, provide better quality of life to residents, and build on assets such as traditional main streets, agricultural and working lands, and natural resources. The Partnership for Sustainable Communities, in collaboration with the U.S. Department of Agriculture (USDA),

established a Rural Work Group to reinforce these initiatives. This report summarizes the Rural Work Group's findings and creates a framework for the Partnership's future work with rural communities.

Synopsis

Purpose: The purpose of this effort is to reinforce successful local and regional rural initiatives that are working to strengthen their economies and provide better quality of life for residents. These initiatives build on traditional main streets, agricultural and working lands, and natural resources. The four federal agencies participated as a way to identify how their spending, policies, and programs can support rural communities.
Major conclusions: The Partnership for Sustainable Communities will continue working to ensure that its policies, programs and investments support rural communities that are economically resilient, provide good quality of life for its residents, and have healthy environments. Specific steps are identified to do so are listed on pages 20-21.
Data/knowledge gaps: No data or knowledge gaps are identified.
Existing/emerging trends: No existing or emerging trends are evident.

Sustainability and the U.S. EPA	
Author(s):	National Academy of Sciences - Committee on Incorporating Sustainability in the U.S. Environmental Protection Agency
Year:	2011
Source info.:	
Web link:	https://download.nap.edu/catalog.php?record_id=13152

Abstract

To further strengthen the scientific basis for sustainability as it applies to human health and environmental protection, the EPA asked the National Research Council (NRC) to provide a framework for incorporating sustainability into the EPA's principles and decision-making. This framework provides recommendations for a sustainability approach that both incorporates and goes beyond an approach based on assessing and managing the risks posed by pollutants that has largely shaped environmental policy since the 1980s. Although risk-based methods have led to many successes and remain important tools, the report concludes that they are not adequate to address many of the complex problems that put current and future generations at risk, such as depletion of natural resources, climate change, and loss of biodiversity. Moreover, sophisticated tools are increasingly available to address cross-cutting, complex, and challenging issues that go beyond risk management. The report recommends that EPA formally adopt as its sustainability paradigm the widely used "three pillars" approach, which means considering the environmental, social, and economic impacts of an action or decision. Health should be expressly included in the "social" pillar. EPA should also articulate its vision for sustainability and develop a set of sustainability principles that would underlie all agency policies and programs.

Synopsis

Purpose: The purpose of this report is to outline a method of incorporating sustainability into EPA principles and decision-making processes. The report presents both a general framework and a description of the tools and approaches necessary to apply this framework to EPA decisions.
Major conclusions: The authors recommend that EPA adopt the "three pillar" concept of sustainability, with emphasis on environmental, social, and economic outcomes. The report further recommends that indicators be developed to track these outcomes, and that indicators should be actionable, transferable and scalable, intergenerational, definable, relevant, important, measurable, and durable. Finally, the authors note that a variety of tools are available to measure sustainability and recommend that EPA develop a "sustainability toolbox" to analyze and present consequences of alternative decisions on a full range of social, environmental, and economic indicators. These tools should be capable of analyze the distributional impacts of decisions, particularly on vulnerable or disadvantaged groups and ecosystems.
Data/knowledge gaps: The authors note that sustainability performance measurement tools are continuing to evolve through ongoing research.

Existing/emerging trends: This report reflects a current emphasis on sustainability, although livability concepts are inherently addressed. The framework also reflects the common view of sustainability as a "three-pillared" concept (environmental, economic, and social).

NCHRP 20-24(37)G – Technical Guidance for Deploying National Level Performance Measurements	
Author(s):	National Cooperative Highway Research Program and Cambridge Systematics, Inc.
Year:	2011
Source info.:	Prepared for AASHTO through the NCHRP research process
Web link:	http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24%2837%29G_FR.pdf

Abstract
This report identifies performance measures that every state in the U.S. could use to track the impact of investments in the national livability goal areas. The authors recommend the designation of three tiers of performance measures for consideration in a national performance-based structure. Each state would annually report their performance in these livability goal areas. The benefit is a nationally-consistent set of performance measures that provide flexibility for each state to develop their own performance targets.

Synopsis
Purpose: Responding to trends toward greater emphasis on public sector accountability for more effective performance, AASHTO adopted a federal surface transportation authorization proposal that included a national performance measurement program focused on critical national goals. AASHTO established 7 task forces that worked for nearly 2 years to identify performance measures resulting in recommendation for 3 tiers of measures.
Major conclusions: Three major questions are addressed for each measure: (1) is there general consensus on the definition of the measure, (2) is there a common approach to data gathering and (3) has the availability of consistent data across states been established? Tier 1 measures meet all three. Livability is considered Tier 3, meaning they require further study and input from stakeholders.
Data/knowledge gaps: Practitioners must design details of a process and work agenda to identify and implement livability performance measures including: selection of measures, tracking methods, guidebook for agencies, data sources, validity of results, research gaps, and reporting requirements.
Existing/emerging trends: Other measures are farther along, and therefore attributed to Tiers 1 and 2. These include (Tier 1) safety, pavement preservation, bridge preservation, freight/economic competitiveness and (Tier 2), congestion/operations, and environmental.

The Walk Score Team Online Tool	
Author(s):	The Walk Score Team
Year:	2011
Source info.:	
Web link:	http://Ww2.walkscore.com

Abstract
Walk Score may be the most widely used online tool of any being reviewed for this research. The Walk Score Team is comprised of ten web and software developers with an advisory board that includes Dan Burden, Barbara McCann, Shelly Poticha, David Goldberg, Chris Leinberger and other luminaries of the multimodal, walkable communities world. The online tool allows anyone to type in an address for nearly any location in the world and it will report a score (0 to 100) with 90 to 100 considered a "walker's paradise". Recent enhancements to the online tool, adapted through open source computer coding and free-lance software developers, has been links to real estate offerings, hotels, public transit stops and stations. It also ranks cities according to walkability.

Synopsis
Purpose: The purpose of this effort is to provide a widely used online tool to help people live, work and find lodging in walkable places.
Major conclusions: Links to real estate values shows that property in walkable areas maintain or increase in property value faster than in less walkable places.
Data/knowledge gaps: Sidewalk availability and other pedestrian facilities are not factored into the tool.
Existing/emerging trends: The tool has benefitted from significant press coverage and is now widely used.

Transportation Project Prioritization and Performance-based Planning Efforts in Rural and Small Metropolitan Regions	
Author(s):	National Association of Development Organizations (NADO) Research Foundation
Year:	2011
Source info.:	Non-profit research affiliate
Web link:	http://www.nado.org/wp-content/uploads/2011/11/RPOprioritization.pdf

Abstract
In 2011, national-level research was conducted by the NADO Research Foundation on regional planning and development organizations' efforts in rural and small metropolitan transportation planning. The research effort focuses particularly on regional-level transportation planning conducted by RPOs, which are often organized similarly to MPOs but function mostly under contract to state DOTs to assist with tasks related to statewide and regional planning. This paper reviews the results of that research and describes common organizational and leadership structures, work elements completed through planning contracts, funding and staffing levels, and decision making processes.

Synopsis
Purpose: RPOs assist state DOTs and local officials with regional planning in non-metropolitan areas in approximately 30 states. The research is based on responses from 184 organizations across the country. The report describes the characteristics of the responding organizations including funding, staffing, and leadership. The report also outlines different planning tools and techniques used.
Major conclusions: The findings also suggest that rural planning organizations are seeking ways to improve peer accountability and the quality of deliverables. Performance-based criteria are being used that connect projects to a regional vision and goals. Regions are taking steps to link planning processes, such as transportation, with economic development, land use, housing, environment, and other issues. As transportation planning processes increase in formality, shared goals and objectives and complementary project scoring criteria can help to ensure that these planning processes occur in harmony rather than funding projects with conflicting priorities or unassociated purposes with one another. The majority of RPOs use quantitative and qualitative targets in their long-range transportation plans. Measures are also used to rank priorities in regional TIPs.
Data/knowledge gaps: A majority of the RPOs do not have access to a rural, regional travel demand model.
Existing/emerging trends: Performance based transportation planning is emerging as a trend in statewide, regional and local planning.

Transportation Outlook 2040 (Mid-America Regional Council)	
Author(s):	Gerend, T.
Year:	2011
Source info.:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Gerend.pdf

Abstract
This presentation discusses a transportation policy plan that focuses on process rather than data. The plan overview includes a segmented approval process, policy framework, financial assumptions, evaluation framework, and projects

and measures. The goals of the plan relate to system performance and condition, safety and security, a vital economy, accessibility, place-making, healthy living, climate change and energy use, and the environment. To develop a performance measurement element, plan creators screened all available existing data sources to identify those that were (1) reliable and (2) continuous. One or more indicators and specific measures are included for each of the aforementioned plan goals. These are applied to project evaluation and prioritization and are tracked via the organization's Annual Performance Measurement Report. Based on the most recent report, measures are generally trending in the preferred direction with the exception of accessibility and place-making.

Synopsis

Purpose: The purpose of this presentation is to describe the Mid-America Regional Council's "Transportation Outlook 2040" plan, including its framework of goals, indicators, and measures related to livability and sustainability.
Major conclusions: The presentation suggests that performance measures should be tied strongly to goals/objectives and should be based on data sources that are both reliable and continuous. Measures should be evaluated on an ongoing basis to track trends and inform policy. The experiences of this organization suggest that accessibility and place-making may be particularly difficult areas that are thus important to measure.
Data/knowledge gaps: The speaker notes challenges including data gaps, local vs. regional sensitivity, and the decision of whether to set specific targets.
Existing/emerging trends: The presentation suggests that transportation organizations are using performance measures as part of a larger, integrated planning framework. The Mid-America Regional Council distinguishes between indicators and measures, which are closely tied to livability and sustainability goals. While existing plans may not explicitly address "livability," their goals often cover its main components.

Transportation, Sustainability, and Urbanization	
Author(s):	Zheng, J. Garrick, N.W., Atkinson-Palombo, C., and McCahill, C.
Year:	2011
Source info.:	Conference on Performance Measures for Transportation and Livable Communities
Web link:	http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Zheng.pdf

Abstract

Zheng presents his work on GIS-based methodologies for measuring sustainability and livability relative to transportation. The primary tool presented is the Transportation Index for Sustainable Places (TISP), which addresses the environmental, societal, and economic components of sustainability. The presentation offers a variety of measures for economics, affordability, accessibility, equity, efficient mobility, and urbanization. Many of these measures address federal funding patterns and can thus be seen as national measures. Zheng stresses the importance of measuring any information that may provide effective indicators, noting that "what gets measured gets managed."

Synopsis

Purpose: The purpose of this presentation is to describe a GIS-based tool for measuring the environmental, economic, and social components of sustainability.
Major conclusions: The presentation offers a variety of measures, both national and local, that can be used to gauge sustainability and livability. The speaker concludes that sustainability is strongly influenced by degree of urbanization; that both rural and urban states can be sustainable; and that in general, "the most affordable, efficient, equitable, and resilient states are those that tend to be more urban and have diverse transportation options."
Data/knowledge gaps: No specific data/knowledge gaps are noted.
Existing/emerging trends: Like many existing resources, this presentation focuses on sustainability, although livability is inherently addressed. The scope of the measures provided is broad, with a number of national metrics provided. The presentation also suggests the rising use and influence of GIS-based technologies in measuring sustainability and conveying this information to a broad audience.

What Makes a "Complete Street" Complete? A Robust Definition Based on Context and Public Input	
Author(s):	Kingsbury, K.T C., Lowry, M.B., and Dixon, M.P.
Year:	2011
Source info.:	TRB 2011 Annual Meeting
Web link:	http://amonline.trb.org/12kan4/12kan4/1 (password protected) copy of 15 page TRB paper printed and filed at Planning Communities LLC office in Raleigh, NC.

Abstract
This paper defines "completeness" in assessing complete streets. A public participation process is combined with street context to define desired design elements for street segments in terms of automobile, pedestrian, bicycle, and transit amenities. Street designs are then compared to hypothetical "ideal" street designs in terms of amenities for each mode per the public participation process. The paper presents a framework for evaluating the completeness of street segments based on context and community values.

Synopsis
Purpose: Complete Streets policies are growing in popularity as a way to make communities more livable.
Major conclusions: The resource recommends an audit-based tool to assess completeness and calculates a "completeness score". A case study of 67 streets in one small rural community is provided. Results are compared for streets ranked by technical teams vs. citizen-ranked.
Data/knowledge gaps: No data or knowledge gaps are identified.
Existing/emerging trends: This resource is intended only for sketch level planning.

2010

An Economic Impact Tool for National Scenic Byways and All-American Roads	
Author(s):	America's Byways Resource Center
Year:	2010
Source info:	Technical manual developed for Economic Impact Tool
Web link:	http://www.vermont-byways.us/sites/byways/files/BywaysTechnicalManualFINAL.pdf

Abstract
As part of its Congressionally-designated function of providing technical assistance to local byways groups, America's Byways Resource Center (ABRC) commissioned the development of an Economic Impact Tool that allows local byway staff and/or volunteers to easily measure the impacts of byways and byway-related activities in their communities. The Economic Impact Tool is a Microsoft Excel-based software program with a user-friendly interface that allows even novice computer users to generate economic impact figures for their regions. This Technical Manual presents and explains items related to the Impact Tool, including context behind the tool, data required, its outputs, and how it is updated.

Synopsis
Purpose: This manual explains how to use and interpret the results from the Economic Impact Tool. The economic impact analysis is designed specifically for a Byway community. It will estimate the amount of economic activity that can be attributed to a National Scenic Byway or All-American Road. The tool measures economic output (total spending/valuation), employment (number of jobs), earnings (value of wages), and tax Revenues (municipal, county, special district, state, federal). The tool also measures indirect impacts resulting from the effects of economic multipliers.
Major conclusions: The document describes each economic measure and how to input it into the tool. The document also details how to gather certain types of data that may not be immediately available through other sources, like visitor use data (the document describes the best ways to conduct visitor counts).
Data/knowledge gaps: No data or knowledge gaps are identified.
Existing/emerging trends: No existing or emerging trends are evident.

Effective Practices in Planning for Livable Communities at MPOs (Peer Exchange Report)	
Author(s):	FHWA/FTA Transportation Planning Capacity Building
Year:	2010
Source info.:	Summary of Peer Exchange Meeting of Leading MPOs
Web link:	http://www.planning.dot.gov/Peer/Atlanta/atlanta_2010.pdf

Abstract
The Atlanta Regional Commission (ARC) requested a peer exchange to convene leading MPOs in the emerging field of "livability planning". The peer exchange served as a forum for MPOs to share information about their livability programs and multimodal transportation and land use coordination strategies, and identify opportunities for how to strengthen the state of the practice. This is an excellent document for identifying the key weaknesses in livability and recommendations for strengthening collaboration and community engagement.

Synopsis
Purpose: This report is a summary of the MPO peer exchange held on livability planning. They discussed testing new methods, approaches, and strategies to integrate transportation and land use. One discussion explored how participating agencies are tracking performance and measuring the success of their livability work.
Major conclusions: A key finding of the peer exchange was that performance management and program evaluation are areas of increasing interest, as many agencies want to better communicate with the public and elected officials about the value of their livability programs and other transportation investments. The report links to various MPOs tracking/performance measure projects.
Data/knowledge gaps: None of the participating agencies conduct regular post-implementation evaluations. Participating agencies noted an interest in developing new, non-traditional indicators to better reflect the benefits of livability projects.
Existing/emerging trends: New measures include those for energy and greenhouse gas reduction, multimodal level of service, affordable housing impacts, and health impacts. This is still an emerging field for transportation, especially with regard to non-traditional projects.

Final Report: Framework for Measuring Sustainable Regional Development for the Twin Cities Region	
Author(s):	Kirk, K., Tableporter, J., Senn, A., Day, J., Cao, J., Fan, Y., Slotterback, C.S., Goetz, E., and McGinnis, L.
Year:	2010
Source info.:	TRB Sustainable Transportation Indicators Subcommittee (ADD40 [1])
Web link:	http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=1886

Abstract
Six foundational principles, based on the six livability principles of the HUD-DOT-EPA Interagency Partnership for Sustainable Communities, are accompanied by related measures, indicators, and data sources. The final list of indicators emerged after a three phase process, include review of peer practices and input from focus groups. The final six principles are: provide more transportation choices, protect natural resources, promote equitable and affordable housing, value communities and neighborhoods, enhance economic competitiveness and create positive fiscal impacts, and coordinate and leverage government policies and investment. Thirty-eight (38) indicators are presented, including innovative indicators such as a composite sprawl index and land use mix. Indicators are mapped back to foundational principles identifying whether the relationship is primary or secondary. A comprehensive table listing data sources including who collects data, the location of data, the manner in which data is reported, the most recent date of the data, the scale, and the availability of data sources for each indicator is included in the appendices of the report.

Synopsis

Purpose: The purpose of the project is to identify a framework for an indicator system to measure sustainable regional development in the Twin Cities metropolitan region over the long term. The sustainability framework will likely be used for internal organizational purposes with the possibility of being considered by other local areas. This framework could also serve as a tool to compare sustainability between the Twin Cities region and other comparable regions.

Major conclusions: The report includes six final proposed principles and 38 indicators (organized into three tiers) and measures that were derived from input from focus groups, advisory groups, and a research team. The report also shows the relationships between indicators, and groups indicators by principle. The principle with the greatest number of related indicators is "value communities and neighborhoods."

Data/knowledge gaps: Analysis of historical trends and spatial distribution of disparities across the metropolitan region is recommended to ensure comprehensive and thorough monitoring. Further validation and calibration of the indicator system may be warranted given the complexities of defining sustainability, livability, and other related concepts.

Existing/emerging trends: The report uses the composite sprawl index as an indicator and measure. This is a composite index derived from a list of urban form measures using factor analysis to capture the multi-dimensional nature of urban form.

Linking Transportation Performance and Accountability	
Author(s):	U.S. Department of Transportation
Year:	2010
Source info.:	FHWA
Web link:	http://www.international.fhwa.dot.gov/pubs/pl10011/

Abstract

This is a report on the findings from United States officials' visit ("scan") to international transportation agencies with mature performance management (PM) systems. Representatives studied how these organizations demonstrate accountability to elected officials and the public. Additionally, representatives learned how agencies use goal setting and performance measures to manage, explain, deliver, and adjust their transportation budgets and internal activities. The report summarizes the key lessons learned and includes an implementation plan. The scan provides a broad look at several different PM systems, so many livability types are generally covered.

Synopsis

Purpose: This report summarizes mature PM systems from Australia, Great Britain, New Zealand, and Sweden. Each country's transportation PM program is described, and their Individual goals, objectives, and measures for each country's program are outlined.

Major conclusions: The PM systems of the studied agencies demonstrated clear linkage between government expenditures and transportation agency results. Long-term government goals were incorporated into transportation agency actions–and the results of those actions could be clearly documented to show what the public received for its transportation investment. The scan team outlines major implementation priorities related to outreach and research. The executive summary includes a valuable "Key Lessons Learned" from the scan.

Data/knowledge gaps: As a part of the implementation plan, the scan team recommended several actions related to research/data gaps. These include conducting peer reviews on PM, development of a PM website, crease illustrative ways to present performance information, evaluate comparative safety and GHG emissions efforts, synthesize best practices in benefit-cost analysis, and develop research and development PM roadmap.

Existing/emerging trends: The scan validated the use of PM as an effective means to translate broad government goals into meaningful agency practice. The PM systems observed abroad provided transparency and accountability to transportation programs, while also allowing flexibility to meet local needs.

Livability in Transportation Guidebook - Planning Approaches that Promote Livability	
Author(s):	U.S. Federal Highway Administration
Year:	2010
Source info.:	Prepared for the FHWA Office of Planning, Environment, and Realty and FTA
Web link:	http://www.wsdot.wa.gov/NR/rdonlyres/035FF785-7D8E-4DB0-8D9B-08C0ED2AD936/0/Livability_in_Transportation_Guide.pdf

Abstract

This document showcases a mix of state, regional, and locally sponsored projects that have incorporated livability principles, including in planning, programming, and design. Several of the case studies address capacity and operational issues on major roadways. It also "explores" planning programs that encourage community quality of life improvements, enhancement of environmental performance, and increased transportation and housing choice while lowering costs and supporting economic vitality. Many projects include a multimodal network/systems approach with the goal of integrating land use and transportation.

Synopsis

Purpose: This guidebook demonstrates how livability principles have been incorporated into transportation planning at various levels of government and geographic scale. The document discusses the challenges associated with implementation, and addresses these challenges through a transportation process planning approach. Some indicators and performance measures are outlined in the individual case studies.

Major conclusions: The document describes strategies that can help deliver balanced, multimodal transportation networks that support infill and compact growth around existing centers—at the regional level, corridor level, and project level. The case studies demonstrate actual examples of implementation, some using indicators and measures.

Data/knowledge gaps: Existing transportation metrics are usually not comprehensive enough to evaluate community development, housing, and environmental goals. New performance measures will be needed to allow communities and agencies to monitor the effectiveness of their actions and investments in livability over time.

Existing/emerging trends: Many transportation projects across the country are incorporating livability concepts, both formally and informally.

Performance Measurement: Overview and State of the Practice	
Author(s):	Cambridge Systematics, Inc.
Year:	2010
Source info.:	Presentation to FHWA Office of Planning, Environment, and Realty
Web link:	N/A

Abstract

This presentation discusses the purpose, framework, and uses of performance measurements. Measuring performance requires accomplishable goals, quantifiable/measurable objectives, and measures that directly align with objectives. Performance-based planning is defined as a systematic and ongoing process that uses data and information to assess the extent to which transportation plans, programs and projects assist in meeting overall statewide (or regional) goals and objectives. The presentation also describes concepts related to measures, including outputs, outcomes, and key characteristics. The presentation discusses the need for a performance measure library, but also gives examples of key performance measure databases. The presentation by describing several example performance reports, long-term performance planning, pavement and bridge conditions, traffic and congestion delay, operations, safety, environment and customer satisfaction. The presentation concludes with a discussion of the challenges associated with implemented a performance-based federal program.

Synopsis

Purpose: The purpose of this presentation is to define performance measurement and outline its uses and applications. The presentation describes the characteristics of performance measures and locations of different databases/sources for measurement information.

Major conclusions: The current state of the practice is focused on defining, tracking, and reporting on a broad range of transportation performance measures. The focus of each agency's efforts varies widely, so there are many examples and resources available. FHWA has played a key role in supporting the development of performance management.

Data/knowledge gaps: The presentation discusses some of the challenges associated with a performance-based federal program. These include: setting national transportation goals and defining performance measures that can be reported consistently by all states and all MPOs, setting national performance targets in some or all goal areas, setting appropriate state and regional (MPO) targets, reconciling national/state /regional performance goals and priorities, and delivering results through a performance-based planning and programming process.

Existing/emerging trends: Over the past 10 years "performance management" as an accepted and expected management practice has emerged, and become a key tool to establish/maintain credibility and accountability. Performance measurement provides new opportunities to communicate with stakeholders.

Putting Smart Growth to Work in Rural Communities	
Author(s):	International City/County Management Association (ICMA)
Year:	2010
Source info.:	Developed under Cooperative Agreement No. PI-83233801 awarded by the U.S. EPA
Web link:	http://icma.org/en/icma/knowledge_network/documents/kn/Document/301483/Putting_Smart_Growth_to_Work_in_Rural_Communities

Abstract

This report focuses on smart growth strategies that can help guide growth in rural areas while protecting natural and working lands and preserving the rural character of existing communities. These strategies are based around three central goals: 1) support the rural landscape by creating an economic climate that enhances the viability of working lands and conserves natural lands; 2) help existing places to thrive by taking care of assets and investments such as downtowns, Main Streets, existing infrastructure, and places that the community values; and 3) create great new places by building vibrant, enduring neighborhoods and communities that people, especially young people, don't want to leave.

Synopsis

Purpose: The purpose of this publication is to provide rural decision-makers with resources to balance competing goals, while creating vibrant, sustainable communities. The document shows how smart growth approaches can be adapted and applied in the rural context. The document reviews key issues facing rural communities and how to put smart growth into practice.

Major conclusions: There are three major goals outlined: support the rural landscape, help existing places thrive, and create great new places. To accomplish each of the goals, different strategies are described with accompanying specific tools and policies. The authors suggest a process of self-evaluation and dialogue for rural communities to determine the right combination of policies: conduct an assessment of current conditions, engage in a collaborative visioning process, develop and implement policies.

Data/knowledge gaps: No data gaps are discussed.

Existing/emerging trends: The document suggests tools to reform local policies to promote development of walkable, mixed used places with parks and open space, "form-based codes", context-sensitive design, and green street design.

Recurring Community Impacts	
Author(s):	ICF International/Planning Communities
Year:	2010
Source info.:	NCHRP 25-25, Task 36
Web link:	http://onlinepubs.trb.org/onlinepubs/archives/NotesDocs/25-25(36)_FR.pdf

Abstract
This NCHRP study looks at past guidance and research to formulate a general methodology for identifying and assessing recurring community impacts that are the impacts on communities of previous actions. For example, reconstruction and expansion of an existing roadway may seemingly have minor impacts on the community, but stakeholders who remember the impacts of the initial construction may have different perspectives. The report focuses on examples gleaned from surveys and telephone interviews.

Synopsis
Purpose: The purpose of this effort is to provide practitioners with a reference document to provide a common understanding of requirements and approaches available to improve the analysis, documentation, and mitigation of recurring community impacts.
Major conclusions: More than 30 percent of agencies surveyed in this study indicated that past projects are "never" or "almost never" assessed and one-third indicated "sometimes". Follow-up interviews revealed that the term "recurring community impacts" is new to most practitioners.
Data/knowledge gaps: Gaps include lack of adopted processes for conducting analysis and difficulty in determining the spatial and temporal boundaries of the assessment.
Existing/emerging trends: The field is evolving. The basics in this guide are intended to form the foundation of a "living" guide to be expanded as more case studies are developed.

Smart Mobility 2010 – A Call to Action for the New Decade	
Author(s):	Greenberg, E. (Lead Author).
Year:	2010
Source info.:	Guidance on Smart Mobility implementation
Web link:	http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/2009_11_19%20SMF%20posting.pdf

Abstract
Smart Mobility is a document produced by Caltrans to influence future transportation planning documents in the state of California. Transportation-land use connections are heavily explored and the importance of partnerships in integrating transportation and land use decision making is emphasized. The plan includes a significant discussion of performance measures and stresses the importance of using contextually appropriate performance measures. The role of place in transportation decision making is explored through the use of place typologies that are suggested to be key in contextually appropriate decision making. Hypothetical case studies conclude the report, illustrating the role of both geographic scale and place-type indicator selection in transportation decision making processes.

Synopsis
Purpose: This report outlines the concept of Smart Mobility for Caltrans to address the state's mobility and sustainability challenges. The report outlines six principles for the Smart Mobility Framework: Location Efficiency, Reliable Mobility, Health and Safety, Environmental Stewardship, Social Equity, and Robust Economy. The report presents 17 Smart Mobility Performance Measures (SMPMs) to achieve the Smart Mobility Principles.
Major conclusions: The report describes how to apply SMPMs to different "place types" and details the implementation process for the Smart Mobility program. The report also includes three hypothetical examples to illustrate the application of SMPMs and an implementation checklist.
Data/knowledge gaps: The report recognizes the challenges associated with "mainstreaming" the Smart Mobility tools into the work of Caltrans' functional divisions and districts, as well as partner agencies at different levels of government.

Existing/emerging trends: This report introduces the concept of place types. Seven place types are specifically designed as tools for planning and programming that implement Smart Mobility: Urban Centers, Close-in Compact Communities, Compact Communities, Suburban areas, Rural and Agricultural Lands, Protected Lands, and Special Use Areas.

2010 Sustainable Streets Index	
Author(s):	New York City Department of Transportation
Year:	2010
Source info.:	NYC DOT
Web link:	http://www.nyc.gov/html/dot/html/about/ssi.shtml

Abstract
The Sustainable Streets Index provides data on recent trends in traffic, parking, travel and safety. It also includes a section on "project indicators", an assessment of 11 major DOT projects completed by the end of 2009. This assessment covers the impacts on safety, usage for motor vehicles, cyclists, pedestrians, bus riders and travel times in the project areas. It allows the agency to implement more performance-driven transportation policy, geared toward achieving the sustainability, mobility, infrastructure and quality of life goals.

Synopsis
Purpose: This is the third Sustainable Street Index completed by NYC DOT. Eleven "project indicators" which represent the variety transportation improvement (safety, pedestrian and bicycle improvements; transit mobility improvements; congestion reduction; and parking) occurring in NYC were monitored based on several performance indicators. Performance indicators were measured before and after each project was completed. Performance indicators varied by project, but included traffic volumes, crash rates, average traffic speeds, injuries, speeding, travel times, bike volumes, and bus ridership.
Major conclusions: NYC DOT implemented a performance measure system that successfully monitored the effectiveness of their transportation improvement projects.
Data/knowledge gaps: No data or knowledge gaps are discussed.
Existing/emerging trends: A new section was added to the report from past years. This section profiles transportation patterns at the neighborhood level used field interviews.

2009

The Initiative on Triple Bottom Line Development – "You Can Get There" Briefing Paper	
Author(s):	Portland State University, funded by EDA
Year:	2009 Briefing Paper: Review of Current Practice and Application to the Portland Metro Region
Source info.:	College Social Equity and Opportunity Forum
Web link:	http://www.pdx.edu/cupa/initiative-triple-bottom-line-development and http://pdx.edu/sites/www.pdx.edu.cupa/files/SBL_Briefing_Paper.pdf

Abstract
This initiative seeks to better address the integrated nature of the triple bottom line (TBL). Currently, this project's primary focus is the creation of a tool for the US Economic Development Administration to assess TBL impacts of economic development investments. To ensure that the tool is relevant and user-friendly, the tool is being created with input from economic development practitioners and policymakers from across the US. This project is ongoing.

Synopsis
Purpose: The purpose of this effort is to identify quantitative strategies to encourage real estate developers to consider the social triple bottom line before announcing their proposals to develop property in Portland.

Major conclusions: Measurement must be manageable and meaningful and it must be responsive to context. It is recommended that assessment efforts be institutionalized.
Data/knowledge gaps: Figuring out how to measure is where things get elusive.
Existing/emerging trends: All commitments to sustainable development have grown, so has the search for tools to support this goal. TBL is suggested as a useful tool to accurately account for the full impact of investment decisions and assess our performance with respect to sustainability objectives.

Transportation Cost and Benefit Analysis II (2nd ed.)	
Author(s):	Litman, T.
Year:	2009
Source info.:	Victoria Transport Policy Institute
Web link:	http://www.vtpi.org/tca/

Abstract
This is a comprehensive, 500+ page report, which includes extensive literature reviews and a bibliography, case studies, and sample variable values that describe 23 cost categories for motorized transport. This document is unique in several important ways. This is one of the most comprehensive studies of its type, including many categories of costs and benefits that are often overlooked. It is regularly expanded and updated as new information becomes available. The report is particularly useful for quantifying change measures (in terms of costs) as part of a large community or region visioning exercise.

Synopsis
Purpose: This guidebook provides a framework for evaluating and rationalizing tradeoffs between conflicting transportation objectives. It examines how benefits and costs vary for different travel modes and conditions. The report supports more comprehensive planning analysis by providing benefit and cost information in a convenient and flexible format. This study describes various policy and planning reforms that can help increase economic efficiency and equity.
Major conclusions: This study indicates that on average about a third of automobile costs are external and about a quarter are internal but fixed, among other economic conclusions. The report compiles many economic measures of transportation systems. These are outlined in detail in the full document.
Data/knowledge gaps: The authors state that more research is needed to better estimate transportation costs under various conditions and locations. They also say that more research needs to be done on transport equity and diversity. Research is also needed to evaluate the synergistic effects of combined planning decisions.
Existing/emerging trends: The authors discuss the need for a change in the way individuals think about transportation costs. Vehicle owners have little incentive to limit driving to trips in which benefits exceed total costs, resulting in economically excessive vehicle travel that reduces transport system performance.

2008

Guidelines for Environmental Performance Measurement	
Author(s):	Cambridge Systematics, Inc.
Year:	2008
Source info.:	Contractor's Report: NCHRP 25-25, Task 23 requested by AASHTO Standing Committee on the Environment (version online has not been reviewed by TRB)
Web link:	http://nepa.fhwa.gov/renepa/reneap.nsf/B/KMMM7GT7P5

Abstract
This report and project specifically addresses performance measurements for environmental systems, citing a literature review, survey of 13 agencies, and roughly the same number of case studies. The report identifies non-traditional performance measures and clearly delineates terms such as measurement, indicator, and benchmark.

Synopsis
Purpose: The purpose of this effort is to establish guidelines for the development and implementation of environmental performance measurements for state DOTs.
Major conclusions: Case studies show numerous initiatives directly related to aspects of environmental management systems, yet the practice of environmental performance measurement is not yet comprehensively developed or practiced within state DOTs. The report recommends guidelines for use by state DOTs in furthering the development and implementation of environmental performance measurements.
Data/knowledge gaps: Many environmental issues are difficult to quantify. Also, there are important issues of geographic and temporal scale; what is appropriate for monitoring by a transportation agency?
Existing/emerging trends: This resource reflects an increasing use of performance-based management by transportation agencies.

Improved Methods for Assessing Social, Cultural, and Economic Effects of Transportation Projects	
Author(s):	Cambridge Systematics, Inc. (prime) and Center for Transportation and the Environment (CTE) at NC State University. Planning Communities contributed.
Year:	2008
Source info.:	NCHRP 08-36, Task 66 for AASHTO Standing Committee on Planning
Web link:	http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp08-36(66)_FR.pdf

Abstract
This report identifies existing and emerging methods and practices used during community and social impact assessment that can be employed for evaluating quality of life considerations. The report seeks to answer questions that will assist the practitioner and the transportation agency better understand the general complexities of working in the human environment.

Synopsis
Purpose: The purpose of this effort is to identify existing and emerging community and social impact assessment practices to use as indicators of the quality of a community's life. What constitutes community social wellbeing, how can it be measured, and can it be integrated more fully into decision-making processes?
Major conclusions: This study shows that the use of quantifiable indicators can serve as a valuable supplement to the results of public involvement and community impact assessment.
Data/knowledge gaps: The study identifies methods to close gaps in data availability using new sources.
Existing/emerging trends: Challenges brought to transportation professionals trying to meet the transportation needs of our nation's communities can be met with supporting procedures, processes and decision support systems aligned with the new expectations of customers and decision-makers.

Rating the Sustainability of Transportation Investments: Corridors as a Case Study	
Author(s):	Oswald, M.R. (University of Delaware)
Year:	2008
Source info.:	Delaware University Transportation Center
Web link:	www.ce.udel.edu/UTC/Presentation_2008/MichelleOswald-Master_Thesis.pdf

Abstract
This thesis develops a rating system for corridors based upon models such as LEED certification and Green Globes. It is dubbed SCRS (Sustainable Corridors Rating System) and the "LEED for Corridors". The document begins with a review of sustainable transportation, indicators of sustainability, and multi-criterion decision making models. The evaluation tool is developed through the author's selection of indicators followed by a survey of professionals to define indicator weights. The results of the survey are used to develop the final evaluation tool, which is then applied to a case study. Sensitivity analysis is performed on the case study corridor. The thesis concludes with a brief discussion of policy application.

Synopsis
Purpose: The purpose of this effort is to create a "green rating system" to apply consistent repeatable sustainable concepts to the real world and be able to quantify each credit for project certification. Each credit must be measurable in the field. The tool can be applied to corridor development and redevelopment.
Major conclusions: A participatory phase is included in the rating process to engage stakeholders in the ranking.
Data/knowledge gaps: There is a gap in existing practices and research. LEED and Green Globes focus on building design and neighborhood development.
Existing/emerging trends: No existing or emerging trends are evident.

Sustainable Transportation Indicators – A Recommended Research Program for Developing Sustainable Transportation Indicators and Data	
Author(s):	Litman, T. (Ed.).
Year:	2008
Source info.:	TRB 2009 Annual Meeting, cooperative effort by TRB Sustainable Transportation Indicators Subcommittee (ADD 40)
Web link:	www.vtpi.org/sustain/sti.pdf

Abstract
This paper first defines sustainable transportation definitions and concepts, then it extends the conversation to indicators of sustainable transportation. A set of recommended sustainable transportation indicators are presented. Exemplary measures are noted as are data issues and other barriers to implementation of measures. The role of context in selecting appropriate indicators is also discussed. The paper provides recommendation for further research in order to advance the field of sustainable transportation measurement.

Synopsis
Purpose: The purpose of this effort is for the recommendations to be endorsed by TRB and other professional organizations, leading to the development and application of suitable indicator sets worldwide.
Major conclusions: Indicators are important tools for making decisions and measuring progress. Reference units (also called ratio indicators) are measurement units normalized to facilitate comparison; for example, per-year, per-capita, per-mile, per-trip, per-vehicle-year, and per-dollar. Performance Targets are specific measurable objectives to be achieved by a stated deadline.
Data/knowledge gaps: There are currently gaps between the data collected for transport planning purposes and what is needed for sustainable planning evaluation. For example, improving travel surveys and traffic counts to collect better information on non-motorized travel, travel by children and people with disabilities, energy consumption, and user costs is useful for general transportation planning as well as for sustainable planning.
Existing/emerging trends: There has been extensive use of a wide variety of indicators. Standardization is now necessary.

2007

Designing a Monitoring Strategy to Support Sustainable Transport Goals	
Author(s):	Marsden, G.
Year:	2007
Source info.:	The Distillate Consortium is led by the Institute for Transport Studies at the University of Leeds, UK
Web link:	www.distillate.ac.uk/outputs/Designing_a_Monitoring?Strategy/pdf

Abstract
This report identifies costs, inputs, outputs, and intermediate and long-term outcomes as the key categories of performance indicators, as well as describing the role of indicators on communicating with various audiences and

purposes (e.g., elected officials, public, external benchmarking, and internal performance tracking). The report illustrates how outcomes and performance indicators can effectively enhance communication in a transportation project development process.

Synopsis

Purpose: The purpose of this effort is to provide short, clear guidance on what should be monitored, how information can be connected within a monitoring strategy and how to make best use of limited budgets.
Major conclusions: Indicators are required as the measure of performance. Five reasons to measure performance are: (1) How did we get where we are? (2) Where are we now? (3) Where do we want to go? (4) How are we going to get there? and (5) How will we know when we're there? It is therefore necessary to track information on a wide range of indicators. Benchmarking is a tool for comparing the performance of one authority, delivery sector or company with that of another. The type of information and the ways it is communicated to the general public may be very different to those required for reporting. Political accountability has started to focus around whether or not the end objectives (e.g. greenhouse gas emission level reductions) are met. Turning indicators into an effective monitoring strategy should minimize criticism of the choice of indicators by institutionalizing a clear strategy for monitoring. This requires stakeholders from transport and other sectors to discuss what the most important measures of progress are, who collects them and how this links to the strategies that are being deployed to make progress.
Data/knowledge gaps: No data or knowledge gaps are identified.
Existing/emerging trends: No existing or emerging trends are evident.

Monetary Valuation Per Dollar Of Investment In Different Performance Measures	
Author(s):	Weisbrod, G., Lynch, T. & Meyer, M.
Year:	2007
Source info.:	NCHRP 08-36, Task 61 requested by AASHTO Standing Committee on Planning
Web link:	http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(61)_FR.pdf

Abstract

This study addresses the measurement problem in agency use of performance measures. The units of measurement of various performance measures often vary, which is a problem for agencies doing comparative analysis. The study reviews the idea of assigning monetary values to performance measures that are not normally measured in financial terms as a way to conduct comparative analysis, benefit-cost analysis, and return-on-investment. It provides information on the most promising tools and practices for monetizing benefits.

Synopsis

Purpose: The purpose of this effort is to provide a common and useful unit of measurement for decision-makers. Monetary value is the recommended unit as it is readily understood. The example given is the universal reporting by each state of the number of fatalities and injuries on roads. While this unit of measurement is understood, many decision-makers are unable to evaluate investments designed to change safety outcomes unless it is compared with alternative investments to address other goals.
Major conclusions: Methods used for modeling and calculating the valuation of economic development impacts have started to converge, as have measures of the variability in travel time for commercial vehicles. There has also been convergence on monetary values (or ranges of values) for air quality and human life despite its controversial nature. This study shows some widening of use occurring for monetization of environmental, safety and economic development impacts.
Data/knowledge gaps: Some qualitative measures are difficult or controversial to monetize; for example what is the value of environmental quality or what is the value of a life saved? Despite the forward movement noted above under Major Conclusions, the use of monetized measures is still the exception rather than the rule. There are still many factors where little or no progress has been made (e.g. land use, quality of life, social equity).
Existing/emerging trends: It was noted that as long as factors are not monetized, benefit/cost comparisons will omit valuation of these factors that will limit the use of this method for decision making.

Moving Communities Forward: How Well-Designed Transportation Projects Make Great Places	
Author(s):	Goldberg, A (Center for Transportation Studies at University of Minnesota)
Year:	2007
Source info.:	American Institute of Architects & Center for Transportation Studies at the University of Minnesota with funding from FHWA
Web link:	http://www.movingcommunitiesforward.org/Publications/

Abstract
This document provides case studies of nearly 30 transportation projects that go beyond their original scope to bring a variety of enhancements in the form of economic development, environmental, public safety and health benefits to the communities in which they are located. It identifies successful design principles and practices while stressing the importance of a holistic approach involving all community stakeholders, planners, designers, transportation officials, and builders. It examines the benefits achieved by engaging the public in the decision-making process and how anticipated benefits can evolve even further into a transportation facility that is welcomed by the community. The summary report was sent to Congress. There are six research reports.

Synopsis
Purpose: The purpose of this effort is to show the composite benefits of integrated design processes that are multi-disciplinary, transparent and fully engage stakeholders in the design process.
Major conclusions: Using the case studies, the report identifies key principles and practices that communities can use to realize multiple enhancements to their communities. A major focus is on quality transportation design (Transit-oriented design and context-sensitive solutions are discussed) and wayfinding. The findings set new standards of integrative design excellence.
Data/knowledge gaps: There is little organized quantifiable data, nor is there a comprehensive guide for communities to maximize or integrate the diverse benefits that well-designed transportation projects can bring.
Existing/emerging trends: Significant economic benefits in terms of the real estate value of development adjacent to well-designed transportation facilities. Composite benefits include public health and safety, environmental stewardship, and citizen engagement.

2006

Active Neighborhood Checklist	
Author(s):	Prevention Research Center and St. Louis University School of Public Health
Year:	2006
Source info.:	St. Louis University Prevention Research Center
Web link:	http://prcstl.edu/research/documents/Active_Neighborhood_Checklist.pdf

Abstract
This is a manual providing guidance on how to objectively measure urban design qualities of typical streets for their contribution to walkability. It aims to go beyond typical measures of walkability such as density and street connectivity as those do not adequately describe the quality of what it feels like to walk down a given street and seeks to instead outline subtler qualities that may influence choices about active travel (biking, walking, etc.) and active leisure time.

Synopsis
Purpose: The purpose of this effort is to synthesize available research into a checklist designed to measure the quality and appeal of walking conditions.
Major conclusions: Most checklists miss key aspects of making walking pleasurable.
Data/knowledge gaps: Considerable data collection is required to complete this checklist.
Existing/emerging trends: No existing or emerging trends are evident.

2005

Addressing Sustainability in Transportation Systems: Definitions, Indicators, and Metrics	
Author(s):	Jeon, C.M. and Amekudzi, A.
Year:	2005
Source info.:	Journal of Infrastructure, Vol. 11, No. 1. doi: 10.1061/(ASCE)1076-0342(2005)11:1(31)
Web link:	http://center.sustainability.duke.edu/sites/default/files/documents/transportation_indicators.pdf

Abstract
The paper reviews international transportation initiatives to assess emerging trends related to defining and measuring sustainability. The author reviews definitions, indicators and metrics (qualitative and quantitative measures) of 16 sustainability initiatives for transportation and other infrastructure systems. Three types of frameworks are identified for measuring progress toward sustainability: linkages-based frameworks, impacts-based frameworks, and influence-oriented frameworks. A comprehensive list of indicators for the sustainable transportation initiatives are organized into five themes: economic, transportation-related, environment, safety, and socio-cultural/equity. There is a discussion of shortcomings and opportunities to address future transportation system sustainability in education, research and practice.

Synopsis
Purpose: The purpose of the paper is to review international transportation initiatives to assess emerging trends related to defining and measuring sustainability. This includes review of sustainability definitions, indicators and metrics (qualitative and quantitative measures) of 16 sustainability initiatives for transportation and other infrastructure systems.
Major conclusions: The findings indicate that in order for transportation sustainability to be effective, it needs to: consider impacts on the economy, environment and social wellbeing; address the causes of sustainable or unsustainable trends; consider influence that oversight agencies have with implementation; balance input and output measures; and have a strong stakeholder component. Transportation sustainability is being measured largely by transportation system effectiveness and efficiency, as well as environmental impacts.
Data/knowledge gaps: Indicators are not capturing the important role of education in moving toward sustainability. Infrastructure security is also not being addressed. Existing systems do not appear to differentiate between high and low-level impact areas for moving transportation systems toward sustainability.
Existing/emerging trends: Integrating sustainability planning and measures into transportation systems is a rapidly growing area. There are opportunities to refine sustainability definitions, visions and indicators to support progress.

Measuring Urban Design Qualities — An Illustrated Field Manual	
Author(s):	Clemente, O., Ewing, R., Handy, S. Brownson, R., and Winston, E.
Year:	2005
Source info.:	
Web link:	http://www.activelivingresearch.org/files/FieldManual_071605.pdf

Abstract
The field manual describes key urban design qualities related to walkability and provides guidance on how to objectively measure each quality for a typical street. Urban design qualities are subtler qualities that may influence choices about active travel and active leisure time. The urban design qualities described in the manual include: imageability, enclosure, human scale, transparency and complexity. The manual describes the relationship between the built environment, walking behavior and urban design qualities. Each design quality includes a definition, expert panel comments, photographic examples, steps to measure the quality, and a scoring process. The manual also provides information for what to bring on the field visit, how to define the study area, and how to record observations, and includes a worksheet to document the findings.

Synopsis

Purpose: The purpose of the field manual is to understand key urban design qualities related to walkability, learn how to objectively measure each quality for a typical street, and apply objectives to quantitatively measure walkability.

Major conclusions: Urban designers have historically measured the built environment based on general qualities, such as neighborhood density and street connectivity. Quantifying and measuring urban design qualities can support the design of walkable streets, promoting active travel and active leisure time. Physical features can be measured objectively as compared to qualities such as sense of comfort and safety, which are based on preferences and perspectives. The field manual aims to quantify urban design qualities based on physical features.

Data/knowledge gaps: The field manual does not include information about how to use the results or what the number means in regards to walkability.

Existing/emerging trends: Measuring walkability in a quantifiable way supports a variety of planning initiatives, including urban planning and design and transportation planning. Practitioners can apply both quantitative and qualitative tools to plan walkable streets that promote active travel and leisure.

2004

Effective Methods for Environmental Justice Assessment	
Author(s):	Forkenbrock, D. J., and Sheeley, J.
Year:	2004
Source info.:	NCHRP Report 532
Web link:	http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_532.pdf

Abstract

This guidebook is designed to enhance practitioner understanding and facilitate incorporation of environmental justice into all elements of the transportation planning process. The guide provides a framework to help practitioners better understand environmental justice, learn how to identify protected populations and communities, effectively identify potential issues, and select and use the appropriate analysis methods. Methods include data needs, level of expertise, assumptions and limitations. The guide also includes environmental justice statues and regulations, case law, resources and references.

Synopsis

Purpose: The purpose of the guidebook is to provide a resource for transportation practitioners that can be used to identify practical and effective methods for evaluating environmental justice. The guidebook aims to advance the state of practice in environmental justice analysis.

Major conclusions: Effective environmental justice analysis techniques should evaluate distributive effects to protected populations, be predictive, allow integration into a participation-focused planning process, meet regulatory and legal requirements, and be flexible. Transportation effects on environmental justice populations include human health and safety and social, economic and cultural effects. Practitioners should have flexibility in selecting the method or methods that are most appropriate to their planning effort.

Data/knowledge gaps: Analyses have often not assessed the severity or magnitude of consequences, the balance between positive and negative effects and effects distribution. Traditional assessment methods are often used to determine “significant” effects and only consider issues when significant effects are determined, potentially causing unique concerns of protected populations to be overlooked. Other issues include using incomplete or irrelevant data, not involving stakeholders, presenting information in an overly-technical format, and failing to consider a variety of values and priorities of diverse communities.

Existing/emerging trends: The guidebooks presents both commonly used techniques, new techniques and little-used techniques for assessing environmental justice issues in transportation decision-making. Technological advances in online information systems, data collection and analyses software, and data-sharing may help advance best practices in environmental assessment.

2002

Community and Quality of Life: Data Needs for Informed Decision Making	
Author(s):	National Research Council Committee on Identifying Data Needs for Place-based Decision Making
Year:	2002
Source info.:	National Academy Press
Web link:	www.nap.edu/catalog/php?record_id=10262

Abstract
This report is to help communities who need and demand information from specialized data and from decision-support tools that assess the implications of alternatives so these communities can participate meaningfully in the process of decision-making and to make well-informed decisions affecting quality of life.

Synopsis
Purpose: The purpose of this effort is to convene a workshop to identify the data, including geo-spatial data, and performance measures needed to make local and regional decisions on transportation, land use planning, and economic development. Based on the workshop results, the committee undertook the following tasks: (1) literature review for "livability" and "quality of life" (2) identified opportunities to meet data needs and improve decision-support systems and (3) reviewed federal agency plans to develop these measures and make needed data available to the public.
Major conclusions: A major conclusion of this study is that the basic economic, social and environmental dimensions of livability are not completely separable from each other. For example, environmental health cannot be traded-off against social well-being or vice versa; each depends upon the other. The key is their mutual interdependence. Some indicators must cut across these sectors. Major conclusions are:

- Basic dimensions of livability are not completely separable or mutually compensatory
- Crosscutting measures of livability that highlight the mutual interdependence of livability dimensions are essential
- Dimensions of livability operate at multiple interconnected spatial scales and time frames
- Data on both people and places are fundamental for assessing livability
- Each federal data program has been developed for carrying out agency-specific missions, yet all federal agencies carry critical responsibilities to serve the interests of the nation
- Livability planning can occur at multiple spatial scales but should be integrated across such scales, especially community-based and regional levels
- Robust livability indicators require data that are measured and integrated in ways that are sensitive to underlying geographic processes
- Decision making tools should be designed explicitly for the diverse stakeholders involved in livability planning
- Public data are useful for decision making, but improvements are necessary
- Continued efforts are required to create opportunities for data sharing among federal agencies and to open up opportunities for partnerships with state and local governments to enhance the public data available for common programs or for new efforts in coordination

Data/knowledge gaps: Many but not all of the livability and quality of life indicators use measures that are spatial in nature. The analysis of livability of a place is strongly influenced by the geographic unit of measurement chosen. Problems associates with the arbitrary nature of chosen geographic units are discussed as the modifiable area unit problem in this report. Although public data are useful for decision-making, improvements in data availability are necessary and decision-support tools must be designed for the use of diverse stakeholders. Efforts are going on to create opportunities for data sharing among federal agencies.

The federal government plays a significant role in providing data to support decision making at the national and sub national levels. Its various statistical arms collect and disseminate data that are critical for decision making by all

sectors and at all levels. Other critical data are collected by state and local governments. Yet there remains gaps in the data, which make it difficult to make sound place-based decisions. These include:

1. Certain data are not available on a sufficiently timely basis (e.g. decennial Census data for small areas)
2. Often data is not available at a scale that are adequate for local decision making.
3. Data coverage is patchy and inconsistent (e.g. only a fraction of counties in U.S. have digital parcel data)
4. Land use information is critical for transportation and other planning, yet there is no federal program to provide this information or to define standards for its collection by state and local governments.
5. Some federal data could be quite useful for local decision making, but additional effort is needed to clarify collection and distribution procedures.
6. Federal data programs have to be reviewed and revised because they are incompatible with other federal data collection activities (e.g. various mode-specific administrations of USDOT collect data that are difficult to combine into a general picture of transportation)
7. The rules making all data "owned" by the federal government free to all potential users limit the willingness of various public and private entities to share data with the federal government.

Existing/emerging trends: No existing or emerging trends are evident.

Social, Cultural, Economic Impact Assessment: A Literature Review	
Author(s):	Galisteo Consulting Group, Inc.
Year:	2002
Source info.:	Prepared for the EPA Office of Emergency and Remedial Response
Web link:	http://www.epa.gov/superfund/policy/pdfs/SILitRevFinal.pdf

Abstract

This literature review explores the state of the practice in social, cultural, and economic impact assessment. The resource defines social impact assessment (SIA), identifies key issues and challenges related to this method, and outlines a revised methodology with principles for the selection of specific impacts. The authors emphasize the importance of selecting and addressing impacts that are relevant to identified issues and conditions. Considering the role of geographic scale, the review notes that different impacts will be measured at varying levels of geography; for example, social and cultural impacts may be relevant at the project or community level, while economic impacts are frequently evaluated from a regional perspective. The question of how to address impacts on a community that are generated by actions outside of its borders is also considered. A variety of socio-cultural indicators are provided, and noted challenges include the need for specialists in interpretation; the importance of secondary data in supplementing local expertise; and the absence of standardized methodologies in SIA, which contributes to ineffective studies and bias.

Synopsis

Purpose: The purpose of this resource is to review the state of the literature/practice in social, cultural, and economic impact assessment, as well as to develop a revised methodology for evaluation of these effects.
Major conclusions: The review identifies a set of principles for the selection of impacts to measure. Noted indicators include those describing population impacts, community infrastructure needs, community/institutional arrangements, conflicts between residents and newcomers, political and social structures, and individual and family level impacts. The value of the revised methodology is established through a discussion of the bias and ineffectiveness caused by lack of standardized approaches in social impact assessment.
Data/knowledge gaps: In addition to lack of a standardized methodology, the assessment of social, cultural, and economic impacts is challenged by the need for specialist interpretation and the use of data that have generally been collected for another purpose. Challenges related to geographic scale and the scope of impacts are also identified.
Existing/emerging trends: This resource reflects an emphasis on new methods to address the socio-cultural and economic aspects of livability, particularly those for which assessment and measurement has been limited in the past.

Sustainable Transport and the Role(s) of Performance Indicators	
Author(s):	Gudmundsson, H.
Year:	2002 Proceedings of the Third International Conference on Traffic and Transportation Studies
Source info.:	Danish Transport Council, Danish Environmental Protection Agency and the German Marshall Fund of the United States
Web link:	http://ascelibrary.org/proceedings/resource/2/ascecp/255/40630/ … only the abstract is available via ASCE or DTU Department of Transport in Denmark

Abstract
This paper, developed through a cooperative effort by the Transportation Research Board's Sustainable Transportation Indicators Subcommittee (ADD40 [1]), identifies indicators that can be used for sustainable transportation evaluation. The paper discusses sustainable transportation definitions and concepts, describes factors to consider when selecting indictors, recommends specific sustainable transportation indicators, and discusses issues of data quality. This presentation is about finding performance indicators to measure sustainability in the transportation system. It starts by defining the term "sustainable transportation" and offers up some definitions, but also points out that there is no one correct definition and then it goes on to of real life scenarios where sustainable transportation performance indicators have been used and finally draws conclusions based on those.

Synopsis
Purpose: The main aim of the research is to provide input to planning for sustainable transport in Denmark, the European Union and elsewhere. This paper reviews a number of current indicator systems in terms of their support to more sustainable transport policies.
Data/knowledge gaps: No specific data or knowledge gaps are identified.
Existing/emerging trends: In recent years *systems of indicators and performance reporting* have been introduced to support policy management in many areas.

THRIVE: Tool for Health and Resilience in Vulnerable Environments	
Author(s):	Prevention Institute
Year:	Originated 2002
Source info.:	
Web link:	http://thrive.preventioninstitute.org/thrive/index.php http://thrive.preventioninstitute.org/thrive/factor_tools.php

Abstract
THRIVE is a tool to help people understand and prioritize the factors within their own communities that support community health, safety and wellbeing. The tool provides information about improving health and reducing disparities, particularly among low-income and minority community members. The tool makes health disparities approaches available to the public, enabling communities to select priority factors, identify needs and develop actions. THRIVE aims to address specific ways to close the health gap by: 1) Changing the way people think about health and safety; 2) Providing an evidence-based framework for change; 3) Building community capacity while building on community strength; and 4) Fostering links to decision makers and other resources.

Synopsis
Purpose: The purpose of the tool is to help communities prioritize factors, identify needs and develop actions to improve health and safety and reduce disparities between community members. Users are able to identify priority health problems or factors, review linkages between health and safety and the chosen factors, rate the priority level and status of factors in their community, select priority factors, choose indicators, identify what's working and improvement areas, and select potential activities.
Major conclusions: Low-income people and people of color experience a disproportionately high amount of poor health and safety outcomes, including chronic disease, substance abuse, teen pregnancy, and violence. When a

health condition affects the general population, it affects low income and people of color at a higher rate and more severely. THRIVE focuses on prevention rather than treatment by focusing on underlying risk and resilience factors. THRIVE helps communities identify health and safety needs, design strategies to improve health and reduce disparities, and prioritize actions.

Data/knowledge gaps: No data or knowledge gaps/limitations identified or apparent.

Existing/emerging trends: THRIVE can support a community planning process to establish a broad community vision about health, prioritize factors, and identify specific activities. THRIVE can be used as part of a needs assessment, serve as a framework for strategic planning, and support community involvement initiatives.

Appendix B:
Additional Resource Abstracts

Resource (Title and Author/Organization)	Abstract
2011 (Or Ongoing)	
Certified Green Communities Program Atlanta Regional Commission http://www.atlantaregional.com/environment/green-communities	This resource is a voluntary certification program for jurisdictions in the 10-county Atlanta Region. The program is intended to encourage local governments to become more sustainable. Participants earn points in 10 categories by implementing specific policies and practices that contribute to overall sustainability.
Community Indicators Consortium http://www.communityindicators.net/	The Community Indicators Consortium (CIC) is an active learning network and community of practice among persons and organizations interested or engaged in the field of community indicators and their application. CIC's mission is to: advance the art and science of indicators; facilitate the exchange of knowledge about the effective use of indicators; encourage development of effective indicators; and foster informed civic and media discourse about local, regional, national, and global priorities.
Creating Sustainable Places: A Regional Plan for Sustainable Development in Greater Kansas City Mid-America Regional Council http://www.marc.org/sustainableplaces/RPSD032111.pdf	This document discusses the Greater Kansas City regional vision, strategies to meet changing needs, shared regional goals, key planning themes, and various policies and plans. The resource illustrates how coordinated regional and local plans inform and direct the vision of a sustainable region.
DRAFT 2050 Regional Transportation Plan San Diego Association of Governments (SANDAG) http://www.sandag.org/index.asp?projectid=349&fuseaction=projects.detail	The 2050 Regional Transportation Plan is the region's first document to address the requirements set forth in the Sustainable Communities and Climate Protection Act of 2008 (California SB 375). The plan's vision supports a prosperous economy, a healthy and safe environment (including climate change protection), and a higher quality of life for residents. Plan goals are organized by two themes: quality of travel and livability (mobility, reliability, and system preservation and safety) and sustainability (social equity, healthy environment, and prosperous economy). These goals are supported by measurable objectives, as well as by performance measures for a variety of scenarios (existing conditions, no-build, and revenue constrained network). A set of actions is provided to implement the revenue constrained network build option. Land use integration is emphasized throughout, while separate sections address environmental justice, expanded transportation options, system operations and management, and demand management.
Economic Development and Return on Investment Livability Performance Measures Johns, K. (Conference on Performance Measures for Transportation and Livable Communities)	Johns describes the City of Austin's plan to use supercomputers as tools to forecast transportation and livability needs. Anticipated outcomes of this effort are to more effectively calculate return on investment and to cut development time in half.
Geographic Information Systems (GIS) Mapping Services and Software PolicyMap http://www.policymap.com/	This website offers a free trial and a subscription service for cutting-edge technology to map proposed investments, relate them to other investments, demonstrate how neighborhoods have changed through past investments, and show where future investments would have the greatest positive impact. Subscribers can request customized queries that report and map up to 4,000 indicators.
Health Indicators Warehouse (HIW) National Center for Health Statistics http://healthindicators.gov/Indicators/Selection	The HIW online database provides user-friendly access to national, state, and community health indicators. The database contains a total of 1,109 indicators and allows users to filter their search based on demographics, geography, disease, and a variety of health topics. Within some of these categories, tiers are offered for greater specificity. Indicators returned in the search results are hyperlinked to more detailed information including methodology, references, and data sources.

Resource (Title and Author/Organization)	Abstract
Minnesota Go Minnesota Department of Transportation http://www.dot.state.mn.us/minnesotago/	This document presents Minnesota's endeavor to create a 50-year mulitmodal transportation plan with the help of the public. This plan is being created based on citizen input regarding quality of life, the environment, and the economy.
Social Equity Impact Assessment Brenman, M. (Conference on Performance Measures for Transportation and Livable Communities) http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Brenman.pdf	This presentation creates a template for assessing the potential impacts of transportation projects on low income people and people of color.
Sustainability Performance Measures for El Paso's Transit Corridors Ramani, T. (Conference on Performance Measures for Transportation and Livable Communities) http://utcm.tamu.edu/LivabilityConference/presentations/pdfs/Ramani.pdf	Ramani discusses a conceptual framework for how a transit system might apply livability measures in the process of implementing rapid transit system (RTS) projects, with a focus on El Paso's transportation corridors. The author frames this as a two-step approach that involves (1) understanding livability and (2) applying performance measures.
Transportation for Livable Communities (TLC) Program Metropolitan Transportation Commission http://www.mtc.ca.gov/planning/smart_growth/tlc/	TLC supports community-based transportation projects that bring new vibrancy to downtown areas, commercial cores, neighborhoods, and transit corridors. These projects are intended to enhance amenities and ambiance and to create places where people want to live, work, and visit. TLC provides funding for projects that are developed through an inclusive community planning effort, provide for a range of transportation choices, and support connectivity between transportation facilities and land uses.
U.S. Department of Housing and Urban Development and the Sustainable Partnership Brezina, M. (Conference on Performance Measures for Transportation and Livable Communities)	Brezina discusses HUD's role in the federal Partnership for Sustainable Communities. The presentation outlines the obstacles that HUD has encountered to date; key challenges related to data collection include selecting which data types to use and the expenses in obtaining data resources. Brezina also discusses criteria for performance measures and notes that offering a small number of measures applicable at many scales and densities is an ideal approach.
2010	
Bus Karo – A Guidebook on Bus Planning and Operations EMBARQ-The WRI Center for Sustainable Transport http://www.embarq.org/sites/default/files/Bus%20Karo%20-%20Guidebook%20on%20Planning%20and%20Operations.pdf	Bus Karo is a guidebook for bus operations and planning with a focus on developing countries. Quantitative indicators for system performance, such as passengers per bus per day and boardings per bus kilometer-hour, are compared for various systems. Other indicators, such as political leadership, the influence of local institutions, and the use of transit priority technology, are also compared across systems. Recommended practices for implementing bus systems in various contexts are then presented. The report concludes with several case studies, ranging in context from London to Ahmedabad.
Cities of Opportunity PricewaterhouseCoopers LLP http://www.pwc.com/us/en/cities-of-opportunity	This resource presents rankings for 26 international cities based on a number of indicators. While the focus of the report is on economic vitality, numerous innovative indicators are included in the methodology. Recognition is made that quality of life plays a very important role in attracting labor to cities; therefore, quality of life is considered to a great degree in the city rankings. Indicators are grouped into larger themes such as intellectual capital and innovation, transportation and infrastructure, and lifestyle assets. Indicators include university research performance, mass transit coverage, carbon footprint, rigidity of workforce hours, amount of direct foreign investment, cost of business occupancy, and natural disaster risk. Correlation amongst categorical themes suggests strong correlations between several of the theme areas.

Resource (Title and Author/Organization)	Abstract
Creating Livable Neighbourhoods Through Context Sensitive Multimodal Road Planning Beukes, E., Vanderschuren, M., Zuidgeest, M., & Brussel, M. http://www.mendeley.com/research/creating-liveable-neighbourhoods-through-context-sensitive-multimodal-road-planning/	Improving mobility is n as key to facilitating the economic upliftment of the urban poor. In South Africa the majority of the urban poor live on the periphery of cities. They travel long distances at great cost to go to work and school, and are dependent on public transport and walking or cycling (NMT) for their travel needs. Despite legislation and policies that emphasise the role of public transport and NMT, road planning practice in South Africa continues to be automobile-centric. The needs of other road users are often overlooked, even in areas where they are in the majority. This paper describes the use of spatial multicritieria evaluation to rank modes according to their suitability at points along a defined route by using land use, socio-economic, environmental and transportation factors, which in combination is used to describe the contextual setting of the route. A case study conducted along an existing arterial route in Cape Town is used to demonstrate the method and the results of the analysis. The research finds that contextual regimes can be identified along the route, and shows that each of these regimes have differing implications for the various modes that pass through these corridors. The method can be used in combination with established tools in planning and design guidelines to inform decisions around infrastructure provision, project prioritization and road classification.
Indicators of Environmental Sustainability in Transport: An Interdisciplinary Approach to Methods Joumard, R. and Gudmundsson, H. http://www.cost.eu/library/publications/10-29-Indicators-of-Environmental-Sustainability-in-Transport-An-interdisciplinary-approach-to-methods	This report tries to answer the following questions: How can environmental impacts of transport be measured? How can measurements be transformed into operational indicators? How can several indicators be jointly considered? And how can indicators be used in planning and decision making? Firstly we provide definition of 'indicator of environmental sustainability in transport'. The functions, strengths and weaknesses of indicators as measurement tools, and as decision support tools are discussed. We define what "environmental sustainability in transport" may mean through the transport system, the concepts of sustainable development and of environment. The concept of 'chain of causality' between a source and a final target is developed, as a common reference for indicators and assessments. As the decision making context influences the perceived and actual needs for indicators and methods, we also analysed the dimensions and context of decision making. We derived criteria and methods for the assessment and selection of indicators of environmental sustainability in transport, in terms of measurement, monitoring and management. The methods and the criteria are exemplified for seven chains of causality. Methods for a comprehensive joint consideration of environmentally sustainable indicators are analyzed and evaluated. They concerned aggregated or composite indicators as well as multi-criteria methods. Five case studies are presented. Finally, recommendations for continued research and development of indicators and joint considerations methods for assessment of environmental sustainability in transport are given.

Resource (Title and Author/Organization)	Abstract
Quantifying the Economic Domain of Transportation Sustainability Zheng, J., Atkinson-Palombo, C., McCahill, C., O'Hara, R., & Garrick, N.W. http://amonline.trb.org/12koec/12koec/1	This paper presents several indicators for assessing the economic domain of transportation sustainability at a state level. The economic domain is assessed based on four characteristics: affordability, efficient movement of people and goods, equitable financing, and economic resilience. Indicators used to assess these characteristics include percentage of household income spent on transportation, GDP per VMT, change in GDP per change in VMT, percentage of transportation funding coming from federal sources, and percentage of GDP spent on fuel. These data are presented for 50 states and the District of Colombia. States are broken into four categories based on their degree of urbanization. The paper concludes with a regression analysis, comparing composite scores to private automobile mode shares for each state urbanization category and suggesting that mode share is more strongly correlated with transportation system sustainability in more urban states.
Walkability Checklist and A Resident's Guide for Creating Safe and Walkable Communities Partnership for a Walkable America and the Federal Highway Administration http://katana.hsrc.unc.edu/cms/downloads/residentsguide.pdf	This one-page checklist is designed for community members to determine if their neighborhood is a friendly place to walk. The guidebook can be referenced by participants to learn about roadway conditions, traffic problems that adversely affect pedestrian movements, and ways to address these problems in order to make the environment more supportive of pedestrian activity.
2009	
A Great Reckoning: Healing a Growing Divide Boston Foundation and Greater Boston's Civic Community http://foundationcenter.org/gainknowledge/pubhub/pubhub_item.jhtml?id=fdc96000009	The Boston Indicators Project is an ongoing effort of the Boston Foundation to track a variety of indicators in the Boston region. A Great Reckoning is the latest report summarizing trends in indicators and comparing the Boston area to regional, national, and global trends. Indicators in the report cover a broad range of categories, including civic vitality, cultural life and the arts, economy, housing, technology, and transportation. Some data sources are leveraged in very innovative ways. The report compares measured indicators to the vision for Boston in 2030 and concludes with recommendations.
AASHTO Practitioner's Handbook – Indirect Effects and Cumulative Impacts Assessments AASHTO http://downloads.transportation.org/Pre-Final%20IECI%20handbook_SCOE%20ballot.pdf	This handbook synthesizes previous research contained in NCHRP reports, CEQ guidance, and various state guidance documents in terms of analyzing and scoping IECI studies. One section focuses on how to document these effects, a consistent theme with the AASHTO Practitioner Handbook series).
Data Needs for Bicycling and Sustainability Research Buehler, R. (Transportation Planning Research Advisory Committee)	This presentation outlines the types of indicators and data that are needed to evaluate whether an area is suitable for sustainable transportation in the form of biking, walking and transit, with an emphasis on bicycling. It begins with a discussion of the concept of sustainability and how it applies to the transportation system, and then examines "green" modes of transportation. The presentation lists the data needed to evaluate a community's bikability and measures to evaluate sustainable transportation.
Health Impact Project The Robert Wood Foundation and the Pew Charitable Trusts http://www.healthimpactproject.org/project	The Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, is a national initiative designed to promote the use of health impact assessments (HIAs) as a decision-making tool for policymakers. HIAs use a flexible, data-driven approach that identifies the health consequences of new policies and develops practical strategies to enhance their health benefits and minimize adverse effects.

Resource (Title and Author/Organization)	Abstract
Livable Centers Initiative Indicators & Benefits Study Atlanta Regional Commission http://www.mayorsinnovation.org/pdf/3_lu_lci09_indicatorsbenefits_1009.pdf	The purpose of this study is to examine a sample of Livable Centers Initiative plans and determine their benefits and other impacts on the community and region as a whole. The selected plans were located throughout the Atlanta Regional Commission and vary in their approach to address opportunities for growth and development.
Performance Measurement Framework for Highway Capacity Decision-Making Cambridge Systematics, Inc. (SHRP 2) Report S2-C02-RR http://www.trb.org/Main/Blurbs/161859.aspx	This report covers a broad range of performance measures related to highway capacity decision-making. Categories include a number of traditional quality of life areas, and all included measures may be useful in quantifying outcomes based on the input received from stakeholders.
Plan 2040 Atlanta Regional Commission http://www.atlantaregional.com/plan2040/documents--tools	This plan provides a blueprint to sustain the Atlanta region's livability and prosperity through mid-century, as the region is expected to add approximately three million residents. The plan includes a regional agenda for future land use, development, and growth, as well as a $61 billion Regional Transportation Plan.
Smart Growth Checklist: A Checklist for Municipal Land Use Planning and Management NY State DOT & NY State Governor's Smart Growth Cabinet https://www.dot.ny.gov/programs/smart-planning/repository/SGCheck_Municipal_PRINT.pdf	This user-friendly tool can be used by communities when making decisions about future land use and development. It is designed to assess how well planning and land use decisions in a community follow the principles of Smart Growth.
Smart Growth Checklist: A Checklist for Proposed Development in Your Community NY State DOT and the New York State Governor's Smart Growth Cabinet https://www.dot.ny.gov/programs/smart-planning/repository/SGCheck_Development_Print.pdf	This user-friendly tool can be used by communities to determine how a proposed project would contribute to the overall well-being of a community. The checklist provides a framework for evaluating a project's impacts, including community-wide benefits over time.
Technical Report: Developing Sustainable Transportation Performance Measures for TxDOT's Strategic Plan Ramani, T., Ziestman, J., Eisele, W., Rosa, D., Spillane, D., & Bochner, B. (TxDOT & FHWA) http://tti.tamu.edu/documents/0-5541-1.pdf	The aim of this project was to develop a performance measurement-based approach to evaluate sustainable transportation for the Texas Department of Transportation (TxDOT). TxDOT's strategic plan contains five goals (reduce congestion, improve safety, increase economic opportunity, enhance the value of transportation assets, and improve air quality), each of which must be addressed to enhance the sustainability of the transportation system. This project uses a multi-criteria decision-making (MCDM) approach as the basis for the sustainability evaluation, and requires the development of appropriate performance measures. The scope of this project was limited to addressing sustainability at the transportation corridor level.
The Regional Comprehensive Plan 2009 Annual Performance Monitoring Report San Diego Association of Governments (SANDAG) http://www.sandag.org/index.asp?projectid=309&fuseaction=projects.detail	This monitoring report for the San Diego Association of Government's Comprehensive Plan discusses progress and room for improvement relative to plan goals and outcomes. It includes various indicators used to gauge progress as well as required data.
Towards Zero Deaths Minnesota Departments of Public Safety, Transportation, and Health http://www.dot.state.mn.us/trafficeng/publ/triviacard/trivia09/2009%20Toward%20Zero%20Deaths%20Goal.pdf	This policy mission aims to eliminate fatalities on Minnesota's roads. The initiative provides an example of how a specific indicator can be applied to a transportation goal.
Well Measured – Developing Indicators for Comprehensive and Sustainable Transport Planning Litman, T. http://www.vtpi.org/wellmeas.pdf	This paper provides guidance on the use of indicators for sustainable transportation planning. It discusses sustainable development and transportation concepts, as well as the role that sustainability indicators play in evaluation and planning. Indicator sets and recommendations for selecting indicators in a particular situation are provided.

Resource (Title and Author/Organization)	Abstract
2008	
Gallup-Healthways Well Being Index Gallup, Inc. & Healthways, Inc. http://www.well-beingindex.com/	The Gallup-Healthways Well-Being Index® is the first-ever daily assessment of U.S. residents' health and well-being. By interviewing at least 1,000 U.S. adults every day, the Well-Being Index provides real-time measurement and insights needed to improve health, increase productivity, and lower healthcare costs. Public and private sector leaders use data on life evaluation, physical health, emotional health, healthy behavior, work environment, and basic access to develop and prioritize strategies to help their communities thrive and grow. Journalists, academics, and medical experts benefit from this unprecedented resource of health statistics and behavioral economic data to inform their research and reporting.
2007	
Assessing Your Community's Aging-Readiness: A Checklist of Key Features of an Aging-Friendly Community Partners for Livable Communities and the National Association of Area Agencies on Aging http://www.n4a.org/pdf/07-116-N4A-Blueprint4ActionWCovers.pdf (Pages 69-70)	This checklist is part of a guidebook to provide local leaders with the knowledge and tools necessary to build collaborative partnerships for creating livable communities for people of all ages.
2006	
Guide to Context Sensitive Solutions Alliance for Transportation Research Institute at University of New Mexico http://www.nmshtd.state.nm.us/upload/images/environmental_urban_design_unit/NM_Guide_to_Context_Sensitive_Solutions.pdf	The purpose of this report is to guide the uniform implementation of CSS processes and training throughout the New Mexico Department of Transportation. This report illustrates performance measures for each stage in the life of a transportation project and provides a compilation of these measures by stage and chapter of the report.
2005	
Community Impact Assessment Practice: Where we've been, Where we are, Where we're going Townsend, T., Lane, L., and Hartell, A.	This paper describes the legal and historical developments that resulted in the inclusion of community effects in the transportation planning and project development decision-making processes, current states-of-practice, current challenges associated with the CIA process, and future directions of CIA. An understanding of this evolution and future prospects will help guide practitioners and researchers as they continue to improve assessment methodologies.
Irvine Minnesota Inventory Day, K., Boarnet, M., Alfonzo, M., and Forsyth, A. http://www.activelivingresearch.org/node/10634	This audit tool helps practitioners and public health officials to collect data on built environment features that are potentially linked to physical activity.

Resource (Title and Author/Organization)	Abstract
Sustainable Mobility, Policy Measures, and Assessment (SUMMA) Rahman, A. and van Grol, R. (RAND Europe) http://www.tmleuven.be/project/summa/home.htm	Developed by a consortium of European firms for the European Commission - Directorate General for Energy and Transport, SUMMA is a framework for making tradeoffs between the pillars of sustainability. The report begins by defining sustainability and a set of related goals and sub-goals. In order to analyze policy relative to identified goals, system indicators and outcome indicators are then defined. System indicators are characterized by the component of the transportation system they represent (activities, spatial and time structure, etc.) while outcome indicators are characterized by the basic element of sustainability they address (development needs, ecosystem health, etc.) A decision-making model incorporating the chosen indicators is then described. The report concludes with a discussion of challenges, including the political nature of sustainability and data limitations. An interesting discussion on factors perpetuating the status quo in transport is also discussed in the conclusion of the report, including consistent failure of decision makers to account for externalities, the "stickiness" of infrastructure, and the complex and conflicting interests that complicate transportation decision-making processes.
The Economist Intelligence Unit's Quality of Life Index – Calculation Methodology Economist Intelligence Unit http://www.economist.com/media/pdf/QUALITY_OF_LIFE.pdf	The Economist Intelligence Unit has developed a new "quality of life" index based on a unique methodology that links the results of subjective life-satisfaction surveys to the objective determinants of quality of life across countries. The index has been calculated for 111 countries for 2005. This note explains the methodology and gives the complete country ranking.
2004	
SANDAG Regional Comprehensive Plan San Diego Association of Governments (SANDAG) http://www.sandag.org/index.asp?projectid=1&fuseaction=projects.detail	The San Diego Association of Governments' Regional Comprehensive Plan discusses strategies to improve quality of life. This document is an effective example of how to apply livability principles through policy.
The Clean Air Action Plan Mid-America Regional Council http://www.marc.org/environment/airq/clean-air-action.htm	This plan provides a comprehensive, voluntary, community-based strategy for reducing ground-level ozone pollution in the Kansas City metropolitan area. It includes formal, public commitments by participating stakeholders to work collaboratively through new and existing partnerships in order to maximize the plan's air quality benefits.
2003	
Building Projects that Build Communities: Recommended Best Practices Washington State Department of Transportation, Community Partnership Forum http://contextsensitivesolutions.org/content/reading/building-projects/	This handbook was created by a forum of transportation experts from a variety of backgrounds, including those representing cities, counties, consulting firms, Sound Transit, the Association of Washington Cities, the Federal Highway Administration, and the Washington State Department of Transportation. The handbook provides an in-depth discussion of how to strengthen the planning process by simultaneously advancing the goals of safety, mobility, environmental enhancement, and preservation of community values. The handbook notes that much of these goals can be achieved through effective communication, meaningful public involvement, listening, collaboration, and compromise. The handbook includes case studies; a list of resources to assist in conflict resolution; methods to evaluate, adjust, and improve a project; and checklists to assess project success.
Community Core Indicators of Activity Friendliness – Telephone Questionnaire Prevention Research Center and St. Louis University School of Public Health	This questionnaire was designed to assess how a community views its physical surroundings and whether the environment is supportive and encouraging of physical activity.

Resource (Title and Author/Organization)	Abstract
2002	
Guidance for Estimating the Indirect Effects of Proposed Transportation Projects Louis Berger Group, Inc. http://www.trb.org/Main/Blurbs/153361.aspx	This report provides guidance for interpreting the term "indirect effect" and includes a framework for identifying and analyzing the indirect effects of proposed transportation projects. This framework provides planners and practitioners the ability to integrate indirect effects assessments into ongoing evaluation. Transportation agencies thus have information that can be used as a factor in deciding whether to proceed with a project as proposed or modify the action so that the long-term indirect consequences are consistent with the long term needs of affected goals and areas.
Key Transportation Indicators – Summary of a Workshop National Academy of Sciences - Committee on National Statistics (J. Norwood and J. Casey, ed.) http://www.nap.edu/catalog.php?record_id=10404	This document summarizes a workshop conducted by the National Research Council (NRC) Committee on National Statistics and its Transportation Research Board. The purpose of the workshop was to discuss issues relating to transportation indicators and provide the Bureau of Transportation Statistics with new ideas for issues to address. Participants were asked to consider existing indicators and measures, as well as potential new approaches, in the areas of safety, mobility, economic growth and trade, human and natural environments, and national security.
MetroGreen Action Plan Mid-America Regional Council http://www.marc.org/metrogreen/Resources/reports.aspx	The MetroGreen Action Plan provides a "greenprint" for a metropolitan trails system that connects urban and rural green corridors throughout seven counties in the Kansas City region. The plan is also designed to protect and improve water quality in the region for the next 100 years, conserving and enhancing the region's existing natural elements. Above all, MetroGreen exists to ensure that area residents continue to enjoy a high quality of life.
Social Capital Community Benchmark Survey Short Form and Long Form John F. Kennedy School of Government at Harvard University http://www.hks.harvard.edu/saguaro/communitysurvey/index.html	The survey was designed for those with an interest in surveying constituents on social capital. Users may include state and federal agencies; smaller communities that may not have the time, budget, or staff to use the long-form survey; and communities and non-profits that are already conducting surveys and would like the short-form to provide supplemental information on social capital. The survey is designed to be used pre- and post-project to determine if social capital has changed.
2001	
Guidebook for Assessing the Social and Economic Effects of Transportation Projects Forkenbrock, D. J., and Weisbrod, G. (NCHRP Report 456) http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_456-a.pdf	This guidebook is designed to help practitioners assess the social and economic implications of transportation projects for surrounding communities, including the often overlooked effects on members of society who will not be the end-users of the facility in question. Community effects are divided into two clusters: transportation system effects and social and economic effects.
The Well-Being of Nations: The Role of Human and Social Capital – Education and Skills Healy, T., and Cote, S. (Organisation for Economic Cooperation and Development) http://www.oecd.org/dataoecd/36/40/33703702.pdf	This report focuses on the concepts of human and social capital and their relationships with economic and social development, discussing their definitions, uses, measurement frameworks, and policy implications.
2000	
Livable Communities Policy Washington State Department of Transportation, Livable Community workgroup http://www.wsdot.wa.gov/NR/rdonlyres/A94C2706-00C9-40C8-AACA-B71D9472A296/0/LivableCommunities.pdf	This policy, developed by the Washington State Livable Community workgroup, provides a formal definition of livability and a statewide policy framework to guide transportation decisions in support of livable communities.

Resource (Title and Author/Organization)	Abstract
1999	
Street Design Guidelines for Healthy Neighborhoods Burden, D. (Walkable Communities, Inc.) http://onlinepubs.trb.org/onlinepubs/circulars/ec019/Ec019_b1.pdf	This manual provides guidelines for creating streets and neighborhoods (both new and retrofitted) that are more interactive, walkable, enjoyable, and livable. It lists and describes seven "healthy street categories" meant to replace conventional street hierarchies and offers street design features for each street category.
1997	
Considering Cumulative Effects Under the National Environmental Policy Act Council on Environmental Quality http://ceq.hss.doe.gov/nepa/ccenepa/ccenepa.htm	This national resource describes an 11-step process for identifying and evaluating cumulative impacts. Resources and techniques are described and explained through case studies. General indictors are listed, although thresholds and many aspects of human community effects are not presented in detail.
1995	
Community Quality of Life: Measurement Trends and Transportation Strategies CDTC Urban Issues Task Force	This report focuses on community quality of life as viewed through the lens of transportation. It discusses long-term trends and issues related to livability in the Capital District region of New York, and how these trends should be addressed to continue fostering livable communities.
NO DATE	
Lifelong Communities Handbook: Creating Opportunities for Lifelong Living Atlanta Regional Commission http://www.atlantaregional.com/File%20Library/Aging/ag_llc_designhandbook.pdf	This handbook serves as a reference to ensure that development and community design adhere to the Lifelong Communities principles. The handbook is organized around the seven principles of lifelong communities and shows how they are applied at four levels: the building, the street, the community, and the region.
Manual for Streets – Residents' Perception Survey Department of Transport, United Kingdom	This survey tool can be administered to area residents in order to better understand how they perceive the environment in which they live. It should be used early in the decision-making process to not only assist the transportation agency with this understanding, but also to build trust and initiate the development of ideas for improvement.
Roadway Audit Tool, Analytic Version St. Louis School of Public Health	This audit is designed to understand the relationship between street-scale environments and rates of physical activity.
Under Development	
INVEST Federal Highway Administration, Sustainable Transport and Climate Change Team	The FHWA Sustainable Transport and Climate Change Team is developing a sustainable highway tool called INVEST, which is a self-evaluation tool to assess sustainability in project development, operations, maintenance, and system planning.

Appendix C:
Focus Group Session Summary

Livability Focus Group Forum Meeting

Wednesday, October 26, 2011 at 2PM

Project Team Members:

Jeff Frkonja – FHWA – research in transportation
Leigh Lane, Center for Transportation and the Environment at NCSU (Principal Investigator/Moderator)
Teresa Townsend, Planning Communities, LLC (Moderator)
Eugene Murray – CTE, distance learning specialist (Webinar Technology)
Laura Rydland – LBG
Lindsay Maurer – Planning Communities
Matt Watterson – CTE, research assistant

Focus Group Attendees:

Carissa Slotterback – University of Minnesota
Chris McCahill – University of Connecticut
Jamie Fischer – Georgia Institute of Technology
Tian Guo – University of Minnesota (sitting in for Dr. Ingrid Schneider)
Mike Lahr – Rutgers University
Tara Ramani – Texas A&M (listening only)
Susan Edrington – Texas Transportation Institute (TTI)

I. Introduction

a. Introduction of the FHWA Project Team (members introduced themselves)
b. Introduction of the Webinar Software - by Eugene Murray

II. Welcome and Introduction to Livability – led by Leigh Lane

Leigh asked if participants had received the livability document that had been sent out and then discussed the concept of livability, which includes issues such as smart growth, context sensitive solutions, and sustainability. She described how this concept has evolved over time and has been referred to by many different names. Leigh also verified that focus group participants were familiar with the six FHWA livability principles and asked whether participants had reviewed the work plan for this project: four said yes, while three said no. She then described each of the work plan phases of this project, which are as follows:

Phase I: Literature Review and Livability Performance Measures Tool/Handbook Design
Phase II: Livability Performance Measures Tool/Handbook Development and Peer Exchange
Phase III: User Feedback and Final Livability Performance Measures Tool and Handbook

Leigh then described the objective of the focus group session, which was to identify livability performance measures and indicators that are either currently available or emerging through ongoing research initiatives. Academic input on the categorization of measures by context was also mentioned as a desired goal of this meeting, as was feedback to determine the data needs and other challenges associated with gathering these measures and indicators.

III. Focus Group Participant Introductions

Participants were asked to introduce themselves, share details of their work with livability performance measurement, and indicate their interest in the focus group meeting.

Carissa Slotterback – *Associate Professor of Urban &Regional Planning at University on MN, Environmental Planning with transportation and public involvement expertise/experience.*

Work

Carissa's work has focused primarily on sustainability, but also links to livability as there is some overlap between the two. Her recent work has addressed regional sustainability indicators and public engagement in design. This includes evaluating project design from a user perspective, and consists of 'complete streets' projects reviewing regional sustainability plans. She has also been involved in a number of regional sustainability plans and associated indicators. Much of this work is currently being written and is not immediately available. She has also worked to develop a set of approximately 30 regional indicators for the Minnesota region, including housing access, accessibility, and voting participation. These indicators have not yet been evaluated or adopted, although a report and a full list of indicators and data sources are available.

Interest in Focus Group Meeting

Carissa expressed interest in learning more about indicators, as this would help her with her own work.

Tara Ramani – *Works with the Texas Transportation Institute in the air quality program (environmental and air quality division)*

Work

Tara recently planned a Conference on Livability and Performance Measures in Austin, Texas (http://utcm.tamu.edu/livabilityconference/). While her work has thus far focused on sustainability, she is becoming more involved with livability. Recent work includes an NCHRP project on Sustainability Performance Measures for State DOTs and Other Transportation Agencies. This is a guidebook to help agencies understand sustainability and apply livability measures. She has worked on strategic planning and its overlap with sustainability, and has developed sustainability metrics that are tailored to certain locations and groups. Other projects include research on air quality, freight corridors, rapid transit system (RTS) corridors, and corridor highway-level sustainability projects.

Jamie Fischer – *PhD Candidate and Graduate Research Assistant at Georgia Tech with the Infrastructure Research Group – Currently studying the impact of transportation infrastructure on the quality of life*

Work

Jamie's recent work has addressed quality of life, customer satisfaction, performance management, sustainable development, and other topics. Her dissertation will be a collection of livability test cases for which she is hoping to find GIS data.

Interest in Focus Group Meeting

Jamie was interested in identifying indicators and measures that are most in need of testing, then finding out what data sources are available in different regions to test those measures.

Mike Lahr – *Rutgers University, Associate Research Professor*

Work
Mike's work has been extremely varied and includes a high degree of macro-oriented work, as he does not work within the metropolitan or community level. Working for HUD's Habitat II in 1997, he developed indicator research and conducted hedonic regression analyses, which indicate livability. Other work includes studies on cost of living, quality of life, and the environment to create prices for non-market goods such as air quality. He has also worked for USDA as part of the Center on Policy Research, and is currently doing global work on sustainable economic development and energy use compared to GDP (energy intensity). This has involved work in China.

Interest in Focus Group Meeting
Mike would like to understand how interests and standard of living/lifestyle change over time, and how these concepts might be measured.

Tian Guo – *University of Minnesota; Assistant to and sitting in for Dr. Ingrid Schneider*

Work
Tian is currently studying quality of life and transportation – specifically, how transportation contributes to perceptions of quality of life. She described 10 quality of life domains that the University of Minnesota had generated through focus groups across Minnesota, which indicate how participants pursue and view quality of life. These domains include the following:

1. Education (higher education and traditional)
2. Employment and Finances
3. Environment and Housing
4. Family, Friends, and Neighbors (social community)
5. Health (well-being and access to healthcare)
6. Local Amenities (related to regional and local identity)
7. Recreation and Entertainment
8. Safety
9. Spirituality and Individual Faith
10. Transportation (ease of getting around)

Interest in Focus Group Meeting
Tian participated for the learning experience.

Susan Edrington – *Texas Transportation Institute (TTI), research branch of Texas Tech University; background in public transportation, worked for Houston transit for 16 years, and has done research at TTI for about 4 years*

Work
Susan is currently working on an FTA project: Transit Livability Performance Measures Suitable at a National Level. This effort will develop a set of metrics to measure rural effects on livability. She has also been studying Transit Direct-related measures and Transit Indirect-related measures and how these can be related back to the six Livability Principles. Her organization is also identifying data sets for these indicators, both direct and indirect, and will apply those indicators to case studies from January to May. The project is approximately one-third complete, and the work can be found at http://www.govtech.com/grants/government-

development/Transit_Livability_Performance_29968.html . Leigh asked about the distinction between direct and indirect measures. Susan mentioned that measures are related directly to transit would include, for example, percent of households (65 or older) who have access to transit and an indirect outcome of transit would be the percent of new or major rehabilitated housing that is within ½ mile of a town center.

Interest in Focus Group Meeting
Susan stated that she was interested in which measures were being used/examined and how, especially related to rural issues.

Chris McCahill – *University of Connecticut – PhD student in the civil engineering department*

Work
Chris is currently developing a Transportation Index of Sustainable Places, a project led by Professor Norman Garrick. These are not grouped by the six Livability Principles, but rather into social, environmental, and economic categories. The study identifies the impacts of transportation systems rather than gauging their performance, and is intended to be applicable at any scale. They have begun testing this index for all 50 states and have experienced some issues with social indicators.

Interest in Focus Group Meeting
Chris was interested in the social indicators from this study, partially due to some of the difficulties he has faced with social indicators on the above project. He was also interested in what data was available and how the results of processing that data would look. Additionally, he wanted to gain an understanding of how indicators are linked to desired outcomes and how well they are achieving those, particularly indicators that are easy to use and access. In his work, some indicators have been developed specifically for the state level, but they have also kept in mind the fact that they could be developed from the project through the national levels.

IV. Focus Group Discussion – led by Teresa Townsend

Teresa explained that Planning Communities and CTE are combing through current research on indicators and measures and encouraged participants to join this discussion for the second half of the focus group call. She provided an overview of the pre-focus group survey, which was primarily intended to determine how participants believed the various indicator types should fall under the six livability principles. Teresa noted issues with tying indicators to these principles.

The definition of indicators and measures, as approached by the FHWA Livability research team, was also discussed. An indicator is an effect, occurrence, or condition that relates to a goal, and tells the practitioner if they are moving towards that goal. It might be descriptive or quantifiable and help establish how to reach that goal. A performance measure was described a gauge that shows progress towards the indicator.

The purpose of the database tool was also described, with important criteria being that it had to be tied to real world challenges and issues. It also will need to be useful to transportation practitioners in the sense that it returns relevant, applicable indicators to the task at hand. Teresa noted that this applicability was dependent on well-thought-out indicators and a sound method for choosing them.

Poll Question

Participants were provided with a list of current indicator "types" and asked to determine whether this list generally represented aspects of livability. Two focus group respondents said 'yes,' while four voted 'no.'

To clarify the meaning of indicator "type," Teresa provided a brief example of an indicator type, associated indicator, and representative measure:

- Indicator type: Economic
- Indicator: Transportation costs
- Measure: Local government spending on transportation

Responses / Answers

One participant noted the challenge of indicator overlap. For example, some indicators could go in either a Regulatory category or an Economic category. Teresa recognized that there is overlap between indicator types in many cases. Confusion was also expressed at the exercise of identifying indicator types. Some of the categories mentioned, according to Chris McCahill, were very broad and many indicators were not represented well. Land use, economics, and infrastructure were cited as being very broad, while others were seen as very specific (vehicular safety was described as too specific – safety would be more appropriate). Tara mentioned later in agreement that vehicular safety was too narrow of an indicator type. She also mentioned that Mobility could fit under the indicator of Accessibility. This discussion revealed ways in which the indicator types could be consolidated and suggested that multi-dimensional cross referencing could be useful. Teresa agreed that condensing the indicator types would be useful.

Mike Lahr expressed a similar concern, but noted also that some issues "fall between the cracks" due to contextual or other issues. For example, regarding community amenities, Mike suggested that some small places don't need a large number of offerings if there are sufficient offerings in the region. He noted his neighborhood as an example, as it was less than an hour from Philadelphia or New York. Thus, community amenities would be an issue for a small place in the middle of Iowa that doesn't have regional offerings. Instances were also noted where the measures themselves might fall between the cracks.

Mike also mentioned that nothing on the list covered the 'socio-political climate.' Political climate, for instance, was not represented at all. Teresa stated that levels or gradations (which would be discussed later in the session) could help address these concerns. Susan stated that she viewed the indicators as generally good and fairly thorough. However, she noted that at the rural level, connectivity is very important regionally (although that might fall under mobility or accessibility). This could be seen as a means to address Mike's issue concerning differences in amenity issues related to location. She suggested adding that as an indicator type or modifying existing indicator types to clearly incorporate that concept.

Chris stated that there is a difference between sustainability and livability, and that a livable suburban community is very different from a livable urban community. Tara agreed, and offered as an example that energy might be more applicable as a sustainability indicator set rather than a livability indicator. Jamie concurred that some categories are more applicable to sustainability and

some are more applicable to livability, but suggested that sustainability does impact, and therefore has an interrelationship with, livability. She also noted that David Godschalk is conducting research on this discussion (the livability/sustainability prism).

Mike Lahr stated that he wasn't sure how 'sensory' differs from 'aesthetics' and that these could almost be considered the same. However, an example was given to more clearly define the two, with sensory being described as vibrations from a busy highway or railway, whereas aesthetics constituted features such as a view shed around a transportation hub. Mike responded that he could definitely see the difference between the two concepts in a transportation sense. He also noted that some categories hardly vary across space and time, and that they become somewhat useless as a way to organize indicators. This is not because they don't indicate anything, but because they don't differentiate enough. He suggested that a concept of principal components analysis or factor analysis could be helpful with the indicator types. This would also help with identifying redundant indicators.

It was then mentioned that many researchers have identified indicator type/groups, and that it might therefore be helpful to review what has already been done. Teresa mentioned that some of these indicator types might also be differentiated between primary and secondary indicators, and that the indicators can be judged based on values.

Question: *What other types of categorization beyond the indicator types discussed do you believe are important to include in the tool? (Examples include tiering by: Geography, Density Type, Data, Goals, Scale. What is missing?* For instance, Leigh and Teresa stated that in different densities, a practitioner might have different indicators and concerns.

Responses

As an example, Teresa suggested that different indicators and concerns might be faced in areas of varying density (urban, suburban, rural). Susan responded that her organization has found it very difficult to compare localities that are different. They therefore developed different typologies for rural areas before they applied the measures for their current study. These Rural Typologies included: edge fringe community, traditional main street community, different sizes of traditional main streets communities, gateway communities (to natural areas), agriculture dependent communities, single industry (mining) communities, university/military communities, and second home/retirement communities. Within these typologies, her organization may develop an index for other categories, such as a demographic-economic piece. This index would be beneficial because even with typologies, stark differences are evident – for example, one edge community might be wealthy and one might be poor.

Jamie Fischer noted that Susan's indexing reflects market segmentation and suggested other market segments be considered, such as economic and political issues. Mike also suggested adding tiering by the intensity of land use regulation.

Tara asked if measures would be outcome based. She noted that if these measures are going to be used by public agencies, the research team might want to look at measures that reflect process or system level measures rather than the outcome measures. She also suggested in a side note that IT might fall under scale as a way to tier measures. Jamie asked what aspect of measurement was most important in Tara's research, and Tara mentioned that looking at profit or output measures was

preferred, but also pointed out that it may be beneficial to include system level measures rather than outcome measures.

Jamie noted an attribution/categorization in regards to how much control an agency has over a measure. She mentioned a direct linkage between process outcome and the control/actions of the agencies/government. Tian noted that while public agencies can influence outcomes, both outcome measures (whether there is influence or not) may be informative and useful for agencies that. Leigh agreed with by stating that even if an agency doesn't completely control an outcome it's of benefit to track it in some way.

Data Needs

While data needs/available data sources were identified throughout the discussion, the final focus group question asked participants to identify specific resources to support the research and tool development. Jamie suggested the Neighborhood Transportation Knowledge Network has been tracking information from State DOTs. She noted that performance measures from state DOTs have limited focus for livability however would include indicators that support mobility and safety.

Mike Lahr suggested numerous sources of data. He mentioned US BEA has developed consumer price indices for each county in the US and that the US Census has a database on interregional trade called "The Freight Analysis Framework, Version 3." To support public health data; he noted the use of vital statistics (infant mortality rates) and mortality statistics. He also mentioned that the Toxic Resource inventory has data by zip code.

Mike Lahr mentioned data available by metro area on air quality. Tara mentioned mobile source emissions primarily at the corridor and network level.

Susan mentioned that they are identifying potential data gaps in their study and are challenged by creating indicators for rural communities on a national level.

Jeff inquired if the group had any observations specific to urban form. One example might include tree coverage or biomass in a city or location. Additionally indicator sets to reflect whether an area is primarily residential or primarily business oriented, etc. may be useful.

V. **Wrap-Up –** led by Leigh Lane

Leigh discussed next steps and areas for continued involvement. She mentioned that the project team is in the process of finalizing Phase 1 of the project. Phase two will include the development of the tool/database and that there will be opportunities for beta testing.

Notes from the meeting, as well as a recording of the meeting and the slides of the presentation would also be made available to the participants.

Appendix D:
Practitioner Interview Summary and Documentation

FHWA PL 0115: Methods for Gauging Livability Improvements
Practitioner Interview Summary
Submitted December 9, 2011

Background and Purpose

This report presents findings from a set of 20 practitioner interviews conducted to inform the development of *FHWA PL 0115: Methods for Gauging Livability Improvements*. The products of this effort will include a handbook and a searchable database that will allow practitioners (DOTs, MPOs, RPOs, local governments, tribal representatives, agencies, etc.) to identify livability indicators and performance measures based on their unique goals, needs, and contexts. The database will provide a user-friendly tool for practitioners to use as they pursue livable and sustainable outcomes.

The purposes of the practitioner interview process were as follows:

- Identify performance measures and indicators that are currently being employed in the field
- Determine how existing performance measures and indicators are used to make decisions about transportation infrastructure investments
- Obtain practitioner input on the design of the database tool and handbook, including searchable attributes, tiering criteria, key contextual factors, general functionality, etc.
- Identify contextual elements that affect the applicability and usefulness of performance measures and indicators in various settings

This approach will ensure that products are designed in way that is meaningful and useful to end users.

Methodology

The project team conducted interviews with representatives from state DOTs, MPOs, RPOs, local governments, agencies, and consultants. A preliminary participant list was developed based on project team knowledge of the field of livability performance measurement, with the following considerations in mind:

- Distribution of participant types (i.e. state DOT vs. MPO vs. local/regional entity)
- Geographic coverage (e.g. across the U.S.)
- Contextual coverage (e.g. urban vs. rural)
- Previous and ongoing experience with initiatives related to livability and performance measurement, as determined through industry knowledge, FHWA's Livability Guidebook, The Role of FHWA Programs in Livability, Moving Communities Forward, and a list of TIGER II Grant recipients

This initial list was expanded and revised based on FHWA input. Selected representatives were contacted via email and phone to schedule one-hour phone interviews, and four project team members conducted the interviews between October 13 and November 17. A detailed interview guide was developed (and revised based on FHWA input) to facilitate all conversations and achieve consistency across interviewers and participants. This guide, which can be found in the appendix of this report along with all individual interviews, contained the following major sections:

- Indicators and Performance Measures and their Use in the Decision-Making Process
- Searchable Database
- The Role of Context
- Closing and Next Steps

Participants

Through this process, 20 organizations provided input on livability performance measurement and project materials. These organizations and the representative(s) interviewed are listed in the table below:

Organization	Representative(s)
State Departments of Transportation	
Minnesota	Lynne Bly, Deanna Belden, Cindy Carlsson
Mississippi	Dr. Imad Aleithawe
North Carolina	Julie Hunkins, Harrison Marshall
Pennsylvania	Brian Hare, Brian Wall
Washington (state)	Paula Reeves
MPOs, RPOs, and COGs	
Alamo Area Council of Governments	Peter Bella
Atlanta Regional Commission	Rob LeBeau, Jared Lombard, Carolyn Rader, Mike Carnathan
Capital District Transportation Committee (Albany, NY)	Chris O'Neill
Chittenden County Regional Planning Commission (Burlington, VT)	Charles Baker
Mid-America Regional Council (Kansas City, MO/KS)	Ron Achelpohl
Piedmont Triangle Regional Council (NC)	Jesse Day, Paul Kron
San Antonio-Bexar County MPO	Stephanie Velasquez
San Diego Association of Governments	Muggs Stoll, Coleen Clementson, Christine Eary
San Francisco Metropolitan Transportation Commission	Doug Kimsey
Southeast Michigan Council of Governments (Detroit, MI)	Ed Hug, Tom Bruff
Local Governments and Agencies	
San Francisco Department of Public Health	Dr. Rajiv Bhatia
City of San Antonio, TX	Bill Barker, Marita Roos, Trish Wallace
Agencies, Organizations, and Consultants	
FHWA – National Scenic Byways	Rob Balmes
Noblis	Mike McGurrin
Sustainability Planning	Dr. Lester King

The interview list provided coverage of all levels of organization—including state DOTs, MPOs, RPOs, local governments, agencies, and consultants—as well as significant geographic and urban/rural representation. While the interview task has been completed as of the date of this report, the project team may conduct additional interviews, including some recommendations made during the November 8 meeting with FHWA, in order to enrich the development of the database tool.

Results

The results of the interview process are summarized below, organized by major interview guide section.

Indictors and Performance Measures and their Use in the Decision-Making Process

For this section, participants were asked to indicate how their organization defines livability, what indicators and measures the organization is currently using to gauge progress, how they are used in the decision-making process, and what new indicators and measures may be useful to track in the future.

Definitions of livability

The interviewed organizations are guided by a variety of livability definitions, ranging from those formally adopted to those loosely based on the six federal principles. Only one organization—the Washington (State) Department of Transportation (WSDOT) —has adopted a formal definition of livability, which is as follows:

"Livable communities provide and promote civic engagement and a sense of place through safe, sustainable choices for a variety of elements that include housing, transportation, education, cultural diversity and enrichment and recreation."

While WSDOT is the only interviewed organization with a formal definition of livability, three organizations have adopted definitions and/or principles for other related terms; these include "Quality Regions" (Capital District Transportation Committee), "Creating Success" (Southeast Michigan Council of Governments), and "Smart Transportation" (Pennsylvania DOT). Four organizations noted that they defer to the federal definition of livability in their work.

Alternatively, eleven organizations indicated that they do not operate with a formal definition of livability, although their work may address its components in various ways. For example, while the San Diego Association of Governments has not formally adopted a definition, the concept of livability is reflected in the Regional Comprehensive Plan. In a similar manner, the Atlanta Regional Commission addresses multiple aspects of livability in its regional comprehensive plan (Plan 2040), although the organization does not formally define the term. One state department of transportation previously attempted to define livability but abandoned this effort when opponents deemed it as unnecessary. Additionally, one organization is currently in the process of developing a formal definition of livability for adoption.

Livability goals, initiatives, and motivations

Eight of the interviewed organizations have adopted livability goals or standards, while four are in the process of doing so. Two interviewees noted that the concept of livability is addressed through their organizations' goals and standards for sustainability.

Among those organizations operating under specific livability goals and standards, common formats include performance targets (in areas such as pedestrian safety, air quality, housing, climate change, community safety, health, open space preservation, economic vitality, and agricultural preservation); trend assessment and monitoring; planning and investment principles; statewide goals and policy statements; and long range transportation plan guidelines, goals, and evaluation criteria. While these activities were not in all cases specifically geared towards livability as a defined concept, interviewees perceived them as livability goals and standards due to their strong connection with the principles of livability.

State DOTs, MPOs, RPOs, and local governments are pursuing livability through a wide variety of mechanisms and initiatives. Efforts identified by interviewed organizations include the following:

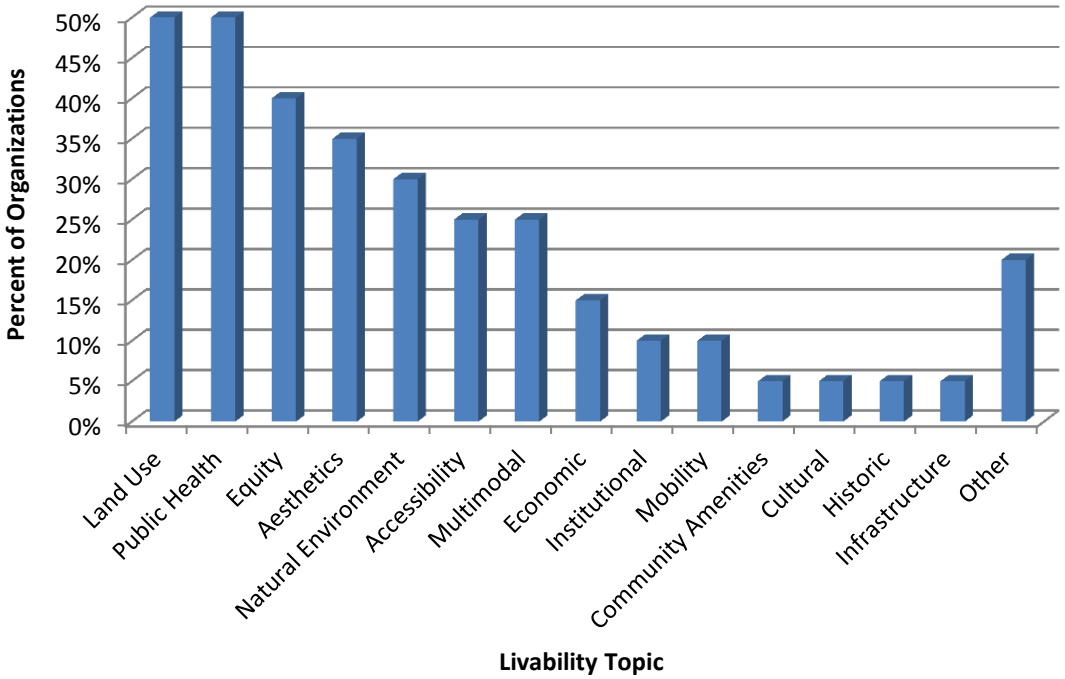
- Programs
- Plans
- Policies
- Projects
- Investment strategies
- Case studies
- Charrettes
- Partnerships
- Research
- Grants
- Tools
- Guidance
- Small area studies

Interviewees noted that these efforts tended to be initiated by a combination of plans, legislation, policies, community and grassroots organizations, local government requests, individual champions, grants, and other incentives. The source and degree of motivation was strongly tied to the political climate surrounding the organization; for instance, departments of transportation and other entities in Washington (state) and California were motivated in part by strong, progressive state legislation in the areas of livability, sustainability, and environmental protection.

Areas of emphasis: current and future

Interview participants were asked to consider the livability topics or "types" most frequently addressed through their organization's work. The chart below displays the percent of organizations emphasizing each issue area:

Which component(s) of livability does your organization work with most frequently?



As shown in the figure above, livability efforts of the interviewed organizations most commonly address land use, public health, equity, aesthetics, and the natural environment. Additional areas of emphasis include accessibility, multimodal considerations, economics, institutional concerns, and mobility, while topics such as community amenities, cultural resources, historic resources, and infrastructure were less prevalent. "Other" categories noted by participants include community values, scenic elements, and the needs of an aging population.

Interviewees identified a variety of livability topics that they would like to address more fully in the future. Participant responses included accessibility, housing, VMT reduction, public health, climate change and resiliency, economic development, freight, rural livability, livable centers, noise, pedestrian safety, access to non-work destinations, and social and regional equity.

Collection and use of livability performance measures

Seventeen of the interviewed organizations are currently collecting or beginning to collect livability performance measures. These measures are diverse in nature, topic, and extent of application. Livability performance measurement efforts typically fell into one or more of the categories below, as outlined in the descriptions that follow:

- Frameworks
- Plans and programs
- Technical memos and performance reports
- Tools
- Efforts related to specific livability domains

Several organizations have created detailed **frameworks** to tie performance measurement to goals, objectives, and outcomes. In its Plan Bay Area and Transportation 2035 documents, the San Francisco Metropolitan Transportation Commission (MTC) presents a framework of adopted targets and qualitative assessment criteria related to climate protection, adequate housing, healthy and safe communities, open space and agricultural preservation, equitable access, economic vitality, and transportation system effectiveness. The Mid-America Regional Council links specific performance measures to more general factors (indicators) and broad goals including accessibility, economic vitality, climate change/energy use, environment, place making, public health, safety and security, system condition, and system performance. For instance, under the goal of accessibility, the factor of "level of transit service" can be measured by transit ridership, revenue service hours, and the population within one mile of fixed-route transit service. Finally, WSDOT promotes a framework including a statewide livability goal, policy statement, policy strategies, outcomes, and measures. More information on each of these organizational frameworks can be found in the interview transcripts in the appendix of this report.

A number of interviewed organizations address livability performance measurement through their **plans and programs**. As noted above, the San Francisco MTC includes a variety of indicators and measures in the Plan Bay Area and Transportation 2035 documents; this inclusion was noted by the San Francisco Department of Public Health representative, who stated that the Department was able to provide input into the indicators and measures selected, particularly with respect to health. The City of San Antonio includes performance measures in multiple area plans, including SA 2020 (which addresses metrics related to arts, education, poverty, obesity, air quality, crime, downtown population and employment, and a variety of additional topics) and the Mission Verde Sustainability Plan (which promotes measures including a housing and transportation affordability index, hours of delay, lost hours of productivity, and VMT). Additionally, representatives from the San Diego Association of Governments (SANDAG) noted that the area's Regional Comprehensive Plan (RCP) contains 39 indicators that follow the basic structure/outline of the RCP (urban form/transportation, housing, healthy environment, economic prosperity, public facilities, and "borders" (intergovernmental context)).

Livability performance measurement activities related to programs include the WSDOT Main Street Highways Initiative and the Atlanta Regional Commission (ARC) Livable Centers Initiative (LCI). For the former, WSDOT tracks investments and budget/schedule performance over time in highway segments functioning as "main street" corridors, identifying the need for community engagement given the prevalence of scope overruns in these unique segments. For the latter initiative, ARC tracks private and public development in LCI project areas—including number of residential units and hotel rooms; office and residential square footage; and the type, status, size, and location of all new development—and compares these figures to the region as a whole to measure the impacts of LCI projects. Other LCI-related measures include the jobs-housing balance, density, internal street connectivity, street route directness, use mix, use balance, emissions, population/employment change, proximity to transit, and acres of park per person.

Several organizations track performance measures through **technical memos and performance reports**. For instance, the Capital District Transportation Committee has produced a Technical Memo on Community Quality of Life Measurement to track access (transit, bicycle, pedestrian), accessibility (travel time), congestion severity, flexibility, safety, economic cost, pavement and bridge condition, and quality of life (based on public input). The Minnesota DOT produces an annual performance report that tracks pedestrian access, mode shares (bicycle, pedestrian, and transit), air quality, and fuel consumption. Similarly, WSDOT produces a quarterly report—the Gray Notebook—which contains both a full description of performance as well as an executive "Performance Dashboard" for general audiences. WSDOT regularly tracks measures related to safety, preservation (asset management), mobility, environment, economic vitality, and stewardship, with more specific measures including traffic fatalities, bridge condition, delay, travel times, vehicle volumes, and project budget/schedule performance.

One agency and one local government have produced **tools** to track indicators and performance measures related to livability. FHWA Scenic Byways uses an Excel-based, input-out economic impact tool to track visitor

profiles, visitor spending, visitor counts, investments in infrastructure and projects, property value appreciation, and employment. The agency has also prepared other economic studies to similarly track the impacts of investments and grants related to byways. The City of San Antonio Sustainable Neighborhood Planning Tool allows practitioners to track specific measures related to street connectivity, pedestrian and bicycle network coverage, transit adjacency to housing and employment, amenities adjacency, transit orientation, intersection density, street route directness, and other indicators (see interview transcript in appendix for full list).

In addition to these common formats, some organizations are pursuing **specific domains** of performance measurement. Noblis, a consulting organization, focuses on accessibility measures and concepts, including cumulative opportunity models, gravity models, modal accessibility gap (between automobile and transit), and the percentage of jobs reachable within 30 minutes. The Noblis representative explained the rationale behind this emphasis, stating that the goal of transportation is not to travel, but rather to reach jobs, goods, and services. The San Francisco Department of Public Health has also taken a unique approach to measuring accessibility: the Department calculates composite scores for intersections in the city based on the number of school "seats" (weighted by test scores), parks, food places, and transit within one mile of an intersection. In addition to accessibility, these intersection scores are interpreted through a public health lens to complement other health measures such as pedestrian injuries and fatalities, air quality, and noise. Finally, the Pennsylvania DOT places particular emphasis on asset management measures—including roadway and bridge conditions—although the organization is also tracking domains such as funding, safety, mobility, accessibility, multimodal, economics, consistency with local and regional plans, and land preservation.

Additionally, three organizations are just beginning to collect and analyze livability performance measures. The Piedmont Triad Regional Council is initiating efforts to track measures such as brownfield/grayfield development, water quality, and the number of people commuting out of their home county for work. The Chittenden County Regional Planning Commission has hired a local university to begin collecting measures related to community health, economics, land use, housing, energy, and natural resources. The Minnesota DOT is also initiating livability performance measurement activities, after previous attempts were turned down due to opposition and the general political culture of the area. Once implemented, the organization's efforts will primarily address safety, environmental protection, stakeholder communication, maintenance, and multimodal transportation.

Interviewees whose organizations are currently collecting livability performance measures were asked to describe the ways in which their organizations use (or plan to use) these measures to make decisions about transportation investments. Methods of incorporation into the decision-making process included grant selection, project prioritization, regional transportation plan development, demonstration of value (to constituents), project screening, integration into programs, and alternatives analysis.

These interviewees also described the challenges faced by their organization in collecting and implementing livability performance measures. Common responses included time, money, data availability, scale, historic obligations and emphasis on motor vehicles, complexity of tool use/application, lack of data collection standards, privacy issues, and lack of national standards for measuring livability.

Alternatively, two organizations are not currently collecting livability performance measures. Barriers noted by these participants included data availability and format, scale, lack of public demand, shortage of funding and resources (including staff), political culture, and the fact that livability performance measurement has not been established as a priority by senior leadership. One organization noted that they would like to collect livability performance measures in the future and that they do collect some measures that relate to livability, though not specifically geared towards it; this effort would need to be preceded by a formal, adopted definition.

Finally, interview participants were asked to identify new ideas for measures that could be collected in pursuit of livability. Recommendations included measures related to accessibility, walkability, active travel, bicycle and

pedestrian safety, bicycle parking, water and energy consumption, the natural environment, transportation-land use linkage, infill, economic vitality, social and regional equity, and child and maternal health (birth outcomes).

Searchable Database

During the second portion of the interview, participants were asked for input regarding the attributes or search criteria that would be most helpful in using the database to identify indicators and measures suited to their needs. To initiate this conversation, a series of examples—including livability types, data intensity, geographic scale, and other similar attributes—were provided as potential criteria for searching for indicators and measures.

Interviewees generally agreed with the searchable attributes provided as examples, and the attribute most frequently cited as important for searching was livability type. However, one interviewee recommended further **distinguishing livability goals or outcomes from "types,"** as goals/outcomes may be more specific. This interviewee suggested that users be able to search by both of these levels of information. Additionally, several interviewees recommended **using a term other than "density"** to distinguish urban, rural, and suburban contexts.

Another interviewee suggested that few users would willingly select "high" data intensity when other measures are available. This participant recommended that users be asked to **rate their data capabilities (rather than selecting "intensity")**, and further suggested that this attribute be made searchable only after an initial list of measures is received, stating that more complex measures should not be ruled out and that even smaller areas might gain something from seeing complex options.

Building upon the initial list of search criteria, interviewees recommended a variety of ideas for additional searchable attribute categories. Several recommendations related to **data characteristics**, including the following:

- Data availability (e.g. immediately available vs. primary data)
- Data source characteristics (e.g. reliability, age)
- Data type (e.g. qualitative vs. quantitative, predicted/modeled vs. observed)
- Cost of use and resources required (potentially divided into three levels – high, medium, low)
- Frequency of data collection (e.g. quarterly, annually)
- Whether or not an accepted analytic technique exists (for standardization across levels and locations)

One interviewee noted that it is important not to dismiss qualitative, subjective measures, as these have equal value to quantitative measures and as even quantitative measures become subjective when practitioners interpret findings and set targets.

Other searchable attribute recommendations focused on **contextual factors** such as those listed below:

- Population size
- Geography type (e.g. local, regional, state)
- Primary user (e.g. government vs. civic) – as different users may have varying needs with respect to cost, legal backing, etc.
- Program area (e.g. public health, transportation) with sub-areas (e.g. transit, highway) – could help to separate measures by mode, and categories that are not mode-specific (e.g. congestion) could also be included
- Mode of transportation

However, one interviewee suggested not separating measures among modes of transportation—thus promoting a more holistic approach to transportation improvements—unless a strong rationale exists for doing so.

Two recommended searchable attributes addressed **how the measures will be used** by practitioners, including:

- Timeframe (e.g. near-term vs. long-term impacts and measurement)
- Application type (bond process, project level, corridor level, planning level)

Additionally, one interviewee noted that it would be beneficial to highlight the overlap and differences between sustainability and livability, perhaps through a tier that distinguishes these two concepts.

Several interviewees offered ideas on other database functionalities and the format of results. Overall, interviewees suggested that the database should provide a **drill-down, hierarchical method** of searching, and one participant noted the importance of **cross-reference data** for different searches (i.e. mix and match searching). While some interviewees wanted their search to result in relatively few measures, others indicated that they would like to see **more options**—from which they could further narrow down—in order to see solutions that they may not have considered previously.

Among the organizations interviewed, there was a strong interest to see **examples and best practices** illustrating how and where livability performance measures have been implemented. Suggestions for accomplishing this included case studies and links to reports, attached to each measure returned in a database search. Furthermore, several interviewees noted that they would benefit from the ability to **search for examples and case studies based on context**, including population size, organization type, density, geographic level, and state. This functionality would allow users to see how communities and regions similar to their own have successfully implemented the measures that the database has helped them to identify.

Finally, a number of interviewees recommended providing **attributes and other information about the measures** returned through the search process, including data sources and links to relevant academic research.

The recommendations and issues identified through this process will be used by the project team to create an organizational structure/tiering for the searchable database.

The Role of Context

To conclude the interview, participants were asked to consider the role of context in determining which indicators and measures are most useful and relevant. Interview facilitators explained that by understanding how context affects the applicability of tools in various settings, the project team will be able to design the searchable database to narrow down results for practitioners in the most meaningful way. For this section, participants indicated how the usefulness of indicators and measures may change based on density, geographical scale, data requirements, built environment characteristics, and other contextual factors.

Density

Interviewees generally agreed that the applicability of measures is affected by density and gave a variety of examples to illustrate this concept. Several of these examples related to **safety**, particularly across travel modes. For instance, three interviewees noted that bicycle and pedestrian safety is a larger concern in urban areas, while motor vehicle safety is a primary concern outside of urban areas. As an example, the WSDOT representative stated that more than 90 percent of pedestrian and bicycle collisions in the state of Washington occur in urban areas. Another interviewee noted that transportation safety is affected by the different roadside environments typical in urban, suburban, and rural areas.

Alternatively, one interviewee stated that safety measures should not vary across different densities (or other context types), due to their universal importance.

Several examples of the role of density dealt with **accessibility and road network** characteristics. One interview noted that access to housing and employment via transit is likely more applicable in urban areas, while another

stated that non-redundant (extent of network) and vulnerable (single point of failure) networks are much more likely to exist in rural and suburban locations (with associated differences in measurement needs). Appropriate measures may vary based on road network type (e.g. grid system), and issues such as school siting may differ greatly between urban and rural locations.

Interviewees also indicated that **transportation mode** measures may vary based on density context. Several participants stated that walkability is likely more important in urban areas, although one suggested that these measures would be easier to measure in rural settings. Some also noted varying transportation needs between urban and rural locations; for instance, one interviewee stated that urban transit solutions could include light rail, bus, and metro options, while transit in rural environments may include coach buses along scenic byways.

Other topics and livability domains that may differ between urban, rural, and suburban settings include:

- Definition of congestion (and thus congestion management strategies)
- Direct vs. indirect impacts (direct impacts are often greater in urban locations, while indirect impacts occur more frequently in rural settings)

In addition to these topical suggestions, interviewees also noted the following recommendations and issues related to the role of density:

- Regional equity (across the three density) scales should be considered to ensure that sufficient information is available for regional entities (not just urban and suburban areas) and that decisions are equitable (e.g. providing rural transit but not forgoing investment in much needed urban transit).
- Density levels may not be high enough to support some indicators—such as building permits and certain employment data—as information is often more difficult to acquire in rural settings.
- While measures may be different according to density context, it is also possible that the same measures with different *targets/thresholds* would be needed.

Geographic scale
Interviewees also agreed with the influence of geographic scale. A number of participants noted that **data availability** varies greatly across geographic levels; for instance, not all Census-oriented measures are available for smaller geographies. Similarly, interviewees noted difficulty in obtaining localized measures for issues such as obesity, VMT, air quality, and emissions, as these are traditionally collected and available only at larger, regional levels.

Furthermore, interviewees suggested that the **relevance** of certain measures varies according to geographic scale. For example, congestion measures are more applicable for a corridor than for a region; walkability is more relevant at the neighborhood level; and habitat planning makes sense from a regional perspective, but not necessarily for a smaller jurisdiction.

Additionally, two interviewees addressed the topic of **regional dilution**. One participant noted that while certain elements such as sidewalks may be lacking in a regional sense, they may be more prevalent (and relevant) in the urban core. Another noted that transit shares at the regional level may not accurately depict what is happening on main corridors—during peak periods, key corridors have much higher transit shares that are more indicative of the value of transit to the region.

Data requirements
As previously noted, interviewees strongly felt that data availability and quality vary across contextual settings. Indeed, data availability and reliability were key themes (and noted obstacles to livability performance measurement) in interview feedback. However, while data requirements (as well as data reliability) affect the

usefulness of measures in various communities, participants stated that **measures will be necessary regardless** of data characteristics. Thus, a tiered approach was recommended to provide opportunities for both well- and less-equipped users. As described in the previous section, some participants also felt that even less-equipped communities and regions could benefit from seeing the realm of what is possible in livability performance measurement.

Built environment and infrastructure characteristics
While interviewees agreed that built environment and infrastructure characteristics are highly important to measure for livability purposes, they offered relatively few examples of how these features would influence the applicability of various measures. One interviewee noted that walkability and safety are affected by traffic speed and volume, which is a function of the built environment. Similarly, another suggested that transit service applicability may vary in different built environment contexts. Participants stated that in certain contexts, data related to sidewalks, land use, bicycle infrastructure, and traffic may be particularly important (although data availability may present obstacles to performance measurement). One interviewee suggested that while measures may be similar across varying built environment contexts, the *targets/thresholds* for these measures may be different.

Other
Interviewees identified several additional contextual factors that influence the applicability of measures. These recommended contextual elements include the following:

- Population size
- Demographic characteristics (e.g. concentration of older adults would indicate need for specific pedestrian and built environment elements)
- Political/administrative boundaries (e.g. county, city)
- Location within or outside of environmental justice areas (to address equity considerations)

As previously noted, the project team will address interviewee input on the role of context through the organizational structure/tiering of the searchable database.

Conclusions

The practitioner interview process provided a variety of insights into the state of the practice of livability performance measurement and the potential structure and characteristics of the searchable database.

The organizations interviewed for this process are currently pursuing a great deal of livability efforts, although attempts to formally define livability have been somewhat limited. Interviewees clearly understood and expressed how their work relates to livability, even when the concept is not formally recognized by their organization. Key topics addressed by the interviewed organizations' livability initiatives include land use, public health, equity, aesthetics, and the natural environment. The vast majority of interviewed organizations are currently collecting or beginning to collect performance measures specifically related to livability or similar terms/concepts. These measures will be reviewed and evaluated for potential incorporation into the searchable database for this project.

Most importantly, interviewees provided a wealth of recommendations for the structure and content of the database tool, including key searchable attributes, the format of search results, and other functionalities. Interviewees also suggested a variety of ways in which the influence and applicability of measures may vary based on density, geographic scale, data requirements, built environment characteristics, and other contextual factors. Interviewee recommendations will be incorporated into ongoing database development and project work—including the organizational structure and tiering of the searchable database—to ensure that final products are of maximum use and value to practitioners.

Interview Summary Appendix Materials: Interview Guide and Transcripts

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	
Organization(s)	
Interview Date and Time	
Interviewer	

Thank you for agreeing to participate in the interview process for the FHWA Livability Performance Measures project. As we mentioned in our email, FHWA is in the process of developing a resource for practitioners that will help to gauge the effects of livability improvements. The end products of this effort will be a handbook and a searchable database of indicators and performance measures, which will allow users to search for indicators and measures based on their unique context, needs, and livability goals.

We are now conducting interviews with the practitioners who will ultimately use the database and handbook to measure progress towards livability. The purposes of these interviews are…

- To identify indicators and measures currently being used in the field
- To determine how these indicators and measures are used in the decision-making process
- To identify contextual factors that affect the usefulness of indicators and measures in various settings
- And to obtain practitioner input on the design of the database so that it is most helpful to users

Do you have any questions before we move on?

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

First, we would like to find out how your organization defines and works with livability.

1. **How does your organization define livability?**
   [INSERT RESPONSE]

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   [INSERT RESPONSE]

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☐ **Yes** ☐ **No**

   [INSERT RESPONSE]

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☐ **No**

   [INSERT RESPONSE]

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   [INSERT RESPONSE]

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   [INSERT RESPONSE]

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☐ **Yes** ☐ **No**

   [If "yes," answer questions below; if "no," skip to Question 8]

   a. **Please describe these indicators or performance measures.**
      [INSERT RESPONSE]

   b. **Which aspect(s) of livability do these indicators or performance measures track?**
      [INSERT RESPONSE]

   c. **What are common sources of the data for the indicators and performance measures you track?**
      [INSERT RESPONSE]

   d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
      [INSERT RESPONSE]

   e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
      [INSERT RESPONSE]

   f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
      [INSERT RESPONSE]

   g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
      [INSERT RESPONSE]

   h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
      [INSERT RESPONSE]

   [If answer to Question 7 was "yes" and questions above were answered, skip to Question 9]

8. **If your organization does *not* currently collect livability indicators or performance measures:**

   a. **Has your organization collected or attempted to begin collecting indicators or performance measures in the past?**
      [INSERT RESPONSE]

   b. **What barriers or constraints has your organization experienced in tracking livability indicators or performance measures (e.g. data needs, resource requirements, lack of political support, etc.)?**
      [INSERT RESPONSE]

c. **What indicators or performance measures *could* your organization collect to track progress towards livability outcomes? How could these indicators or performance measures be used to make decisions about transportation infrastructure investments?**
[INSERT RESPONSE]

Section B: Searchable Database

Next, we'd like to have your input on the design of the database, including the search criteria that will help users identify indicators and measures that suit their unique needs.

For this question, imagine that you're sitting in front of your computer and about to use this tool to find a certain type of performance measure. Now, the database that we've started compiling already has more than 1,000 indicators and measures, and you're certainly not going to want to comb through all of these to get what you need for one specific purpose. So how can the database filter through all of those measures to help you find what you need? What should you be able to search by in order to find a list of 10 or 12 measures, rather than 1,000?

For instance, imagine that you've started a public health initiative in your community. You may be able to narrow your search by selecting "public health" as a livability topic area. Perhaps you're also working in a smaller municipality with fewer data resources and analysts than might be found in a large metropolitan area, so you might be able to filter out some of the more complex measures based on data intensity. Finally, you could select the scale of your initiative as being "community-wide," rather than at a specific project area or intersection. So in this case, when you come to this tool's user interface, you could select "public health" as a topic area, "moderate" for data requirements, and "community-wide" as your scale; click "submit"; and the database would give you a list of perhaps a dozen measures that fit your purposes—rather than looking through a list of 1,000.

These are just a few of the possibilities for search criteria—topic area, data requirements, and scale. We are interested in finding out what other criteria you think it would be useful to be able to search by.

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?**
[INSERT RESPONSE]

Section C: The Role of Context

Finally, we'd like to discuss the role of context in determining which indicators and measures are most useful and relevant. For instance, if you are trying to measure safety, you might need different measures in urban areas (perhaps related to bicycle collisions) than in rural areas (likely more focused on vehicle crashes). We would like to have your input on how appropriate measures may differ according to density, geographic scale, data requirements, built environment characteristics, and other factors.

10. **Can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    [INSERT RESPONSE]

    b. **Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.**
    [INSERT RESPONSE]

c. **Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.**
[INSERT RESPONSE]

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
[INSERT RESPONSE]

e. **Other? Please explain.**
[INSERT RESPONSE]

Closing and Next Steps

That's the end of the interview questions we've prepared. Do you have any additional input to offer on the project?

[IF YES, INSERT COMMENTS IN BOLD]

Thank you so much for your time and your input. We will be using the interview results to add to our list of indicators and measures and to design the handbook and database. As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☐ Yes ☐ No

Your feedback will be very helpful as we develop these important livability resources for practitioners. Please feel free to contact us at any time with questions or comments. Thank you for your time!

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Rob LeBeau
Organization(s)	Atlanta Regional Commission
Interview Date and Time	Friday, November 04, 2011 at 2 PM
Interviewer	Laura Rydland, Louis Berger

Interview Attendees
Rob LeBeau – Land Use
Jared Lombard – Land Use
Carolyn Rader – Aging Services and community Development
Mike Carnathan – Research

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   ARC does not have an official definition of livability.

   The Atlanta Regional Commission (ARC) just adopted a new plan regional plan – Plan 2040. The underlying principles are social, economic, and environmental sustainability and includes five (5) objectives:
   1) Increase mobility options for people and goods.
   2) Foster a healthy, educated, well-trained, safe and secure population.
   3) Promote places to live with easy access to jobs and services.
   4) Improve energy efficiency while preserving the region's environment.
   5) Identify innovative approaches to economic recovery and long-term prosperity.

   Livable Centers Initiative (LCI)
   Program goals include:
   1) Create communities with a mix of uses and choices (housing, employment, shopping, and recreation)
   2) Access to multi-modal transportation to improve access
   3) Through a process that involves a full public participation process

   Lifelong Communities Initiative (in coordination with LCI)
   Program goals include:
   1) Provide and expand housing and transportation options.
   2) Community designs to encourage active design/living and encourage healthy lifestyles).
   3) Expand information and access to services.

   ARC is the MPO for the region and also serves as the regional agency on Aging Services, Land Use, and Environment (water district), as well as workforce.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   Land Use and Transportation. Aging Services is also becoming a stronger component now as well (growing older population, health impacts).

   ARC does get involved with design and aesthetics but it is more of a subset of land use and transportation, and is less frequent compared to other work.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   Public Health
   Social and/or Regional Equity
   Trying to integrate more data – how public investments affect quality of life, health, education, life, etc.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   ARC has developed goals or standards for sustainability, which encompasses many of the attributes and characteristics of livability.

   ARC focuses on five (5) objectives for sustainability in their Plan 2040 including defined principles for each objective. According to Plan 2040, "the Objectives and Principles will become the official land use policy that guides programs, decisions and investments within the PLAN 2040 Implementation Strategy."

   ARC does not have performance measures at this point but will include in the future.

   ARC has applied for the HUD Sustainable Communities Regional Planning Grants. Their grant application is to implement Plan 2040 and includes performance measures.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**

   Livable Centers Initiative includes Small Area studies that link land use and transportation. The program has been running for 12 years and has funding for the next 6 years. The program "awards planning grants on a competitive basis to local governments and non-profit organizations to prepare plans for the enhancement of existing centers and corridors consistent with regional development policies."
   Aspects of livability addressed: Reduce VMT by promoting mixed use communities where people can walk, drive shorter distances, or use alternate means of transportation.

   Lifelong Communities Charrette (1500 people, 6 sites) – These charrettes helped to develop and implement the Lifelong Communities program on the ground. The Lifelong Communities program works to create places where individuals can life throughout their lifetime.
   Aspects of livability addressed: Health, helping people to remain independent in their community as long as possible.

   Human Services Transportation and Mobility Management
   Aspects of livability addressed: Bring (better) transportation to those who are disadvantaged.

   Transportation – Comprehensive Transportation Program. ARC provides funding to local transportation agencies to do comprehensive / integrated transportation plans. ("The Atlanta Regional Commission (ARC) initiated a funding assistance program in 2005 to encourage counties and their municipalities to develop joint long-range transportation plans. The final products will serve as input in developing ARC's future regional plans.")
   Aspects of livability addressed: regional transportation options and connectivity.

Green Communities program – This program is a voluntary certification program for jurisdictions within the 10-county Atlanta Region that recognizes local governments that are promoting sustainable programs and projects. The program also hopes to concurrently encourage other local governments to become more sustainable.
Aspects of livability addressed: Sustainability, reducing environmental impact, preserving natural resources, etc. (This program is run through Environmental Services.)

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
ARC's projects are implemented primarily based on incentives.

(ONLINE) "ARC established the LCI program in 1999 to encourage local jurisdictions to plan and implement strategies that link transportation improvements with land-use development decisions," particularly because "the Atlanta Region has no physical boundaries restricting its growth and development" and "over the last 40 years, Atlanta has grown into one of the least-dense metropolitan regions in the U.S." ARC Board approved funding for the Livable Centers Initiative below.

Livable Centers Initiative "is a program that awards planning grants on a competitive basis to local governments and nonprofit organizations to prepare plans for the enhancement of existing centers and corridors consistent with regional development policies." ARC then incentivizes the implementation of these plans by having transportation funding available if ARC start implementing those projects. Transportation funding is direct funding for up to 80% of the project. Therefore the LCI program is an incentive program, ARC do not mandate.

Lifelong Communities program was created through adopted policy by the board and regional commission.

- No direct money involved.
- Provide data to all the local governments. Providing best practices and technical assistance /support as well.
- ARC receives grant support from the Administration on Aging (national). These grants assist with pilot projects.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

From 2004, ARC has been annually tracking both public and private developments through a development inventory portion of a survey ARC ask recipients of LCI areas to submit. The inventory tracks number of residential units, hotel rooms, office and residential sq ft and the type, status, size, and location of all new developments constructed, under construction, or planned within the LCI areas. ARC then compares the amount of development that occurs within each LCI to the amount of development that occurs in the region as a whole (which ARC gather from other resources), to see the impact of the program over time. ARC has over 100 LCI communities in their database.

At one point ARC did do some modeling indicators – youth mixture in 10 of the LCI areas, how would population and employment change as you build out that LCI plan, etc.

   a. **Please describe these indicators or performance measures.**
      - See above.
      - Focused on 5 key indicators – Jobs-Housing Balance, Density, Internal Street Connectivity and Street Route Directness, "Use Mix" and "Use Balance", and Vehicle

Miles Traveled (VMT). The interviewees, however, also mentioned the following: resulting air emissions, density of the plan, population and employment change, proximity to transit, street route directness, park supply per person (acres), etc.

b. Which aspect(s) of livability do these indicators or performance measures track?

- Air quality among others
- Align with the goals of the LCI program – providing access to a variety of transportation options and creating a diversity of employment and housing options.

c. What are common sources of the data for the indicators and performance measures you track?

- A lot of info came from local government tax parcel data.
- Some info ARC created themselves – by looking at residential data (to see changes of development over time; tracking land use change at a gross level – vacant to development, office to residential; new housing units) and looking at aerial photography.
- Also asked local governments to fill out information themselves.
- Interviews with local governments.

Looked at existing and future land use and transportation systems.

d. What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?

- Time and resources to make it a priority, combined with a lot of other demands on their time. Interns help with a lot of the detailed data collection.
- Data consistency – 18 different counties – 18 different parcel and data sets. Very time consuming to understand what is going on in one community vs. another community.
- Build out scenarios – the time and performance between one community and another may not be equal. Build out from 2010 – 2030 vs. 2000 - 2030.
- Computing power. Doing micro level analysis gets very difficult at a small scale, so it is very difficult to show changes [at that small scale level] with the computer power ARC have. Therefore, ARC has to keep the analysis at a higher level because of the data and computer power.

e. How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?

- The indicators and performance measures do play a role in the decision-making criteria. ARC look at the impacts to VMT reduction, access to regional centers, environmental impacts, etc. – ARC all play a role.
- Every project gets evaluated through these screens that measure impacts (environmental, social equity, etc.).
- Making decisions about transportation infrastructure investments based on indicators and performance measures will probably get stronger at ARC as ARC develop these plans for Plan 2040.
- With the LCI program – ARC tracked indicators for 2 reasons: to make sure program is going in the right direction and to support continued funding from the program.
- Evaluating the projects by the indicators/performance measures helped determine whether projects made it to the final transportation list (of projects to be funded).

f. Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?

There are a variety of forecasts:

- INDEX – site specific program that gives you projections based on indicators that you enter
- LCI plans include transportation projects on the small / individual project scale
- Regional forecasting
    - Population and employment conditions
    - Evaluate: Congestion cost, VMT, hours of delay, accessibility, connectivity, air quality, emissions (out of travel demand model)
    - Scenarios based on population and employment projections
    - Different transportation systems scenarios (not project by project)

g. What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?

- ARC could improve the decision making process by including other indicators. ARC noted that certain locations are starting in different places than others.
- Socio-economic indicators could be included in the indicators and performance measures. Race, health, housing affordability, access to transportation (cars, etc.). Things that you may not think of as necessary are important to livability.
- Common basis to evaluate change.
- ARC has struggled with using indicators and performance measures in the decision-making process because ARC encompasses a very large and diverse region. For example, how indicators and performance measures should be weighted varies among the different areas in the region – very urban and very rural.
- ARC has found it difficult to develop indicators for an 18 county regions that really show change.

h. Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?

- Health Impacts is an emerging field. Indicators and performance measures could include measure areas such as: chronic disease of older adults due to lack of physical activity, low access to nutritional food, access to parks, etc. ARC is currently measuring some of these aspects and other emerging areas, for example, potential impacts for a community with a high percentage of low-vision citizens
- Socio-economic.
- Experimenting with Urban Form. (How development supports a livable, walkable place.)
- The region is also looking at birth outcomes. How the physical environment can affect maternal and child health.

8. N/A

Section B: Searchable Database

9. From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?

- Most popular indicators within each topic area.
- Also, the inverse. If you have a street data set - what indicators could ARC use based on the data that ARC have? If ARC had streets - what types of indicators could ARC do/study from a street database?

- Recommended looking at the Mineta Transportation Institute report on *Measuring the Performance of Livability Programs* by Lisa Fabish and Dr. Peter Haas.

Section C: The Role of Context

10. Can you identify any indicators or performance measures that would vary in their applicability depending on:

a. Density (rural, suburban, urban)? Please explain.
Yes

b. Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.
Yes

c. Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.
Yes

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.
Yes, but probably not as much as the others.

e. Other? Please explain.
- Demographic characteristics. For example, does an area have a higher concentration of older adults? If so, that could mean it would be beneficial to look at different street and pedestrian environments/requirements to make it livable for that age group.
- Political/administrative boundaries – county, city, etc.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Chris O'Neill
Organization(s)	Capital District Transportation Committee (Albany, NY)
Interview Date and Time	October 17, 2011, 10:30 AM
Interviewer	Laura Rydland, Louis Berger

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   For the last 15 years, the Capital District Transportation Committee (CDTC) has extensively developed and used the concept of "quality of life," which is very consistent with the federal partnership definition of livability (the CDTC does not have a formal definition of livability, but it has begun to use the term more in the last few years). The term quality of life entails protecting urban, suburban, and rural character and quality of life; urban reinvestment as an important quality of life principle; and bicycle access, pedestrian access, and transit access as measures which also strongly support livability.

   The CDTC also focuses on regional quality of life. CDTC defines a quality region with the following statement:
   A quality region considers health, the economy, and the environment within an overall framework of land use and transportation policies. Creating and sustaining a quality region in the Capital District is central to the direction of *The New Visions for a Quality Region Plan* which directs the region towards urban reinvestment, concentrated development patterns, and smart economic growth. The plan also calls for a strong livability agenda including land use planning, smart growth, urban investment, transportation choices, community values, and walkability and complete streets.

   The idea of quality of life has also been strongly supported by the public process and the community. This is clear by the fact that *The New Visions for a Quality Region Plan* reflects a regional consensus of residents, businesses, state and local government representatives and transportation providers to use transportation and public policy to promote a variety of livability principles.

   The CDTC considers these quality of life impacts at the project, community, corridor and regional levels.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   The CDTC works with all of the components of livability mentioned as examples in the question (aesthetics, land use, equity, and public health), but it focuses more heavily on the first three of those components.

   For equity – CDTC ties back into the concept of urban reinvestment. There has been a strong history of FHWA funding going to state highways outside of cities. Also, while in the past (the 1920s and the 1930s) cities have been known for their affluence compared to the suburbs or rural areas, this paradigm has shifted and many cities today are in distress. This makes it very difficult for cities to compete on a level playing field in terms of creating and maintaining viable places with a high quality of life. The CDTC and the communities CDTC represent believe that cities need to have equitable investment in them compared to other locations and that CDTC need to have equal access to available (state and federal) funding. As such, CDTC has policy that specifically focuses on reinvestment in cities and urban areas.

The element of aesthetics as it relates to livability extends not only to the design of the street, but also to the design of land use that is next to the street. Aesthetics becomes important also in the CDTC's work to encourage TOD and mixed-use development

In terms of land use, the organization tries to encourage investment in the already built areas. Through their public participation process CDTC have seen a lot of public support for that objective. (The CTDC also maintains that land use is very important to transportation planning.)

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   The CDTC wants to better incorporate the "quality of life" components (i.e. components of livability) CDTC have identified with the community into (1) local decision making and (2) project design. These two areas have been difficult to incorporate these principles into, as described below.
   1) Local Decision Making – Although elected officials have strongly endorsed the New Visions Plan, CDTC cannot control local land use or development, so CDTC make sure CDTC advocate for good land use planning. More progress is needed in educating local communities in this regard. CDTC have also created a grant program that provides funding for planning studies in return for the cities or towns agreeing to incorporate the New Visions principles into the studies.
   2) Highway project design – When highways get into the design process, the planning process is often ignored and congestion is seen as the trump performance measure. The CTDC's belief is that congestion is just one of the performance measures, and that there are others. But CDTC often views the other performance measures overlooked in place of congestion.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   CTDC's 31 Planning and Investment Principles have been adopted and strongly support livability (the principles are very comparable to the livability goals).

   In summary, the principles that say that land use, bike/pedestrian access, etc., are important in relation to transportation planning. More specifically, the New Visions principle visions follow four themes:
   [*text taken directly from the" New Visions for a Quality Region" plan*]
   -Preserve and manage the existing investment in the region's transportation system.
   -Develop the region's potential to grow into a uniquely attractive, vibrant and diverse metropolitan area.
   -Link transportation and land use planning to meet the Plan's goals for urban investment, concentrated development patterns and smart economic growth.
   -Plan and build for all modes of transportation including pedestrian, bicycle, public transit, cars and trucks.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   The Linkage Program strives to link transportation and land use planning through grants that it provides local communities (about $200,000 total per year, federal funds capped at $75,000 per study). The grants allow the CTDC and hired consultants to partner with local communities to do transportation and land use studies in communities and corridors at the local level. In order to receive the grant money, local communities are asked upfront to commit to incorporating the organizations regional goals and investment principles into the Linkage Study. While the local communities need to match 25% of the cost, the program is an incentive to make local plans align with the regional New Visions plan. This has been very a successful and popular program.

In terms of initiatives, the CTDC pushes for big ticket initiatives. CDTC have identified regional investment projects that CDTC think will support livability and put them on the table as ideas, but CDTC are currently unfunded. The CTDC also strives to achieve significant increases in investments in the cities to achieve equity with the rest of the state.

The New Visions plan also included scenario planning that assessed the impacts of four scenarios on the regional New Visions plan. The result of the analysis was the conclusion that policies should reflect smart growth principles.

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
These projects were empowered by the new CTDC New Visions Regional Transportation Plan and developed with strong public participation and support. The key message from these projects is that public participation is the best implementation tool. Public participation, Chris elaborated, meant meaningful structured public participation, including interaction with the material. In conducting public participation in this way, the CTDC found that over and over again the public supports livability once CDTC understand what it is and what CDTC mean by it.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

   a. **Please describe these indicators or performance measures.**
   CDTC use a wide variety of indicators and performance measures. (The "Tech Memo"** more clearly shows the various indicators that CDTC use. Indicators or performance measures include: poverty measures, quality of education in the cities, traffic counts, pedestrian counts, pedestrian access measures, transit measures, census population data, etc. CDTC doesn't necessarily monitor these indicators in a quantitative and/or regular basis, but is actively incorporate them into the public dialogue of the quality of life performance measures that CDTC use (and the public supports).

   **"Community Quality of life: Measurement, Trends, and Transportation Strategies" report, prepared by CCDTC Urban Issues Task Force and CDTC Staff, August 1995

   b. **Which aspect(s) of livability do these indicators or performance measures track?**
   The New Visions performance measures track: Access (Transit, Bike, Pedestrian), Accessibility (travel time), Congestion severity, Flexibity, Safety, Economic Cost, Pavement and Bridge Condition, and Quality of life (a qualitative measure based on public input; touches on areas such as poverty and quality of education).

   c. **What are common sources of the data for the indicators and performance measures you track?**
   CDTC use dozens of sources of data. The actual sources of data that are used are explained more in the "Tech Memo" that he will be sending me and I will pass on. Traffic counts, pedestrian counts, pedestrian access measures, transit measures, census for population data.

   d. **What challenges has your organization experienced in collecting and analyzing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
   Having enough staff time to collect and publish the data.

One thing CDTC do when CDTC go into doing a Linkage Study, CDTC get to go in and flesh out the Quality of life and other performance measures that CDTC use at the local level.

Originally, when CDTC first started in the 1990's, there were issues with the availability of data (as described in their Tech Memo) – a lot of quality of life data was either not collected at all or at a level of detail appropriate for their use. CDTC were also limited to existing data sources.

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
The CTDC has used the indicators or performance measures in developing the overall regional transportation plan. CDTC have also used these indicators or measures at the project selection level; CDTC have looked at how projects at the TIP level address a variety of indicators or measures and do not necessarily single projects out solely by different project categories.

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
Yes, at all scales - regional scenario planning level, project selection, alternatives analysis for project development, etc.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
CDTC can be used to create a better linkage between planning and design. All too often the CDTC performance measures are ignored in the design process, where congestion and the 85th percentile design speed tends to trump all other measures (such as those in the New Visions plan or Congestion Management process (CMP)).

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
The CTDC would love to have new indicators, and hopefully that will be one of the benefits of this study. But in terms of new indicators or measures, he could not think of any new ones at the moment. He did want to stress that qualitative measures should not be dismissed – CDTC have a high value.

8. **N/A**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
Any data that helps them quantify livability is most welcome. But one of the most important attributes for searching for indicators and measures would be qualitative / quality of life values, and its various subcomponents. The concept of qualitative, subjective measures should not be dismissed - CDTC almost have equal value as quantitative measures. (There are multiple aspects of quality of life that are important and that can be measured in a quantitative way, but CDTC really also need to be measured in a qualitative way as well. See examples at the end of this answer.) Additionally, quantitative measures that are considered standard and unobjectionable indicators, such as auto level of service, can ultimately be subjective measures. (Who is to say that waiting 58 seconds at a traffic light is LOS E? What about 65 seconds? Many people will in fact accept slightly lower levels of service if the overall experience (i.e. quality of life) is better.)

Also, public participation and input at the regional level and at the community/neighborhood level is critical to evaluating performance measures.

(Examples that were given: 1) A street is part of a community; it's not just a means to get through a community. In addition to the quantitative aspects of a street, the following more qualitative measures are also very important to creating the whole environment of the street: aesthetics, land use, pedestrian access impacts, etc. 2) Pedestrian access is another good example. Sometimes CDTC can measure that, but sometimes it is a qualitative measure. Despite the number of lanes of traffic that you have to cross (quantitative value), there is still a qualitative factor to it (it is not friendly for a person to cross 8 lanes of traffic).)

Section C: The Role of Context

10. Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:

Yes, he would be able to identify indicators or performance measures that would vary in their applicability depending on density, geographic scale, and data requirements. And while performance measures should be customized to their context, equity is a very important thing to look at when it comes to indicators and performance measures – including equity amongst the three density scales.

Context is also important, but it does raise policy issues. Rural transit is desirable, but it is also extremely expensive; we need to make sure we are not forgoing investing in urban transit to provide rural transit. In this example, equity means being careful and sensitive to look at the whole region and population.

a. Density (rural, suburban, urban)? Please explain.
Most measures should be customized to urban, suburban, and rural contexts. Each of these densities is different and has unique characteristics that need to be preserved. The CDTC has customized their measures based on different densities through their Linkages program, where CDTC have done transportation studies and used indicators or performance measures based on the density of that particular area.

Equity considerations among the different densities (or density scales) – urban, suburban, and rural – are important, as are equity considerations in different contexts as well.

b. Geographic scale? Please explain.
The CDTC seeks community plans that are consistent with regional vision but also customized to the local community/neighborhood context.

c. Data requirements? Please explain.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

Other Info:

- The interviewee said that the interview hit all of the points he wanted to cover. He also said he would send the notes he had made to the interview questions.
- The interview started at 10:45 and ended at 11:35.

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Charles Baker
Organization(s)	Chittenden County Regional Planning Commission
Interview Date and Time	October 27, 2011, 2:00PM
Interviewer	Matt Watterson, Center for Transportation and the Environment

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   We don't have any adopted indicators and measures. We're early in the process of doing that as a part of the HUD regional planning grant. As part of the goal statement, we decided not to spend too much time on the definition.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   N/A

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   We talk about economic health, environmental health, quality of life issues, and what our built environment looks like. Public health is more on our radar, but I can't say there's an emphasis. It's more that "everything's connected"; it's more of an ecosystem.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   The RPC is working to establish goals and standards but is not very far along in this process.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   We're getting our communities more onto the same page as we we're on pretty similar pages independently. We're having conversations now about our shared priorities. We can achieve better things working together than separately.

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   Technically, I initiated the project. It was originally proposed by staff, looked at by a lot of partner organizations and our board, so there was a collective decision to collect goals, indicators and actions.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☐ **Yes** ☐ **No**

   We hired the university to do that and collect them. Each chart is a potential indicator. We're refining our data and are in the process of development.

a. **Please describe these indicators or performance measures.**
They have not gotten to the point in development of having information ready to share. We'll have indicators on the public table by January.

b. **Which aspect(s) of livability do these indicators or performance measures track?**
Community health, economics, land use, transportation and housing, energy, natural resources.

c. **What are common sources of the data for the indicators and performance measures you track?**
It depends on the topic area. Data sources include:
- Labor
- Employers
- CalTrans (transportation data)
- SANDAG as the MPO
- Housing data comes from a variety of data sets
- Municipalities
- Department of Health (collected from health providers)
- Natural resources agencies

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
We'll always have challenges with the data. The quality and measure is different than what we'd really like. For water quality we'd use a particular species as a surrogate for water quality. We want to make sure the data we're using for indicators are things that we can use for more than one thing.

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
We use measures in our transportation investment priorities.

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
We're not planning to forecast indicators.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
We're trying to build annual measures of our indicators into our planning process so we can adjust our work program to better accomplish our goals. Usually the adjustment stages are left out.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
Not right now.

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
   I think topic is important, but I would probably start with geography first: municipality, city, and state. I'd like to know whether it is a region that covers multiple jurisdictions. Then I'd want by topic indicators (health, economic, transportation) and sub breakdowns (ex. Economic: workforce development, economy). I would also be interested in equity and diversity, but they might go in a separate category. For example, housing could be under diversity and health.

   Searching databases can be difficult, which is a resource issue. It's one thing to collect a database, it's another to categorize it. People use different terms, like economy might also mean income, and economic development. If you categorized it on the front end, it helps me understand how the database would be organized to get what I'm looking for. If I had geography and topic I could probably get close.

   Understanding the source of the indicator data would be helpful. Sometimes indices aren't helpful. For example, if you are normalizing multiple pieces of data to make an index, the index is not helpful. I would like to know how an index is produced, but would need to have the actual data in order to replicate data for my own use. Indicators are bundled to make it simple for public consumption, unless it's coming from the census bureau.

   The place I'm looking for at the moment is Inkley (sp?). They have a SAR community index. HUD (the sustainability partnership) is currently developing a capacity building tool where they're trying to assemble indicators or links to places. Each of us regionally has to also do indicators at our region and scale.

   The other thing I'd like to know is maybe the population of regions. For example, if a county has 10,000 people and my county has 150,000 people.

   Would you be interested in a feature that allowed you to see if and how the indicator in question had been used in similar communities?

   Yes. Areas with similar population densities or size would be a good benchmark for us. Maybe pick some bigger than you so they know what you're going through. I think it would better to know "where you're at" in the indicator process for each area. If I could screen between communities of 50-100,000, population density would give me a better fit because it better indicates suburban or urban mix. Regardless of size, I'd like to look at population density.

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
       Density helps being able to understand context, even if there was some way to link to the jurisdiction demographic--maybe its population density of the geography.

b. Geographic scale? Please explain.
We have a problem getting anything at the municipal level. The only way to produce local data is through permit data, so it's definitely an issue. There's health data published at the county level and health data is at geographic scale. Energy is also useful at the geographic scale. Some economic data is hard to get a hold of at the municipal scale.

More scale means better applicability. If you're talking about relevance, the natural resource indicators wouldn't be that applicable in urban areas. As for land use and transportation, different things are relevant depending on the area's density. These better illustrate policy issues rather than not being applicable.

c. Data requirements? Please explain.
I don't think we're far enough along in the process to respond to this question.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.
Again, I don't think we're far enough along to respond. I can produce a connectivity index.

e. Other? Please explain.
It would be good to have something that distinguishes the context of rural, suburban, and urban. We may be more rural than most MSAs, so I guess that's why I was using population density as a surrogate for rural, suburban, or urban. For what we do, we try to pick similarly sized counties and local jurisdictions.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Rob Balmes
Organization(s)	FHWA – National Scenic Byways
Interview Date and Time	Thursday, October 20, 2011 at 11 AM
Interviewer	Laura Rydland, Louis Berger

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   The National Scenic Byways (NSB) defines livability utilizing the FHWA Six Livability Principles.

   The NSB tries to focus on the livability factors that relate to scenic byway corridors. Livability in scenic byways is investing in a variety of factors that support the unique features of each community. In doing so, they focus on creating a positive visitor experience on a byway. NSB works to show travelers the best experience as possible – whether that is allowing and facilitating multiple types of transportation modes, safe intersections and crossings, links to trails and multi-use paths, providing connections to other activity centers along the byway (parks, visitor centers), etc.

   As an organization, they work to educate the public on livability principles that apply at all scales, including in rural areas. Livability applies to rural environments, as many livability features (sidewalks, transit) are directly linked in people's minds to urban areas.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   The NSB helps organizations preserve and protect the unique features that they have and focus on positive visitor experience. They encourage the organizations they work with to preserve, protect, and highlight the unique features that are found along that specific byway.

   Focus areas of the Scenic Byway programs include:
   - Natural (environment)
   - Scenic (environment)
   - Historic
   - Recreational
   - Cultural
   - Archeological

   The NSB program provides technical assistance to Scenic Byways organizations all over the country. Many of them are non-profit organizations, but the NSB also does a lot of consultation with state DOTs as well. With the relatively new focus of FHWA on livability, the NSB has been funneling a lot of information about livability from FHWA to state DOTs.

   The NSB is also, in general, just beginning to get people to think about the livability concept.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

"What exactly is the role of livability in rural communities?" The concept of livability in rural communities needs to be focused on a little bit more because there is a lack of understanding of what that means.

The NSB would like to provide some good examples of how to incorporate livability in rural areas or small communities. These examples of livability in rural areas would illustrate that livability as envisioned by NSB means providing ways for visitors and residents to enjoy and experience the positive and unique features of a community, whether that is historic resources, the natural environment, or recreational opportunities. These resources can be supported by investments in features that promote livability, such as sidewalks, traffic calming, accessibility, streetscaping, or economic attraction/vitality. Some communities believe that just because there is a small population, they don't need to provide those extra livability features; but there is usually more that they can do to create a vibrant livable community.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☒ **No**

   The NSB office does not have specific standards themselves, but rather they follow the goals and standards of livability that FHWA has established.

   The NSB grant program, though, has recently changed its administration criteria for National Scenic Byways grants (for the last 2 rounds of grants). The new criteria gives priority to projects that can demonstrate a value added livability component in addition to the value added component they will provide to the byway and the byway traveler.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   The main way the NSB program works in the US is through National Scenic Byway grants (in addition to technical assistance). Most of the grants that are given out today relate to livability, especially as the administration criteria has been changed to give priority to grant projects that include a demonstrated focus on livability (see #4).

   The NSB program is a discretionary program that is administered by FHWA that has been in existence since 1992. It is a National program and they administer $40 million a year in grant programs.

   In addition to providing grants, the National Scenic Byway program also designates roads as National Scenic Byways through their nomination process, which happens every 3-5 years. Being designated a NSB relates to livability in the areas of economic vitality and identity of place.

   <u>Some example grants from FY 2011…related to Livability</u>
   - Illinois River Road (IL): CMP Revision to Include Livability and Greatest Strategic Benefit Criteria $78,520
   - Maryland Baltimore's Historic Charles Street (MD): Context-Sensitive Design and Management Guidelines $75,000
   - Massachusetts Connecticut River Byway: Design and Planning for Trails, Access, and Interpretation $162,690
   - Michigan Sleeping Bear Heritage Trail $328,000
   - Michigan Iron County Heritage Trail (MI): Non-Motorized Pathway - Phase 1 $995,600
   - Minnesota North Shore Scenic Drive (MN): ADA Planning $50,000
   - Missouri Cliff Drive Scenic Byway - Overlooks, Trails, and Bike Routes $641,990

- New York Olympic Byway (NY): Lake Placid Multimodal Path $1,208,708
- New York Route 20 Scenic Byway (NY): Enhancing Byway Traveler Access and Safety at Brookwood Point $188,175
- Pennsylvania Journey through Hallowed Ground Byway, PA: Seminary Ridge Trail $960,000
- Washington San Juan Islands (WA): Scenic Byway Shuttle Pilot Project $171,680
- Wyoming Wyoming Centennial Scenic Byway: Jackson Livability Enhancements to Improve Safety and Mobility $1,253,575

http://www.bywaysonline.org/news/2011/3215 - link to grants awarded in August 2011 for FY 2011
http://www.bywaysonline.org/news/2011/2965 -link to grants awarded in April 2011 for FY 2010

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
The NSB program and grants were initiated under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 (grants were first distributed in 1992) and reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation, through the Federal High Administration (FHWA), recognizes certain roads as National Scenic Byways or All-American Roads. The program and projects stem from the organizational policy of FHWA that focuses and advocates for livability.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

The NSB program has an economic impact tool that was developed and then published in 2010. It is an excel based user interface tool that focuses on tracking 4 or 5 key areas – visitor profiles, visitor spending, visitor counts, investments in infrastructure and projects, property value appreciation. (The tool is a pretty straightforward input output kind of a tool.) The tool was developed based on the direction of FHWA to allow them to see results of the improvements and funding that they've put forward.

Also, five (5) National Case Studies are starting soon and each of these will have a very detailed economic study done of the byway corridor. The NSB hopes that these, in addition to the economic impact tool mentioned above, will help shed light on the impact of the grants and new facilities / new investments that communities invest in (information kiosks or signage, multi-use trails, etc.), including the economic impact of those investments.

   a. **Please describe these indicators or performance measures.**
   Measures the economic impact of any investments or grants to a scenic byway corridor. → Six types of economic activity are looked at with the analysis tool including: 1) Visitor Profiles; 2) Visitor Spending; 3) Visitor Counts; 4) Investments (Public & Private); 5) Property Value Appreciation; and 6) Employment.

   b. **Which aspect(s) of livability do these indicators or performance measures track?**
   Economic impact (of visitor spending and investment to byway)

   c. **What are common sources of the data for the indicators and performance measures you track?**
   There are a variety of sources, but they include:
      - US Bureau of Economic Analysis → RIMS data (employment, tax revenue earnings)
      - Visitor Chamber, Chamber of Commerce, Universities, or other organization → Visitor spending, number of people going to visitor's center, visitor profiles.
      - See also Appendix A of BywaysTechnicalManualFINAL.pdf

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
The NSB is currently having a contractor do a separate sensitivity analysis at the moment to look at how the economic tool can be made more user friendly to the public and how to get people to understand how to operate it.

Challenges:

- Getting that RIMS data is an issue because it costs a few hundred dollars.
- Getting all the information.
- The average person can't always just use tool – training and webinars aren't always enough.

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
At the moment the economic tool is more about just showing the information. But ultimately they want the tool to become very valuable and to demonstrate to constituents the value of scenic byways. The NSB would like to show people the results of investing in scenic byways to encourage them to invest further and see the value of doing so.

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
None noted.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
Tangible results will be really important for decision-makers along the byway. Therefore, utilizing the tool and the results to make the case for why more investment needs to take place and why businesses need to be involved (to get more visitors to their communities) could really have a big impact in certain decision-making processes.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
Some case studies could be done along byways that have had safety enhancements implemented

In trying to stress safety – particular pedestrian and bicycle safety – an organization could measure the before and after crash and accident information.

While it is hard to measure users of multi-use trails, a sample could be taken.

Performance of visitors centers – counts, mode of transportation, shuttle volume if any.

8. **If your organization does *not* currently collect livability indicators or performance measures:**

a. **Has your organization collected or attempted to begin collecting indicators or performance measures in the past?**
The NSM does not collect any data themselves, but they do guide others in how to collect the data that they need and how to do the analysis.

b. **What barriers or constraints has your organization experienced in tracking livability indicators or performance measures (e.g. data needs, resource requirements, lack of political support, etc.)?**

Lack of resources.

People have questioned the economic tool and there is likely a misunderstanding on the creation and rational of the tool.

c. **What indicators or performance measures *could* your organization collect to track progress towards livability outcomes? How could these indicators or performance measures be used to make decisions about transportation infrastructure investments?**
    - Could do things on a case by case basis. (There is no really realistic way, at the moment, for the organization to collect data on all 150 NSB in the US that cover thousands of miles.)
    - Already doing economics
    - Could do: safety, accessibility, infrastructure

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
Include modes of transportation such as bicycling, for example.

The type of data required for each performance measure. Case studies or data sources would be helpful.

In the past, organizations have not ventured to use certain performance measures or measure s of effectiveness because they do not have the experience or staffing to find or analyze the data. But if they see other good examples (case studies) or could contact places that have done these types of studies before, that would help them.

Breakdown by each type of agency organization by city, county, MPO, DOT, etc. For example, someone is working for an MPO, they can go to the MPO area and see what other MPOs have done.

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    It would be useful to differentiate between rural and urban – having different indicators or performance measures for each environment as well as different livability solutions. (For example, transit in urban environments could include light rail, pedestrian, metro, biking, buses, etc. But transit in rural environments could include coach buses along scenic byways or pedestrian improvements.)

    b. **Geographic scale? Please explain.**
    None indicated.

    c. **Data requirements? Please explain.**
    None indicated.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.
None indicated.

e. Other? Please explain.
None indicated.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Ron Achelpohl
Organization(s)	Mid-America Regional Council (MARC)
Interview Date and Time	October 20th, 2011, 11:00
Interviewer	Ted Mansfield, Center for Transportation and the Environment

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   MARC has no formal definition; however, two ongoing projects will help define livability for the organization. The first ongoing project is the HUD Sustainable Communities Initiative grant. MARC has been working on this project for 6 months. A focus of this project is creating integrated corridor plans; the creation of these plans has informed a working definition of livability based upon the 6 livability principles defined by the EPA-HUD-DOT partnership. These 6 principles have not been adopted by MARC formally.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   - Transportation choice (emphasis on providing multi-modal options).
   - Land use and development policy – the LRTP has used policy based land use and employment forecasting and scenario planning.
   - Aesthetics and the quality of the built environment have been a focus in the past.
   - Public health related to transportation – a primary focus has been placed on transportation safety (multi-modal safety, including public transportation).
   - Equity and transportation investment (i.e., providing transportation options) in environmental justice areas. Equity has been a key component of many HUD projects.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   Freight transportation and livability is missing from the conversation. Freight is very important to the local economy, yet much of the current thinking regarding freight is simply framed in avoidance – not a reasonable strategy when freight transportation is such a large economic driver.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   MARC does have established goals that relate to livability; however, there are not called out as livability goals specifically. The goals of the LRTP focus on accessibility, economic vitality, climate change/energy use, environment, public health, place making, safety and security, system condition, and system performance.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   In the late 1990s an initiative called Creating Quality Places defined desirable characteristics of the built environment and provided principles for mixed-use, walkable development, quality of construction, etc. Creating Quality Places was truly a foundational effort for livability initiatives at MARC.

In June 2010, the newest iteration of the LRTP (Transportation Outlook 2040) incorporated performance measures into metropolitan plan. There was an emphasis on more sustainable growth (infill, population density, corridors) in the plan and in the performance measures; thus, some of the plans metrics are related to livability.

The Creating Sustainable Places project is being funded through a HUD Sustainable Communities Grant and integrates housing, land use, and transportation plans for 6 corridors and related activity centers. The project contains individual implementation plans for pilot projects. The project also has 60 partners including 4 main equity partners and local universities. While not specifically framed as such, the project has developed and adopted principles related to sustainability and livability.

The Creating Livable Places project is being funded through an FHWA research grant. The project will identify impediments to addressing the 6 livability principles of the partnership in the metropolitan planning process and ways the process may be modified to better address the 6 livability principles.

Smart Moves is a transit planning project that focuses on transit oriented development, creating walkable scale development, and using transit as a development plan.

The Metro Green plan is a regional trails/greenway plan. The plan is also coupled with environmental remediation and water quality protection elements.

The Clean Air Action Plan focuses on transportation choice and VMT reduction and has a clear parallel with livability (not only providing modal options, but also improving air quality and public health).

The Metro Outlook project is a larger MARC initiative that tracks a whole host of regional indicators outside of the transportation world (social indicators, economic indicators, etc.)

All of the above documents may be accessed at the following web address:
http://www.marc.org/sustainableplaces/component_plans.htm

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
Via three main categories:
   a. Requested by local governments (Metro Green, Quality Places, etc.)
   b. Window of opportunity via grant program (Sustainable Places, Livable Places)
   c. Mandate (LRTP updates, Clean Air Action Plan [EPA])

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

   a. **Please describe these indicators or performance measures.**
   MARC has many performance measures related to livability; however they are not called out as livability performance measures.

   The latest update of the LRTP (Transportation Outlook 2040) incorporated a series of performance measures including transit LOS, equity, affordability, VMT, obesity rate, ozone, multi-modal split, population within 1-mile of fixed route transit, etc. (see table below for a full list of measures)

GOAL	FACTOR	MEASURE
Accessibility	Level of Transit Service	• Population within mile of fixed-route transit service • Ridership • Revenue service hours
	Environmental Justice	• Transportation investment in environmental justice tracts
Economic Vitality	Transportation Costs	• Affordability
Climate Change/ Energy Use	Vehicle Miles Traveled	• System-wide daily vehicle miles traveled
	Vehicle Occupancy	• Vehicle occupancy rate
	Carbon Dioxide	• System-wide carbon dioxide emissions
Environment	MetroGreen Network	• Miles of MetroGreen trails and greenways network
Place Making	Multimodal Options	• Balance between modes of transportation
Public Health	Ozone Pollution	• Ground-level ozone • Ozone pollution violations
	Physical Health	• Obesity rate
Safety and Security	Crash Fatality and Disabling Injuries	• Roadway crash fatalities • Roadway disabling injuries
System Condition	Bridge and Pavement Condition	• Roadway pavement condition • Bridge condition
System Performance	Level of Service	• Travel speeds
	Congestion	• Network congestion • Incident clearance time
	Travel Time	• Regional travel time • Average commute time • Travel delay

b. Which aspect(s) of livability do these indicators or performance measures track?
The primary focuses of the transportation indicators used by MARC are transportation choice, quality of the built environment, and economic competitiveness. MARC as a whole also tracks social indicators and economic indicators such as innovation.

c. What are common sources of the data for the indicators and performance measures you track?
Primary response: It depends on the measure.
The baseline process is to try to find data sources that MARC doesn't have to generate (cost, effort, etc. make primary data creation too costly for MARC).
Example(s):

- Crash statistics come from the state DOT
- Transit performance statistics come from transit agencies
- Travel patterns, demand, congestion, etc. come from the regional model
- Air quality monitoring comes from the EPA/state environmental department
- The obesity rate is used to track health in the region

d. What challenges has your organization experienced in collecting and analyzing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?
Looking for existing sources of data – much of the data available are not direct indicators (example: obesity rate is used to track health, but many factors lead to obesity outcomes) Therefore, a significant amount of time is devoted to finding and developing relevant outcome measures from output measures (causally is the issue here – once again obesity is a good example).

For some things MARC wants to track, the data is just not collected and to do so is beyond the capacity of the organization.

Some data that has been available in the past has become less available now due to privacy issues (examples: information on licensed drivers and health data).

Data processing and analysis may be labor intensive. For example, some crash data needs to be geocoded in house (very labor intensive), although the DOT is starting to produce better data with a higher percentage of crash data already geocoded.

Significant issues: there are no national standards on how to measure livability, therefore each organization must invent their own techniques to measure livability. This makes measuring livability difficult and risky (that is, significant resources may be devoted to produce fairly meaningless livability measures). There needs to be a standardized method for gauging livability.

Standardization in data collection is also very important (especially for regional councils). The same data collected at the local level may be presented to MARC in different formats, etc. which makes reconciliation into a usable regional dataset very difficult.

e. How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?

In the LRTP, performance measures have been used to evaluate projects and prioritize projects for funding (**project prioritization**; designed evaluation criteria for projects related to goals and objectives of the plan, evaluation criteria fed by relevant performance data or proxies when data not relevant).

> Example of a proxy: obesity rate at a regional level not useful on project level, needed to develop a proxy at an appropriate geographic scale (but related by a common goal).

Next level up in the decision making process – given a finite pot of funds, how should we carve up funding and prioritize modes? This relates back to goals and objectives of the plan.

f. Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?

Scenario planning is not performed in terms of mixes of projects; however, MARC did develop alternative land use and development patterns and used indicators (transit ridership, traffic, VMT, etc.) to evaluate alternatives (land use scenario planning – policy based land use forecast).

g. What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?

MARC could probably do so, but I don't have specific recommendations. MARC has taken a good first step and hopes to refine this in the future. National leadership, specifically in terms of standardization of methods, is very important.

MARC is currently assessing how implementation of the LRTP plan (i.e., project programming) addresses the goals and objectives of the organization and whether or not performance measures are effectively filtering projects based on the goals and objectives of the plan (plan implementation feedback loop).

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
More data relevant to walkability and active transportation is needed (even sidewalk data is lacking or presented inconsistently amongst local governments).

Real-time travel data technology should filter down to lower functionally classified streets in the network and will create a lot of new, useful data in the future.

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
I like the example categories given above (livability goal, data intensity, geographic scale).

Cross-referenced data for different searches (i.e., mix and match searching) is very important.

Organization by livability goal is most important – and should be the primary way in which the database is organized.

Whether or not an accepted analytic technique exists is also important (i.e., rubric for what you do with raw data – back to the need for standardization of methodology – accessibility is a good example here. There are hundreds of potential ways to measure accessibility; standardization allows everyone to create oranges instead of some agencies producing oranges, some producing apples, some producing pomegranates, and some producing I-Phones).

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    Walkability is more applicable in urban areas, but it is probably easier to measure in rural settings.

    A lot of transportation metrics will vary greatly depending on density – targets may be different for different areas as well.

    Congestion management – a rigorous definition of congestion would vary based on density.

    b. **Geographic scale? Please explain.**
    As previously mentioned, obesity rates are relevant regionally but not on a project scale
    Air quality data is only available regionally (and depends on location of monitoring stations – at the very least, the data are very lumpy) yet is very relevant at local scales.

    Equity (FTA guidance on environmental justice) – does an EJ area have the same access to employment as non EJ areas? Need a different scale of analysis within EJ areas than outside EJ areas.

c. **Data requirements? Please explain.**
This question is a little difficult for a regional council of governments to address. There is simply not much regional data (either MARC has collected it or manufactured it by aggregating local data) so all data presents significant challenges.

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
The data and measures may be similar; however, targets may be different.

Closing and Next Steps

Other information:
I am very interested in the guidance and training FHWA provides to their own field staff for implementation of the guidebook (the research idea is really good in principle, but has the potential to create a lot of conflict and confusion in implementation).

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Lynne Bly with Deanna Belden and Cindy Carlsson
Organization(s)	Minnesota DOT (MnDOT)
Interview Date and Time	October 19, 12:00
Interviewer	Matt Watterson, Center for Transportation and Environment (CTE)

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   It is a work in progress. My take on this is that MnDOT has not specifically defined livability beyond where the federal DOT is moving. What we have done is take livability and built it into our sustainability and quality of life issues, and how that indicates livability. We don't really have a definition outside of the federal definition. The context is different. Customer Relations have done market research for MnDOT, so there's a long history of tracking how the public perceives the transportation system. Over the last year we've done 45 different focus groups on how the public views transportation. People see transportation as being very important in connecting them with things important to them. They've done surveys of about 3500 people in total.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   Traditionally, MnDot has had a major focus on Context Sensitive Solutions (CSS) based on the aesthetics of an area. Public health, land use, access management, density related issues—it goes back and forth. Multimodal transit is also a major focus, as well as safe routes to school, bike and pedestrian issues.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**
   Safety, multimodal options

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**
   No, not in the sense you're looking for. We're approaching the conclusion that it's best to work towards a 50 year vision towards quality of life. We're starting the exercise of translating that into practice, especially with how we fund highways and other infrastructure.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   50 Year Plan (with multimodal focus) - http://www.citizing.org/projects/minnesotago
   Towards Zero Deaths - http://www.minnesotatzd.org/

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   Policy plans/desired by the community

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☒ **Yes** ☐ **No**

We are collecting indicators and they are in our annual performance report: pedestrian access, biking, transit share of commuters, air quality, fuel consumption, etc.
http://www.dot.state.mn.us/measures/index.html

Some of the things most relevant to livability will probably be developed in conjunction with Deonna and Carla—that will measure very different things than we measure now. The last team meeting was in late August. The direction we're going will lead to different types of measures, but we don't have a lot of information. There's typical multimodal traffic and infrastructure condition issues that we want to look at. Also, if goals indicate we should develop measures, we will do so. Right now, most measures are not focused on livability. We want to be able to track things that we are able to affect the outcome of. I would think we're going to have some effect on livability, but it's often more indirect—for example through pavement investment in sidewalks.

In past planning we've looked on a grand scale based on pavement conditions, bridges, and other infrastructure, but it's never been pulled together from the public's perspective. We have had opportunities to work very closely with communities. St. Peter, MN would be a real hallmark project for us.

There was a desire for multimodal options, so people who do Highway Investment Planning starting with priority corridors to show what investments have been made in last ten years, asking: Where do we have roadway segments that will have a significant pavement issue? Where do we have a bridge programmed to be replaced? The baseline information is going to form a framework for discussion across the corridor to see whether the communities have issues (utilities, repairs, replace, development going on, some other opportunity as the project traverses) so the project can be completed in a way that better addresses everyone's needs. This new orientation and focus on community desires is starting in the next round of highway improvements.

a. **Please describe these indicators or performance measures.**
   Indicators include things like highway deaths, housing availability, housing cost, schools, and transportation issues related to things like congestion and driving times.

b. **Which aspect(s) of livability do these indicators or performance measures track?**
   Affordability.

c. **What are common sources of the data for the indicators and performance measures you track?**
   A lot of it is gathered from surveys. Some of it is crash data or taken from Federal sources. Some data on waiting times we've gathered ourselves.

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
   I think that communities are generally quite interested in the concepts incorporated under livability. Our challenge is money. Our challenge in smaller areas is their long range planning and projects are driven by traffic demand models, which is a single lens of what is required. We were actually behind a peer review for traffic demand modeling for declining communities, regarding whether they need to do modeling or whether there are other forecasting ways. We haven't agreed on a definition of livability, so how can we track data? It's not a barrier constraint. I just wonder about the processes we have in progress that are changing.

   It's not clear to me that there should be an indicator, as long as there is a good process. We do a survey every 2 years where we ask the public and get feedback. We've used that tool in a

number of ways to gauge the progress. We have a zero death policy for safety patrol, education and enforcement. Folks began to look at the accident data differently. As folks looked at where incidents occurred, it became not so much the suburban, urban location as the rural run off the road. Now we have plans based on historically dangerous areas. Is it really an enforcement, education problem, or engineering solution? In most cases an engineering fix hasn't been the best option. We have had rumble strips and reflective lights in basically every new road we build though. But the low accident rate is because we're just one slice in the picture.

http://www.minnesotatzd.org/
http://www.citizing.org/projects/minnesotago

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
They are used to gauge progress, not to forecast anything.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**

8. **N/A**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
Geographic issues are one thing in particular I'd like to see addressed, because I spent my time on a state wide scale, and small-scale indicators wouldn't be useful for some of the things I work on.

Attributes and other information about the data itself would be great so we have some sort of indicators to know how relevant the data is. For example, census data can be out of date. It would be good to know recommended factors, and information on data reliability (quality and how long you can rely on the data). I think you can go so far as to say Minnesota is downright allergic to composites. We heard this in Austin and it was just a horror.

Always start with existing data and build off what is already collected instead of finding new data.

I think the other thing to talk about is the utility of some ephemeral information. What strikes me is there's data like Walkscore (walkscore.com) that are better than anything we collect. There are other resources like the Housing and Transportation index that are really simple and tell you what you want to know without needing a lot of additional information and without a lot of cost. So the tool, or maybe at least certain components of it, doesn't have to be incredibly complicated or data-centered to be useful. That would change depending on what's being measured, obviously.

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    One of the things MnDot is grappling with is a definition used by Complete Streets, which is "It doesn't mean all modes on all roads, but equal consideration." One project got hung up because it mattered what the geography was and where it was relevant (Twin Cities or the whole state). One of the topics I'm dealing with is I feel people often disregard the security planning factor. I feel that's much more about our ability to rely on availability of the system under very challenging circumstances. For example, there are threat models, whether it be terrorism or HAZMAT spill. But can they deliver the right solution at the right time?

    b. **Geographic scale? Please explain.**
    I guess they all change. Expectations change based on everything, maybe everything changes. Then again, everything is going to be very different. And the scale is different from urban to rural.

    c. **Data requirements? Please explain.**
    There's an issue we've seen where we want to use data, but we have to be able to trust it. If you don't know how old data is or how readily it can be collected, it's not really that useful.

    d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
    It is almost a policy, but it turns towards meanings and whether we need to change our definition standards. However, the definition of complete streets is geared towards freight, pedestrian and bike issues, not just traveling along a corridor. It has to do with being able to traverse the corridor with whatever modes you happen to be using. That seems to be relevant to things because it varies.

    e. **Other? Please explain.**
    There are sometimes really challenging circumstances well beyond the design storm. We had bad floods three years ago, major road/bridge washouts. That's a level of thinking where we're doing planning work, but we may not change what we built or operate, but what if it gets worse? We can look at the question contextually. If we had to evacuate an area, do we have the network to do it? Are there alternate ways of delivering critical services? I think it's a piece of our planning we take for granted and the infrastructure needs to reflect that.

Closing and Next Steps

Other information:
I'd like to see how you address the data availability issue.

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Dr. Imad Aleithawe
Organization(s)	Mississippi Department of Transportation
Interview Date and Time	November 17, 2011, 10:00AM
Interviewer	Matt Watterson, Center for Transportation and the Environment (CTE)

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

Initial comments:
We don't have any procedures outlined related to livability, but we do have some information we're gathering now. We haven't yet considered how livability and performance measures will be used in the decision-making process.

1. **How does your organization define livability?**
   This is a rural state and livability would really be "wherever I want to live I'm going to do that" and there's not a whole lot of variation, but as far as policy goes we don't have a definition of livability.

   My definition would be a livable community where they have multiple transportation options and destinations. It isn't a one size fits all concept—it means different things to different agencies. The roles of urban and rural communities in defining livability and what livability principles are relevant are different. It's based on context. We tried two years ago to define livability. The initiative got shot down because somebody stepped in and said it wasn't worth spending time on. That is a part of the political culture here.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   From the environmental standpoint, we have to consider health, what with "going green." There's an Action Plan from Jackson Mississippi that worked with sustainability.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   After Hurricane Katrina, I think it would be good to think about just defining livability. I would like to see land use included as a major component, but land use is a hard, contentious thing to look into because of the political climate. Health issues would also be something I'm interested in and would like to see. Being "green" would be a good thing to focus on if it can be rolled into make Mississippi healthier by biking more, and provide more trails for pedestrian and biking activity.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☒ **No**

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   None noted.

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   N/A

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☐ **Yes** ☒ **No**

   Interviewer note: They are in the middle of the process, but haven't collected any indicators so I asked the questions from number 8 instead.

8. **If your organization does *not* currently collect livability indicators or performance measures:**
   We're working on sustainable policy as part of the action plan we're developing—the Commission Path Policy (not published, only as a concept). You need to have some sort of goals and objectives with this. But everything is related to the federal plan here in Jackson.

   We're in the early stages of performance measures and livability measures. With safety, I'd like to reduce fatalities, since in Mississippi we have had very high fatality numbers. I've been receiving indicators from others, for example: how to meet and exceed all environmental laws, incorporate environmental protection, and enhance communication with stakeholders.

   I would consider those goals, but different places define these things in different ways.

   We provide a lot of education to stakeholders and their work in transportation activities in the community.

   For example, there are a lot of issues on level of service. One of the maintenance issues where we'd like to an indicator related to how many cracks on the pavement, how long, what type are they, etc—basically the level of service per lane miles: the smoothness, ride quality, whether the ditch and drainage is effective or not effective, dips in the road, potholes and how deep. Maintenance and sustainability is important because to determine which highways should be repaired this year versus future years. Maintenance is very important to determine where to put the money or where to put the project with the bridges.

   So do you think cost would be good to include, going back to the database?

   Absolutely, because the mantra now is "do more with less," so you're always looking for savings. Cost benefit will be involved with everything, so is a project feasible and worth the money? For example, the slow process of impact of condemnation on properties and its effects on the construction phase costs money. When you have condemnation, it slows the down the process.

   a. **Has your organization collected or attempted to begin collecting indicators or performance measures in the past?**
      It was tried, but it was shot down with the attempt to define livability.

   b. **What barriers or constraints has your organization experienced in tracking livability indicators or performance measures (e.g. data needs, resource requirements, lack of political support, etc.)?**
      Probably the only barrier would be the political culture.

   c. **What indicators or performance measures *could* your organization collect to track progress towards livability outcomes? How could these indicators or performance measures be used to make decisions about transportation infrastructure investments?**

Accessibility: If you're in a community, how accessible are amenities and what multimodal options are available? Environmental indicators like clean air would be things I'd want to look at. We also need to think about statistics on recycling and ways to encourage it.

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?**
Given that we don't have anything yet, it will be very helpful to have a centralized database so I can tap in and get what I want. The main thing is to synthesize the definitions, because maybe my livability definition is different.

A comparison of different state's goals and objectives related to livability would be helpful. Maybe what Geographic area information would also help: rural, urban, suburban. It would also be helpful to search by each indicator yourself.

I think a keyword (not case sensitive) would be better than a dropdown menu. This way I can type what comes to mind.

Would you come to this database with indicators already in mind?
Yes, I would have an idea but I don't know how to instigate it. I would have a keyword in mind and see what I can search according to this keyword. That's why I would like to see other communities, similar indicators, and see how things are done.

What about data? Would you want it to provide you with data or do you picture yourself already having data available?
I would probably have my own data, I just wouldn't know how to use it. I'm going into this with data in mind or have an idea of what data I will have access to or can get easily. It would also be good if the database provided additional data sources.

Would you like to use data as a search parameter, like it kicks back indicators with the data you have? So say you had census data and you plugged that into the database, and it gives you indicators that rely on census data?
Yes definitively, that would be useful.

Would you like more or less indicators to be kicked back to you? I've had some interviewees say they want fewer indicators so they aren't overwhelmed with things that aren't useful and some that want lots of choices.
More options. I want to examine more without being just limited to one thing. I could be presented with a solution that I hadn't thought of before by getting lots of indicators and other information back.

Would you want to use this tool within the DOT or as way to present data to political figures or the public?
Both. I would want to tell upper management, "This is what we want and why we should do it." I also want to be able to go the Legislature with information from the database--again the political climate here is different--with graphs and figures and say this is what we have. I would also like links to reports or studies, anything like that, because then even if it has limited information, I'd like it to point me to somewhere that has more.

So it would be tiered?

Yes. I like to have more options, and there's always something better out there. As an example, I would like the search term "Land Use" to give me action plans, indicators, anything related to that phrase, not just indicators. Data requirements would also help.

Section C: The Role of Context

10. Can you identify any indicators or performance measures that would vary in their applicability depending on:

a. Density (rural, suburban, urban)? Please explain.
It would definitely change because in rural areas you wouldn't have much traffic compared to the city. We don't have pedestrian crashes because we're a rural state, but most accidents are car accidents, although rail crossings are one of the bigger problems we have. So to put a measurement towards rail accidents we'd be interested as far as safety. So we don't' have pedestrians a lot, when I go to big cities in other states its completely different though, so I imagine pedestrian based indicators would be a bigger deal there.

b. Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.
Indicators based on things like utilities would vary geographically since each geographical area has different utility programs. It would also help to see what I could find from other states on sustainability and pavement management. Pavement management is treated differently in the north and south (heat vs. cold) Maybe there are more states that are the same.

Like unlucky states like Virginia that have to deal with both extremes.

Exactly. But states to the extreme north of the country would have different maintenance priorities I imagine.

c. Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.
I'd want reliable data, but simple and user friendly would be good. I wouldn't want complex data that can't be understood. I'd want to be able to understand it easily. Something that an average Joe could use, but is also reliable. Our traffic data isn't reliable because it's not just DOT data, it's also county data. You can't do measurements based on that, unless you do a lot of clean up.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.
It depends on what kind of information you want. The owners sometimes disagree with the policy and don't want to sell. He may have his own reasons, so you'd have to negotiate and that slows the process down. It would be beneficial to know what other states are doing in that area now.

e. Other? Please explain.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Julie Hunkins, PE and Harrison Marshall, PE
Organization(s)	North Carolina Department of Transportation
Interview Date and Time	October 21, 2011, 11:00 AM
Interviewer	Lindsay Maurer, Planning Communities

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   The Department has not formulated an official definition of livability.

   (Julie) Through my work in this area, my take on it would be that livability equals sustainable communities. That would be the closest thing as opposed to the broader umbrella of sustainability. Livability gets down to a scale that is much more refined and context-specific. We would perhaps by default accept the FHWA definition of livability—although when these came out originally, I think they confused a lot of people. As a matter of vocabulary, there is not a common understanding throughout NCDOT of what livability is.

   (Harrison) We have a number of initiatives that the Board has adopted, such as Complete Streets, but I'm not aware of any definition of livability that has come down from an agency perspective. There are references to quality of life and economic development in several policies, but nothing that defines livability as a goal.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   (Harrison) I would say that it depends on which part of NCDOT you are talking about. Roadside Environmental deals with aesthetics, the Transportation Planning Branch deals with land use, etc. My section deals with preventing harm. Equity is addressed through the process, but it is particularly important in the work of both Public Involvement and the Office of Civil Rights. There are some initiatives underway on public health. We address a lot of these categories—it's like blind men describing an elephant. Everybody addresses their own piece in detail.

   (Julie) Yes, it depends on what you're working on and your areas of responsibility. My work is in an area that hasn't been institutionalized—we're currently in the strategizing phase, working but not to the point where we've articulated livability goals. We're just now getting our organization to understand that we have a role in livability.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   (Julie) Public health is certainly an area that we are doing a lot of strategizing around. That would be an important piece. Climate change and resiliency are important as well. I would also say that the transportation-land use connection should be emphasized, including how that connection supports things like multimodalism, transit effectiveness, etc.—how the things that we do intersect with economic development, prosperity of regions and communities, and the competitiveness of our state with other states.

(Harrison) I've worked for two different branches—the Transportation Planning Branch and PDEA. The big picture is always systems planning. We deal with mobility, but I would much rather see us focus on accessibility. Our measures focus on vehicle movement, not travel times, modes, etc. Livability involves how all modes and land uses work together, not just focusing on the automobile. NEPA means documenting and preventing negatives, but it would be so much nicer if we got to do things that were positive—from "not screwing a place up" to "placemaking."

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☒ **No**

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   (Julie) NCDOT's participation and inclusion on the North Carolina Sustainable Communities Task Force is one initiative. Some of the work that NCDOT is doing with the long-range comprehensive transportation planning process—including integrating planning and NEPA and work with regard to CIA and ICE—has an intersection with livability.

   (Harrison) There has been increased and enhanced effort around Title VI. Also, the current Healthy Environments Collaborative is a good example. We've been working with Office of Civil Rights for the past year and a half on ways to implement or better incorporate EJ and LEP populations into our public involvement process.

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   They are initiated through a combination of plans and champions. We are being opportunistic—we have some key individuals in strategic places throughout NCDOT that "get it" and understand that it's the right thing to do. We are working within NCDOT and with partners to be opportunistic. Also, with Secretary Conti and Deputy Secretary Paul Morris, we have some strategic key leadership that is also very interested. Another thing that pushes envelope in our need to address it, I would say, is the idea of trying to leverage funds and draw down federal money from, say, the HUD-EPA-DOT Partnership. There has been increased interest by communities and certain regions to be more competitive for these types of funds, and they take the livability piece more seriously. It's not a federal mandate, but it's certainly a carrot—when there is alignment with the federal level, it gives an extra lift. It is a federal incentive, but not a mandate. We do have the state mandate with the NCSCTF, but truly, that came about from some leadership through the Governor's Office. It was not legislation in that somebody told us we had to do it, but rather we helped to get it in the legislation because we knew it was the right thing to do.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☐ **Yes** ☒ **No**

8. **If your organization does *not* currently collect livability indicators or performance measures:**

   a. **Has your organization collected or attempted to begin collecting indicators or performance measures in the past?**
      (Julie) Some measures we are collecting might relate to livability, but they are not geared specifically towards livability. We have a consultant contract that involves selecting performance measures and indicators for sustainability in general. This would include sustainable communities and livability. So yes, in a way—this effort is underway.

b. What barriers or constraints has your organization experienced in tracking livability indicators or performance measures (e.g. data needs, resource requirements, lack of political support, etc.)?
(Julie) It hasn't been established as a priority for our Department by senior leadership or policy. We have been tracking the kinds of things that we perceive either the public or Department cares about, but now that's shifting and changing a little bit. I would say that it hasn't been a priority, so it's not something we've been assigning our resources to.

(Harrison) For what we do within NEPA, the constraints include that we are not incorporating health data—or to do anything other than equity data for Title VI. We are down to 70% of our staff now, and every time we add something to look at, it lengthens what we're doing. We're not in a situation where we can really take on anything new without any major change or without something giving.

(Julie) There are also some barriers in terms of livability. We are becoming increasingly more aware that there's a lack of data, data collection, and data sharing, particularly through the health discussion. There is a shortage of funding and resources, and we are only capturing certain things at a regional level—this is very watered down and not as specific or usable for project-specific work. When data is available, it's usually not in the same place or the same format. Communities, in terms of feed-ins in to long-range transportation planning, and even PDEA have not been asking for these things. Everyone has been looking into mobility, not accessibility or the other co-benefits that haven't been captured. There hasn't been quite the demand by the public to do it, and without that, it is difficult to justify expenditure of funds.

(Harrison) What counts gets counted, and what hasn't doesn't because nobody's counted it. Certain local governments try to bring this into planning and projects, but we don't have a great way of handling it. There is a huge difference between how cities handle it and how we do. We operate at a much broader, coarser level.

c. What indicators or performance measures *could* your organization collect to track progress towards livability outcomes? How could these indicators or performance measures be used to make decisions about transportation infrastructure investments?
(Julie) Yes, but don't ask me what they are. All types should be emphasized.

(Harrison) If you want to use existing NCDOT policy, a stronger emphasis on CSS and Complete Streets would get you partly on your way. Those swing the closest to livability and give you things to aim for. Until something is adopted, we wouldn't even begin to know what to measure. Once you know the reason, then you can pick the measures.

Section B: Searchable Database

9. From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?
(Julie) The livability "types" would be most helpful for me.

(Harrison) Of the ones that are listed, I would go with livability goals. Data intensity, I'm not sure I'd know what to do with. Density, I would refer to as context. Other ideas include:

- Cost and time frame—whether it is low-cost and near-term, high-cost and long-term, etc.

- Who is the primary user? If government users are involved, things like legal backing and finance would be important. But for most civic people, this won't matter—they will care more about goals and physical context than implementation cost.

Section C: The Role of Context

10. Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:
All of these things matter. The biggest thing right off the bat: we generally have a one-size-fits-all approach to highways, regardless of where it was going. Newer projects are being better handled by having more context-specific definitions of how facilities are supposed to work and fit in.

a. Density (rural, suburban, urban)? Please explain.
When we get into community impacts, urban areas have needs for pedestrian access, transit, and high levels of connectivity. Any kind of direct impacts seem to be much greater in an urban setting. Indirect effects happen more frequently in a rural area; for example, if a rural area is close enough to a suburban area, over time it is going to become suburban.

b. Geographic scale? Please explain.

c. Data requirements? Please explain.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.

e. Other? Please explain.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Mike McGurrin
Organization(s)	Noblis
Interview Date and Time	Friday, October 28, 2011 at 2:00 PM
Interviewer	Laura Rydland, The Louis Berger Group

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   Noblis does not have its own definition of livability. As a research and consulting organization, Noblis has examined what others are doing and is using these observations as a definition of livability. The organization's work focuses on transportation accessibility, and thus primarily uses the DOT/EPA/HUD definition of livability.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   Noblis works most frequently with accessibility, primarily in transportation but also addressing land use and substitutes for transportation (e.g., telework).

   Accessibility itself impacts multiple areas of livability, including:
   - Providing transportation choices.
   - Lowering the combined cost of housing and transportation.
   - Land use.
   - Reliable and timely access to goods and services.
   - Supporting existing communities.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**
   Noblis believes that accessibility metrics are a key performance metric for livability, as they are outcome-focused, rigorous, quantifiable, transparent, and understandable.

   The University of Minnesota and Bipartisan Policy Project transportation study has focused on accessibility, but this focus hasn't been as strong from the federal government.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☒ **No**

   Noblis has not set any specific goals because it is a research and consulting organization.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   Noblis has a small internal R&D project to work on mobility performance metrics and is hoping to expand those into livability.

   First, the organization is examining accessibility at the metropolitan level or region, since many accessibility metrics are examined at the neighborhood level. Noblis would like to find metrics for metropolitan regions in order to compare livability from region to region.

A second initiative is to reduce the complexity and cost of developing measures. Noblis has developed the Noblis Open Source Accessibility Toolkit (OSAT), a set of free and open software tools built around open source tools that others have developed, particularly OpenTripPlanner. OSAT is available at https://github.com/Noblis/OSAT and is free open source code for any organization to use.

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
These were internally funded and were therefore internal decisions. Internal research funding was used to expand the organization's performance metrics work, which has primarily been focused on mobility metrics and the importance of the traveler perspective (trip-based travel times, delay, and variability), into additional areas (looking at client needs).

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

Noblis has collected indicators and measures only through case studies; the organization does not regularly maintain or collect that information.

The work is focused on accessibility, and Noblis has examined three types of accessibility metrics: cumulative opportunity models, gravity models, and modal accessibility gap (different accessibility gap between car and transit). The organization believes "a normalized cumulative opportunity metric is the one best-suited for use across an entire metropolitan area. Specifically, the percentage of jobs reachable within a given travel time threshold, such as 30 minutes."

Other notes:
-The company's paid work supports US DOT.
-Brookings Institution recently did a study on accessibility with transit schedule data in 100 cities in the US. "Missed Opportunity – Transit and Jobs in Metropolitan America."

   a. **Please describe these indicators or performance measures.**
   These measures address access to jobs and reducing travel times to jobs. These are output performance measures. Factors might be land use changes, transportation congestion, teleworking, etc. The goal of transportation is not to travel; it is to access a good, service, or jobs.

   The three different accessibility metric models include:
   - Cumulative opportunity models – percentage of jobs, access to recreational opportunities, (sets a 0/1 threshold if you can reach the destination within the time period specified)
   - Gravity models – exponential weighting (weights the job right next door, not a 0/1 hard cut-off)
   - Modal accessibility gap – whatever measure you are using – compute for car and transit travel, and subtract transit from car to get the difference

   b. **Which aspect(s) of livability do these indicators or performance measures track?**
   Transportation accessibility

   c. **What are common sources of the data for the indicators and performance measures you track?**
   - Transit schedule data and information – preferably in the GTFS data. Transit schedule data is not always available, but where it is available is from the transit agencies. 100 or

150 agencies publish that in the U.S. Lists of transit agencies that provide transit schedule information in GTFS format are available from two sources: the GTFS Data Exchange (http://www.gtfs-data-exchange.com/) and Google (http://code.google.com/p/googletransitdatafeed/wiki/PublicFeeds). Some agencies may have GTFS data unpublished but available by special request.

- Auto travel time data. This is not available from any free source, so Noblis has to purchase or estimate it (by road type and time of day). There is no open source for travel time data for cars.
- Map data for the region. This is the key data element needed for their approach. It is possible to use commercial maps, but for the purpose of their studies TIGER maps or OpenStreetMaps (global crowdsourced effort) are good to use.
- Demographic data – population data, jobs data, information on shopping or recreation. Noblis typically gathers this information by traffic analysis zones or census block groups, and generally get this from US Census files or local metropolitan planning organizations. The Longitudinal Employer-Household Dynamic files are especially useful for working at the block group level, although a few states, including Washington, D.C. and Massachusetts, either do not participate in this program or have yet to produce data.

d. What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?

One of the goals of Noblis' work is to reduce the barriers to using these methods. The main challenges to address include:

- Limited availability of transit data in the proper format (GTFS files).
- Unavailability of open data source of auto travel times or speeds.
- At finer levels of resolution, (below the traffic analysis zone level down to census block group level), the analysis can become computer intensive and take a lot of time.

e. How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?

N/A

f. Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?

Noblis has developed techniques that could be used for that, and in fact done more quickly than the multi-year travel studies. Noblis has not tried to forecast, but developed a tool so that forecasts could be made.

g. What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?

The measures can be used at a finer grained level with their technique because they can be done at a lower cost (e.g., used to access changes in transit service or impact of redevelopment). These measures can also assess conditions at a region-wide scale as well as a neighborhood scale.

In Seattle, Noblis evaluated transit access to the airport, identifying locations with good access and locations with poor access.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
Noblis has not focused on developing new indicators or measures.

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?**
Goal area, data intensity, and geographic scale should definitely be searchable attributes. Other ideas include:
    - Type of region – urban, suburban, or rural.
    - Time scale – near term vs. long term impacts. For example: The effects of changed transportation schedules may take a year to appear, whereas land use can take a decade or more to significantly change.
    - Predicted indicators vs. measured.
    - Cost of use, potentially at three different levels of magnitude.
    - Type of data: quantitative vs. qualitative.

Section C: The Role of Context

10. **Can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    Yes.

    b. **Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.**
    Yes.

    c. **Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.**
    Yes.

    d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
    In Noblis' work, this would not be a distinguishing characteristic.

    e. **Other? Please explain.**
    Population type of the area—what modes are feasible to different population types and densities?

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Brian Hare and Brian Wall
Organization(s)	Pennsylvania Department of Transportation
Interview Date and Time	Friday, October 21, 2011 at 3 PM
Interviewer	Laura Rydland, Louis Berger

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   Several years back (early 2000's), PennDOT started to move forward with an effort to tie land use with transportation decisions which ultimately culminated in the development of the Smart Transportation guidebook completed in March 2008. This guidebook was not a formal publication, but it was used to update several agency publications and outlines PennDOT's **approach** and goals. (http://www.smart-transportation.com/guidebook.html)

   Defining "smart transportation," however, is not an easy thing to do. PennDOT defines Smart Transportation as "partnering to build great communities for future generations of Pennsylvanians by linking transportation investments with land use planning and decision-making." Within that framework, PennDOT defined a number of core principles, many of which are tied to understanding local values, land use values, environmental values, and community values and built that into their approach to planning. PennDOT decided that good planning based on sound land use principles is what would drive projects to get developed and built. Several of PennDOT's policies are based on the guidebook and include livability, sustainability, and complete street concepts.

   In particular, the Smart Transportation Guidebook was used as a guide in the development of the (1) Long Range Transportation plan, and (2) Design Manual Part 1 (DM1) – Program Development and Project Delivery Procedures document, two very important documents that guide projects in Pennsylvania. www.smart-transportation.com

   Another publication, ***Keystone Principles*** includes criteria and principles that all Pennsylvania state agencies follow.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   PennDOT works to develop projects that fit within the context of the community. PennDOT define the components of context with 5 different criteria: land use, community values, environment, transportation and financial context. (p.3. fig. 1.2)

   PennDOT has evaluated highway design criteria to better align it with land use designations. For example - local roads should be designed as locally functioning roads, regional roads should be designed as regionally functioning roads. PennDOT looks at what is the intended purpose of the transportation facility.

   In the Smart Transportation Guidebook, PennDOT has decided to focus on 10 themes and 6 principles. These 10 Smart Transportation themes include:
   1. Money counts
   2. Understand the context; plan and design within the context
   3. Choose projects with high value/price ratio

4. Enhance the local network
5. Look beyond level-of-service
6. Safety first and maybe safety only
7. Accommodate all modes
8. Leverage and preserve existing investments
9. Build towns not sprawl
10. Develop local governments as strong land use partners

(The above list is from: Smart Transportation Guidebook, http://www.smart-transportation.com/assets/download/Smart%20Transportation%20Guidebook.pdf)

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**

☒ **Yes** ☐ **No**

5 components of contexts: land use, community, environment, transportation, financial.

4. **Has your organization established goals or standards for livability? If yes, please explain.**

☒ **Yes** ☐ **No**

While PennDOT's livability goals are perhaps not formal goals, their livability objectives are clearly outlined in the Smart Transportation Guidebook. Long range transportation planning guidance incorporates guidelines for developing long range plans that are tied to the Smart Transportation Guidebook themes also reflect statewide livability criteria.

Livability evaluation criteria. In the long range transportation guidance document.
Cost-benefit for all modes of transportation.
Safety such as high crash data.
Preserving unique opportunities – historic and environmental resources.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**

- PennDot has used this guidebook to (1) develop long range plan guidance, (2) used it to develop their program development and project delivery (DM1) document, (3) used to update their highway and design criteria, used to update the HOP (permit) process for developers to follow.

- Developing more continuity in addressing community and land use needs.

- -As a result of trying to demonstrate what smart transportation looks like on the ground, the former governor set aside $60 million for smart transportation projects 2008, Second round for $24 – 2010. And the projects that were selected based on the livability principles.
- Pennsylvania Community Transportation Initiative

- -Case studies have also been done to embody these themes and principles that are embodied in guidebook, many of which focus on livability. (website)

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**

PCTI initiated by the former Secretary of Transportation.

PennDOT's incorporated Context Sensitive Solutions (CSS) in the Program Development / Project Delivery process. PennDOT didn't come out of any specific program or mandate.

The way PennDOT institutionalized linking transportation and land use approach. DM1 – policy. (design publication) DM1 is the way that the Department does business – so it could be considered a mandate.

Planning and designing highways and streets that support sustainable and livable communities.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**

☐ **Yes** ☐ **No**

Currently PennDOT is formally tracking the land use transportation connection. If PennDOT has any larger capacity added projects on the system, they are tracking those that have included land use studies.

Asset related measures that are in place – bridge, roadway condition, safety. Certainly measured monthly or quarterly. Make sure PennDOT maintain their infrastructure.

   a. **Please describe these indicators or performance measures.**
   Asset management indicators – roadway and bridge conditions.

   b. **Which aspect(s) of livability do these indicators or performance measures track?**
   Financial – make effective use of funding.
   Transportation safety.
   Mobility
   Accessibility
   Alternative modes of transportation.
   Economic
   Consistency with local and regional plans and policies
   Open Space/Park Lands - preservation

   c. **What are common sources of the data for the indicators and performance measures you track?**
   Hard metrics (above) – inspection data.
   No other soft metric has been implemented or are being collected besides the land use mentioned above.

   Corridor travel times.
   Sidewalks
   Pedestrian crossings
   Bike access
   Public transit access
   (See Chapter 2 – Smart Transportation Guidebook)

   d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
   Trying to find metrics that truly were indicators of the results of their efforts.
   (2008 – with high gas prices – it was hard to see that their initiatives had an impact on VMT)

   e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
   How investments are pointed in the same direction

Context Screening tool that looks at planning, econ develop, land use, environmental consideration, establishing purpose and need, elements of what that proposal may look like, engineering aspects, utility costs. Requiring that all new transportation projects that are going to be on the 2013 TIP have a form that's associated with them.

Tools to implement linking, planning, NEPA process/plan/document decision making was implemented in July and is a requirement for all new projects that have not gone through Engineering.

Asset planning tool that goes along with this, this is done in addition to the screening form, more complex projects have more detail – these types of asset planning projects and entered in the project selection and prioritization process.

PennDOT is working to make the process more effectively and efficiently.

f. Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?
Asset planning/management – performance data that is reviewed in order to make decisions on future investments.

g. What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?
Would like to see out of the research – opportunity to dig into that soft side of indicators – pedestrian access, transit access – get an evaluation of how effective their new process is for planning, delivering sustainable livable projects.

h. Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?
- Still struggling with the same issues – travel time issues, VMT issues, modal issues/modal splits.
- Finding / developing reliable retraceable performance metrics.
- Determining how effective are we in linking our land use and transportation.

8. N/A

Section B: Searchable Database

9. From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?
- Data intensity and geographic scale.
- Mode of transportation.
- Connectivity (streets).
- Quality of life issues. (tough one because it is on the soft side)

Section C: The Role of Context

10. Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:

a. **Density (rural, suburban, urban)? Please explain.**
   Yes. Different metrics for suburban, rural, and urban areas.

b. **Geographic scale? Please explain.**
   Yes. Definitely want metrics on a corridor basis and everything up through statewide.

c. **Data requirements? Please explain.**
   Data has to be easily accessible and replicable.
   Metrics needs to be based on good data – that has always been a challenge.

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
   Built environment/infrastructure- N/A

e. **Other? Please explain.**
   Modal indicators.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Jesse Day and Paul Kron
Organization(s)	Piedmont Triad Regional Council
Interview Date and Time	October 25, 2011, 3:15PM
Interviewer	Matt Watterson, Center for Transportation and the Environment

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   The context for our responses today is that we as a region are one of 45 recipients of HUD communities grants, so I'm not sure we have an organizational definition but we do use the 6 indicators (principles). That's our starting place. We have 9 different work groups, each working on different elements, but it all boils down to those 6 main things.

   However, we have almost 70 municipalities and each of those is a mill village/town/city that has changed over the last 15 years. The manufacturing base of the economy of furniture and textiles has gone away to foreign countries. It is a difficult situation in that all of our municipalities are trying to redefine their economic base and virtually every one of them has one big factory mostly underutilized. There's an overarching theme of economic sustainability becoming a key component of livability.

   Within that context, there's a historic pattern of environmental degradation where plants put things into streams creating water quality issues. There are also, to some degree, social justice issues. We had two council of governments in the region. One of those has long history of housing/workforce development/criminal justice programs, so they focus more on social justice issues within the context of these federal funding programs.

   We're trying now to get a more broad-based handle on housing choices and barriers to affordable housing. We're coming in a little late and playing some catch-up. Another way to consider that is, for the last twenty years, we've been building a regional planning program based on long-range planning that's focused on economic development. Those kinds of activities have been a focal point. We are also re-writing zoning to have a strong focus on livability. It's not enough anymore to put colored blobs on a map. We have to look at the development patterns historically, how we would like land to develop, and write ordinances to actually get those things accomplished.

   There is another component: Agency on Aging. There is a strong emphasis to have a livable community for the aging population. We haven't generally provided direct services. We get a lot of federal funding and will figure out how to distribute that to help the aging population.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   Equity is an important factor. Land use and transportation are something we focus on quite a bit.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   The emerging issue is public health, so that's something we're hearing a lot about with our regional plan, especially addressing the obesity epidemic. Does that mean more trails? Probably, but how do you

measure that? How does it relate to economic development? One practical example is we've been talking about organizing a school consortium where all 70 jurisdictions are invited. The community would actively participate in some kind of program to get kids to walk and bike more to school. *Also discussed in Question 5.*

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☐ **No**

   That's what we're in the process of doing for the HUD project. We're trying to assess existing conditions of 7-8 main arenas including: development patterns, healthy communities and mobility. We're assessing where we are now. From there, we're going to look at holding a series of meetings to try to include parts of our 6 million population that tend be underrepresented (Hispanics, African Americans, people without English as first language). We want to ask them, "Does this resonate with you?" *(also noted in Question 5)*

   We're basically in our infancy. We want to increase the proximity of the population to healthy food sources that our region and other regions use. We are wondering if there's a way to find this information, maybe using the E-logic model. It would be valuable for the research team to take a look at the 45 communities, what activities you've been involved with, what are the results you'd like to achieve, and here are the activities we're going to undertake. You're trying to use a tool designed for one thing and fit it into another. It's kind of a lesson learned process, with understanding how to implement it the way you really want it, and not have the FHWA get in the way of that.

   One area we maybe haven't covered is a difference between livability in the urban and regional scale.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   Consortium of Schools from all 70 jurisdictions to formulate a plan to encourage more walking to school. We want to include different populations into the planning process that have been historically underrepresented in the planning process. *Also see: http://triadsustainability.org/*

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   They were initiated as part of a plan.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☒ **Yes** *Just getting started* ☐ **No**

   a. **Please describe these indicators or performance measures.**
      Brownfield/grayfield development, water quality, number of people that commute out of their county for work

   b. **Which aspect(s) of livability do these indicators or performance measures track?**
      Density, accessibility, environmental quality, housing, employment

   c. **What are common sources of the data for the indicators and performance measures you track?**
      We are just getting started with tracking.

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
N/A

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
N/A

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
N/A

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
N/A

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
N/A

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
We've placed high priorities on redevelopment for municipalities. Over the last couple of decades the big opportunities have been greenfield development—land that is cheap but still close to regional highways. I think that's part of the puzzle. We're not precluding any more greenfield development, but economic development may occur. We want to also make sure there's a robust way to develop brownfields and grayfields. That's one of the criteria we're using. We want something in or near downtowns that has some criteria. Is an area a good choice for some sort of multimodal center? That's the three criteria we'll be considering.

I think that once you get out to the more rural areas there's a lot more qualitative data. For example, there's a lot of talk about food deserts based on proximity to grocery stores. This doesn't apply very well to the rural areas—you get a map that comes up because it is a known underserved area. It kind of tells the wrong story. There needs to be a threshold to say "not enough data available".

You'd probably want a way to make it accessible to the community so the community can understand what the indicators mean. This way, when the practitioner uses the tool, the community can also use the database, or at least part of the whole module. This will show how it's being used to make decisions. It would also help to make it available on the internet, if possible.

Section C: The Role of Context

10. Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:

There are four MPOs within 12 counties in our region. In North Carolina, rather than housing MPOs, the DOT decided to set up MPOs in major cities (High Point, Burlington, etc.). We have two RPOS. In a sense, we have six regional transportation agencies. On top of that, we have created PART – a ten county organization to provide transit in the form of buses and vans. There are four State DOT highway divisions and each gets a different slice of the pie. Those don't necessarily coincide with any political boundaries. In our organization we have two big counties right in the middle. About half of the population lives in these two counties. On the other side, there are a couple of counties that only have 20,000 to 25,000 people.

a. Density (rural, suburban, urban)? Please explain.
How density has changed since 1950. Suburban sprawl is a big story in our counties and other close counties. Some of the centers, and to a lesser degree of some of the smaller centers, have been dramatically losing density over the last 40-50 years. The surrounding areas have very clearly gained in density. Certain rural counties don't really experience that. You still see some dispersal of the population.

b. Geographic scale? Please explain.
It can't be one size fits all, and you need something that can fit to different things. You can't use the same density indicator for a rural and urban landscape.

c. Data requirements? Please explain.
Scalable for their context. The measurement in the urban core would be different. I think that has a pretty big effect on transportation planning. People in a small town in a rural area would have a different scale for measurement. For these smaller and midsized towns to support or have buy in they would have to know they're being considered.

Would the data be scalable?
It's sort of the same data, but you'd have to interpret it differently, especially if you're planning it for regional use. We have counties where 70% of workforce works outside of the county. If transportation is an indicator: Most people have no choice but to use the car, but a second choice has been provided by park and ride lots. For the first time in our history there has been a second option.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.
No built environment/infrastructure indicators or performance measures that could vary in applicability were noted.

e. Other? Please explain.
No other indicators or performance measures were noted.

Closing and Next Steps

Other information:
One interest of mine is bicycle and pedestrian trails planning. There's the concept of proximity to trails, but I wonder if there's another way to get at that because there is another layer there. I live ¼ mile from the sidewalk but it's only a tenth of a mile long. For example, Greensboro may have thirty miles of trail but only one that's more than a mile and a half long. It's more of a recreational source. I think that'd be a useful to know: A) how to get to trails and B) factor in connectivity. Like "macaroni vs. spaghetti." *(referring to quote from Sig Hutchinson-father of the Raleigh-Durham multimodal program).* You can use the trails for recreational use in the case of "macaroni" trails, but you can't really get to a lot of places with them like you could with a "spaghetti" trail.

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Lester King
Organization(s)	Sustainability Planning, Rice University
Interview Date and Time	October 18, 2011, 3:00PM
Interviewer	Matt Watterson, Center for Transportation and the Environment (CTE)

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   Livability was kind of the politically correct term. We didn't want to use sustainability. I think livability is defined as this moniker for contemporary planning ideas of what it takes to make a nice neighborhood and a nice way to live. I like the APA's work on the comprehensive set of principles between new urbanism, smart growth, and transit oriented development. LEED helps add metrics to those. Those differ from sustainability in that livability tends to be more social-oriented than geared towards economic and environmental concerns.

   The APA made 18 bullet points on everything that deals with the built environment regarding livability.

   I don't think LEED is on the same level as new urbanism or smart growth. It has more to offer and I would refer to it for metrics.

2. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**
   Here in the Houston area there's a program coming out called the Livable Centers Program. They've identified areas they consider to be sub-centers. They say we should locate to those centers, invest in them, and link those centers together. How do we identify those centers? How do we limit the time it takes to get from one center to another? These arteries open up in new directions, and I'm not sure how that's being addressed. There is a major concern with livability, but the other concern is making it clear that livability is not sustainability and they can't be used interchangeably.

3. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   Jim Blackburn did research that looked into sustainability indicators being used around the country and applied it to Houston. It focuses more on sustainability. In my indicator set I have the percent of land within a quarter mile of a park/public facility, percent of population within a mile of a supermarket, and mean travel time to work. Three indicators that address livability on a macro-level are education, social capital, and transportation—and separate for health care. I use the urban area as a lens to interpret livability.

Section B: Searchable Database

4. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**

I would go with those kinds of topical issues that are in my own unpublished research. These are indicators and measures, nested where I envision one fitting under another.

i. Economic base
ii. External trends to transportation that include the following nested in them
    1. Operations
    2. Design
    3. External trends
    4. Cumulative impacts
    5. Performance evaluations
    6. Energy usage
iii. Water
iv. Education
v. Livability as a separate search feature
vi. Capital and environmental justice
vii. Health
viii. Pollution
ix. Wealth
x. A couple of these could be used to address natural hazard management, and could be nested under 'Natural Hazard Management'
    1. Facility design
    2. Mitigation
    3. Natural policy
    4. Natural hazard

Section C: The Role of Context

5. Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:

My project is on two levels: Comparing neighborhoods and regions and then comparing the city as a whole. I was hoping to get historical data, so I've recognized that the larger the scale is, I lose the environmental indicators.

For instance, one really nice indicator we used was the number of streams violating water standards. This makes sense on the city level, but not the neighborhood level because not every neighborhood has a stream. I had 9 indicators and added 3 more to get city level. For example, air pollution—you don't get that on the smaller scale. A workaround would be a bunch of city-wide sensors. I can't think of an indicator that would change based on density levels, but for what I would like to do, standardization of density helps.

a. Density (rural, suburban, urban)? Please explain.
This is easiest because you can normalize what you have.

b. Geographic scale? Please explain.
Large regional impacts don't work on a local scale. Regional is a big one in terms of linking different data sets.

c. Data requirements? Please explain.
Data requirements are an issue because data doesn't get released below zip-code level. Air pollution and health issues in particular are hard to pinpoint at a small scale. I mean "issue" in that whatever metrics are used must be defined in some way.

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
   There is a data availability issue with the built environment scale. Information is not collected at the building level. Employers may collect that information and LEED may help with this, but there isn't a whole lot of information on older buildings or buildings that weren't meant to be LEED certified.

e. **Other? Please explain.**

Closing and Next Steps

Other information:
I'd like a connection between different performance measures and indicators, because it seems like right now so many things are done in a vacuum or without taking other things into consideration.

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Peter Bella, Marita Roos, Stephanie Velasquez, Bill Barker, Trish Wallace
Organization(s)	Alamo Area Council of Governments - Alamo, TX (Peter Bella) City of San Antonio (Bill Barker, Marita Roos) San Antonio MPO (Stephanie Velasquez, Trish Wallace)
Interview Date and Time	10.31.2011
Interviewer	Ted Mansfield, Center for Transportation and the Environment (CTE)

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   Stephanie (MPO) – the San Antonio MPO is in the process of defining livability, currently conducting internal workshops. However, the MPO does have best practices and programs that reflect livability principles – it is currently a matter of making it official. The MPO is also heavily involved in the Livable Communities Grants, an example of which is the walkable communities program, which are also guided by livability principles.

   http://www.sametroplan.org/WCP/WCP.html

   Bill (city) – the city council has adopted the Mission Verde Suitability Plan, which incorporates transportation issues and livability principles. Additionally, the mayor's office initiated SA 2020, a long-range planning effort that includes transportation, core development, air quality, walkable neighborhoods, transit, arts, education health care, active living, etc. Although these plan a may be guided by livability principles, livability is not used explicitly.

   http://www.sanantonio.gov/oep/SustainabilityPlan.asp?res=1280&ver=true

   http://www.sa2020.org/

   Peter (Alamo area COG) – the COG has no definition of livability. However, the COG is highly grant-driven and thus has many tangentially oriented initiatives (i.e., meals on wheels, rural transit, etc.) The COG does need to grow to adopt a centralized definition. Currently, programs are separate and driven by their own needs in the absence of an overarching principle.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   MPO: The walkable communities program works with residents to identify concerns that keep residents from walking/biking/etc. These results are then given to elected officials and agencies. The components of livability that are elucidated via this process include transportation choice and public health. Concerns for the community include high incidences of diabetes (an outcome), presence of stray dogs (a barrier to walking), and high crime areas (a barrier). In conjunction with the COG, the MPO also deals with air quality issues often as well as environmental justice concerns and implementation of complete streets.

   City: Health, transportation, and land development issues are primary. The health department was recently awarded a large grant to boost active living as a means to address obesity – a large amount of these funds have been used to build bicycle infrastructure and develop the complete streets policy. Additionally, the US Department of Energy funds to pay for alternative forms of transportation (i.e., major funding for bike share, car share). Thus, funds outside of DOT funds are being used to promote livability and the city must emphasis the multi-faceted nature of livability, including bringing people

together and bridging gaps. While the city is dealing with livability issues in a variety of ways, they may not be branded as livability initiatives. An additional complication is that funding agencies require different tracking for different gaps; thus, different livability measures may be required for different programs. The city council has also recently passed a complete streets policy; however, at this point it is not well integrated with land use planning (there are many limitations in land use planning in the state of Texas)

COG: The focus of the COG is on public health and minority, elderly, and disadvantaged assistance via programs such as meals on wheels, rural transportation, nursing home awareness, rural issues and aging issues, and workforce development.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   City: Connection between transportation and land use, particularly for transit (TOD, infill development, etc.) Climate change, especially as it affects water, is lacking. Economic and agricultural activity in the region (especially rural areas) is hugely dependent on water; smart growth, green building, water, water use, bring utilities into the discussion, etc. are all important in addressing water conservation.

   COG: The MPO service area is 1 county while COG is 12 counties. The COG doesn't have sufficient resources, yet wider regionalism is implied in transportation planning processes (as well as many other processes). There must be an emphasis on performance measures that are applicable to the wider region.

   The urban heat island effect, if applicable in a given urban area

   Environmental impacts on vulnerable populations (i.e., who is affected?)

   Stormwater runoff: the width of roadway feeds into runoff; additionally, there is a relationship with land use context and driver speed

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☒ **No**
   City: currently in process (SA 2020)
   MPO: currently in process
   COG: No

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**

   MPO: Walkable Communities program, SA 2020, pedestrian safety action plan, bike travel patterns study, air quality outreach, public education, awareness, transportation analysis of south Texas health center, long range plan 2035, etc.

   City: complete streets, major thoroughfare plan (includes land use context), bicycle master plan update, center city redevelopment office working with transit authority (economic development), communities putting prevention to work grant; overall, there is an emphasis on under developed areas of the city.

   The transit authority also has a long range plan with a streetcar emphasis that has a TOD (i.e., land use integration) component

COG: regional air quality planning for all emissions sources

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
City: the walkable communities program has been in existence for a while. Plans are mandate driven. Other programs are pursued when grant opportunities emerge. The previous mayor was a policy champion for the development of Mission Verde, while the current mayor was a policy champion for initiating SA 2020 (i.e., although in a weak mayor system, mayors have used their influence to guide city council decisions regarding policy development and thus commonly serve as policy champions). The county judge has also been a champion in the past.

MPO: no champion

ACOG: air quality is important (mandate); in general, at least 70% of COG's activities are mandate driven

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

   a. **Please describe these indicators or performance measures.**
   <u>From SA 2020:</u>
   Level of attendance at arts programs
   Level of funding for the arts
   Index crime rates
   Number of community networks and trainings to combat crime
   Housing units downtown
   People working downtown
   Per capita income
   Job growth by sector
   Kindergarten readiness
   College readiness
   Poverty rate
   Teen births among females 15 to 19
   Voter turnout
   Activity level and diversity of city boards
   Obesity (adult and child), emphasis on child obesity
   Overall assessment of health and behavioral risks
   Air quality index
   Usage rates for water and energy
   Number of pedestrian oriented neighborhoods
   Population growth in center city neighborhoods and downtown
   Public transportation ridership
   Travel time index

   <u>From Sustainable Neighborhood Planning Tool:</u>
   Internal Street Connectivity (Ratio of street intersections versus intersections and cul-de-sacs)
   Pedestrian Network Coverage (Percentage of streets with sidewalks)
   Bicycle Network Coverage (Percentage of streets with bike routes)
   Transit Adjacency to Housing (Percentage of population within buffer area)
   Transit Adjacency to Employment (Percentage of employees within buffer area)

Amenities Adjacency (Percentage of population within buffer area))
Transit Service Coverage (Number of bus stops / sq. mile)
Transit Service Density (vehicle route miles / day / sq. mile)
Transit-orientated Residential Density (DU per acre within buffer area)
Transit-oriented Employment Density (employees per acre within buffer area)
Transit Orientation Index (ridership potential based on general employment, retail and dwelling density)
Average Parcel size
Intersection Density
Amenities Proximity
Pedestrian Network Coverage
Pedestrian Crossing Distance
Pedestrian Intersection Safety
Street Route Directness
Pedestrian Setback
Pedestrian Accessibilities

From Mission Verde:
Housing + Transportation Affordability Index
Hours of delay
Lost hours of productivity
VMT

b. Which aspect(s) of livability do these indicators or performance measures track?

From SA 2020:
Arts & culture
Community safety
Downtown development
Economic competitiveness
Education
Family well-being
Government accountability & civic engagement
Health & fitness
Natural Resources & environmental sustainability
Neighborhoods & growth management
Transportation

From Sustainable Neighborhood Planning Tool:
Demographics
Recreation
Land Use
Environment
Housing
Travel
Employment
Climate Change

c. What are common sources of the data for the indicators and performance measures you track?

City: SA 2020 is a citizen-driven process; however, the city is not sure how to respond to some of the measures (ex: how do you define walkable? Where is the data?) Although Walkscore can help fill some of these gaps, accessibility still an issue (i.e., what are you walking to?)

In more traditional processes, the US Census, TxDOT VMT estimates, physical inventories of sidewalks, and transit data from the agency are common data sources.

MPO: demographics are not done in-house (pull from public data and state demographer, feeds into model, use census, some primary data); the safety program uses the crash records information system from TxDOT

COG: the standard litany of data are used in general (Census, etc.); however, walkable neighborhood workshops develop a sidewalk inventory for each workshop area

d. What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?
MPO and City: lack of staff and resources; although we could contract out to overcome staff issues, funds are limited to do so. Additionally, deciding on what is most important to measure and how to make the data mean something (framing) are critical. There are also issues that arise due to the political process and timing (i.e., policy windows come and go for data collection initiatives).

e. How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?
MPO: Criteria for project selection for TIP and long-range plan; not specifically related to livability (i.e., safety, VMT, etc.) The selection process does include points if the project related to adopted scenario (which includes TOD and infill strategies); thus, the selection process indirectly rewards projects that enhance livability.

City: Stand alone bike/ped plan: additional points are awarded if a project is a part of a walkable communities programs or similar public involvement process; bond projects also get a boost if related to other efforts with livability outcomes. Thus, livability is often included via a proxy, but is not directly related.

f. Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?
COG: the COG forecasts for population, housing, and employment; however, this is solely for the benefit of MPO's travel planning process and is not used independently. It's main use is for travel planning.

City and MPO: Haven't really gotten there yet.

g. What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?
MPO: It is the responsibility of the transportation policy board at the MPO-level to decide which direction to go and this can change at any moment. Thus, it is hard to get the politics out of supposedly rational processes. Tracking long-term trends may help average out some short-term variation related to political pressures acting on the transportation policy board.

There needs to be an emphasis on breaking down silos – indicators and performance measures must help agencies plan together towards a unified goal.

COG: There needs to be an emphasis on the regional scale and the interaction between agencies. There need to be a unified and standardized definition so that more people use measures and indicators using with same goals in mind – currently, the use of performance measures and indicators is ad hoc in nature (might run counter to the principles of livability themselves due to ad hoc nature).

There should be an emphasis on cost-savings in the long run amongst indicators and performance measures.

Standardization of indicators is important – a federal mandate important but regional autonomy must also be maintained. Currently, there are not enough teeth from FHWA and FTA (i.e., a stronger federal mandate is needed). It would also be helpful if the federal agencies collaborated in developing indicators so that the performance measures/indicators themselves are not in silos (i.e., a unified definition amongst all federal agencies).

COG: the role of context in defining livability and sustainability is huge – some rural areas refute the ideas of visioning and sustainability due to concerns over eminent domain. Stakeholder education is important.

h. Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?
Bicycle parking throughout the region, per capita and per household water use, per capita and per household energy consumption, and per capita and per household emissions (both NAAQS criteria pollutants and GHG emissions)

8. N/A

Section B: Searchable Database

9. From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?
Application type (i.e., bond process, project level, corridor level, planning level, etc.)
Availability of the data (i.e., immediately available data versus primary data)
MPO boundaries, MSAs (i.e., applicability based on context)
Cost/resources required
Overall, needs to be organized topic area (use the "filter down method")
Ex: allow an initial selection for the transportation topic area, then for air quality, then the for specific pollutant ("drill down", hierarchal method)

Section C: The Role of Context

10. Can you identify any indicators or performance measures that would vary in their applicability depending on:

a. Density (rural, suburban, urban)? Please explain.
Safety is probably best example (different roadsides)
Access to housing and employment via transit is likely more applicable in urban areas

School siting differs greatly in urban and rural locations
Walkability is likely more important in urban areas (i.e., what are you walking to? Purpose of the walk trip (commute versus recreation?)
Extent of road network (network redundancy) and network vulnerability (single point of failure): much more likely for non-redundant, vulnerable networks to exist in rural and suburban locations
Jobs and accessibility (distance to transit and transit providing service to people who actually work in the transit service area, not just to jobs)
Healthcare and accessibility to health provider
Network type (grid-system as rural developed into)

b. **Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.**
Congestion for a metropolitan area – makes sense at a small (corridor) scale, but less sense at a regional scale (also noted that congestion is good for bikes/peds)
Lack of sidewalks – could be missing a lot in a regional sense, but have a lot in the urban core
Road networks that are transit supportive (i.e., cul-de-sac versus gridded area; connectivity and thoroughfares that are long enough to make sense within walking distance of neighborhoods)

c. **Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.**
Cost comparisons at the project level (versus the no-build option; compare to other projects)
Defensible definition of complete streets and/or walkable neighborhoods
Sidewalk data (inventory, including condition of infrastructure – also related to land use context)

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
Sidewalk data (the importance of land use and traffic context)
Walkability as affected by traffic speed and traffic volume
Transit service applicability
Safety as affected by traffic speed and traffic volume
Bicycle infrastructure, bicycle parking, etc. and local support for cycling (i.e., business that include showers in building, employer incentives, etc.)

e. **Other? Please explain.**

Closing and Next Steps

Other information:
There is a lot of research going on concurrently on this issue – it is important that local governments are not hit with 10 versions of the same product. Need coordination and cooperation among projects and agencies. Additionally, a lot of different buzzwords are coming through the pipeline. The language needs to be unified to and incorporated together (walkable, sustainable, livable, etc.) Livability needs to framed consistently. FHWA and FTA talk about coordinating things that come through the federal registrar. Need to invite them to the table, and circulate this effort through EPA, HUD, CDC, etc. to help break down those silos.

There is a significant issue in the liability that cities undertake as private developers build infrastructure and the city is later left with road maintenance liability (especially an issue as growth stagnates)

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Dr. Rajiv Bhatia
Organization(s)	San Francisco Department of Public Health
Interview Date and Time	October 25, 2011, 2:00PM
Interviewer	Matt Watterson, Center for Transportation and the Environment

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   We worked in regional planning for 8-9 years, so we're pretty familiar with the basics. We don't define livability. We've incorporated this work under two frames-either population health or sustainability. The goal is to try and improve the consideration of both health and equity in the mainstream dialogue of institutional performance or sustainability.

   We define it in a few different ways: The first is transportation access to health, jobs, goods services, and social networks. That's basically the work of transportation itself. The second most important would be the impact of traffic injuries. The third is pollution, air noise and water. The fourth is the ability to walk around for leisure or physical activity.

   We've worked on a lot of projects that define indicators of good health/bad health in each of these domains. An example of the access indicator that could reflect health is average daily travel trips. It's okay to have trip times of 30-60 minutes. If you're taking 3 hours, that's a problem. We have elevated injuries happening to pedestrians and fatal injuries. Most of the injuries are problematic but not health related. Pedestrian injuries are more likely to be fatal. Safety: Less than 20mph and the number of arterial streets less than 30mph.

   There is also the ambient environment: air pollution, the areas of the city, the extent of the city of which there are air and noise quality levels above national and state standards. The monitoring system run by the federal government doesn't allow us to assess that indicator. They don't capture the intra-neighborhood variation. We've used modeling approaches to capture air pollution levels that affect at the parcel level. There's a technical tool problem.

   We have a data collection issues. The key measures are percentage of time or the number of trips from active transportation. Another measure is simply the pedestrian flows. A lot of people walking can be a sign of a healthy neighborhood. A neighborhood with nobody on the street is an unhealthy neighborhood.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   Public health and equity.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   Gaps: air, noise, and pedestrian dangers need to get much higher profile. I would like to see access to non-work destinations to become a primary measure of the transportation system instead of mobility and speed.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☐ **No**

   As a city we work very closely with the transportation agency to reduce mode share from cars to make bike and walking a higher share. From the health perspective we're advancing two city-wide goals. We have an executive directive to reduce pedestrian injuries by 25 percent by 2015 and 50 percent by 2020. We're working with the mayors' office to eliminate air quality exposures that exceed the federal and state standards. A pretty small area of the city (less than 10% that exceed federal and state standards) is what we're looking at now.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   The Pedestrian Environmental Quality Index and the Healthy Development Measurement Tool are two planning tools we've developed.

   The Pedestrian Environmental Quality Index (PEQI) *(from website)* has been developed to assess the quality of the physical pedestrian environment and inform pedestrian planning needs. The PEQI draws on published research and work from numerous cities to assess how the physical environment impacts on whether people walk in a neighborhood. The PEQI is an observational survey which quantifies street and intersection factors empirically known to affect people's travel behaviors, and is organized into five categories: traffic, street design, land use, intersections, and safety. Within these categories are 30 indicators that reflect the quality of the built environment for pedestrians and comprise the survey used for data collection. SFDPH aggregates these indicators to create a weighted summary index, which can be reported as an overall index or deconstructed by pedestrian environmental category (Table 1) or even by each indicator. (http://www.sfphes.org/HIA_Tools_PEQI.htm)

   The Healthy Development Measurement Tool *(from website)* The ***Healthy Development Measurement Tool*** is a comprehensive evaluation metric to consider health needs in urban development plans and projects. The HDMT explicitly connects public health to urban development planning in efforts to achieve a higher quality social and physical environment that advances health. (www.thehdmt.org)

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   The original impetus for developing a health indicator system came from community groups and we facilitated the 18-month process to develop an indicator system. We developed indicators, and then were tasked by the community to integrate these into different sectors. The Healthy Development Measurement Tool is integrated into the DNA of that agency, and it's been very effective. We've found places where we don't need to work so hard. There is already a strong transportation commitment in some places, but low priorities for pedestrian health and safety. We contribute what we know how to do best, and that's really understanding and assessing data.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☒ **Yes** ☐ **No**

   a. **Please describe these indicators or performance measures.**

   Example
   For years the way the transportation agency dealt with safety was looking at the 10 worst intersections, and decided what do you need to do there to reduce injuries? Only the 10 worst?

There are 17,000 intersections in San Francisco! So what we did is look at where more serious injuries happen.

We did a corridor study and identified streets that affected 70% of injuries. On high intensity corridors we asked:

- What are factors covering injuries?
- Are people misbehaving or are intersection not well designed?
- Are turns protected, what's number of lanes and what's the speed?

We were able to explain for the most part a large percentage of injuries, and said, "Maybe we need road narrowing or traffic calming." There have been a few people that may resist new ideas. But for the most part they really appreciate data-driven, evidence based decision making. Our work is used in a few different ways. We've done something called health impact assessment. We've implemented a pricing system and analyzed how that program would affect longevity, pedestrian and cycling injuries. We take transportation input and translate them to health output.

We also have a state wide NEPA process. We do the analysis and look at impact of land use and transportation, noise health, and safety effects, but we do it implemented into the state-wide NEPA process. The one I think I'm most proud of is we've been able to shape the indicators that are being used to develop the next RTP with 10 performance indicators: 1 is greenhouse gas, the others are housing, transport cost, travel times, etc. Three of ten indicators are health related: Transportation injuries and transport times being two of those three. We've yet to see how it plays out.

The first round of indicators we developed with the Healthy Development Management Tool (detailed above). A number of accessibility measures were there but in a more rudimentary stage, like elementary school proximity (how many houses had no elementary school within a half mile distance). We're now using new indicators. At every intersection we counted the number of school seats from a mile distance, then weighted those based on distance. We then weighted them by quality. So the seats with high test scores were given more weight. We calculated this for every intersection in San Francisco, then normalized that from 1-100 from least to most access. We then accounted for an industrial neighborhood. We are doing the same thing for food, transit, and park access. We came up with composite scores for every intersection.

b. Which aspect(s) of livability do these indicators or performance measures track?
Equity, Multimodal, Health, Safety, Environment

c. What are common sources of the data for the indicators and performance measures you track?
GIS, intersection counts, crash and accident data, decibel levels, pollution levels, geographic distance

d. What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?
Issues related to scale. Some indicators, such as noise, water pollution, and air quality aren't readily measurable on a small, neighborhood or census block group scale because the Federal government or the state doesn't collect that data. And some transportation engineers have resisted expanding the indicators and analysis.

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
These indicators were used to develop the regional transportation plan.

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
No forecasting efforts were noted.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
No recommendations were noted.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
No new indicators or measures were noted.

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
I can't think of an attribute that would be more relevant. You would have to organize it into domains. Indicators are not as important as data, methodology, and real world examples. That's how I think the tool would be useful to others.

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**
I guess I would turn it around: we should be identifying the indicators robust to scales and data requirements. We have very core needs and those needs have not changed for thousands and tens of thousands of years, but how we meet them differs. We need safety and we have a national standard for air pollution. There's no reason to say a rural area has a different standard. We should be able to measure them at every scale. For example: transportation time. Ideally everybody's transit took less than 90 minutes. That could be a goal, but in reality it's going to vary. But, whether you live in a rural or urban area, spending a large area of your time in transit can't be good. I think saying we want to have a different level of protection gets dangerous. For example, we'd argue that in low income areas you have a lot of injuries because there are a lot of people dying. But if they walk, do they deserve to die more frequently? I think the acceptable risk should be zero. I think we should come up with not relative, but universal standards. For most the needs don't vary by place.

a. **Density (rural, suburban, urban)? Please explain.**
Based on the comments and interpretation above, this shouldn't be relevant.

b. **Geographic scale? Please explain.**
Based on the comments and interpretation above, this shouldn't be relevant.

c. **Data requirements? Please explain.**

We have measurability issues. All data gathering is local, it's really an agglomeration of local measures—it's just that we don't do enough of it.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.

Pedestrian quality index: We've mapped good, bad, better streets. Quality and density of infrastructure would be an important measure of access. If you're in a built up urban area we should make the safety characteristics for the streets for non-auto users mandatory design characteristics, the same way we protect drivers. To me anything else is shameful. If you look at an intersection, what does a traffic light protect? It protects cars from colliding with other cars. It builds in a conflict between cars and people. It's Inequitable and unethical, in my opinion.

a. Other? Please explain.

No other indicators or performance measures were noted.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Doug Kimsey
Organization(s)	San Francisco Metropolitan Transportation Commission (MTC)
Interview Date and Time	Friday, October 28, 2011 at 4 PM
Interviewer	Laura Rydland, Louis Berger

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

Doug Kimsey indicated at the beginning of the interview that his answers will not necessarily reflective of the agency.

1. **How does your organization define livability?**
   The organization does not formally define livability.

   There have had some discussion on livability with the recent development of the Regional Transportation Plan (RTP) update. The current update is under the auspices of new legislation (SP375) that requires MPOs that are updating their RTP to develop sustainable strategies. MTC's focus for the update has been more oriented toward sustainability rather than livability. Sustainability is developing complete communities where people can live and work in close proximity to each other and has close proximity to destinations, so livable communities are more complete communities.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   MTC works most frequently with: aesthetics, land use, equity.

   MTC provide grants to localities for projects that support smart growth principles. Many of these grants go to aesthetics. Land use is a key point of their sustainability strategy. Equity is considered because the RTP by federal statute and executive order states that the improvements and the land use components that drive the RTP investments need to have equity in terms of benefits and no one community being burdened more than others.

   Also, public health is a component of livability that MTC sometimes focuses on, but not nearly as much as the others. (For example, he said the MTC could say MTC look at public health in the similar way that it looks at emissions.)

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☐ **Yes** ☒ **No**

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   Yes. As part of this RTP update, MTC've identified 10 target areas (Performance Targets) that MTC is using to evaluate projects and programs with.

   The Performance or 'Adopted Targets' fit within the following Outcomes/Goals, as found in a document sent by Doug Kimsey titled, 'Overview of Plan Bay Area Transportation Project Performance Assessment.'

-Climate Protection
-Adequate Housing
-Healthy and Safe Communities (3 targets within this group)
-Open Space and Agricultural Preservation
-Equitable Access
-Economic Vitality
-Transportation System Effectiveness (2-3 targets within this group)

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
One large initiative that MTC has pursued that relates to livability is its Transportation for Livable Communities (TLC) program. The TLC program provides funding (primarily through grants) to local agencies, transit agencies, and projects that support "community-based transportation projects that bring new vibrancy" to already developed areas, "making them places where people want to live, work and visit." In addition to providing for a range of transportation choices, the program targets projects that support connectivity between transportation investments and land uses and are also developed through a community planning process or effort. http://www.mtc.ca.gov/planning/smart_growth/tlc/)

The MTC also partners with the Association of Bay Area Governments (ABAG) in a program with a similar goal to the TLC program called FOCUS. This program provides financial assistance to local agencies to plan for more livable and transit-oriented communities. The financial assistance specifically goes to local agencies to update plans or create specific plans (often in the form of Station Area Planning grants) to support smart growth and livable communities. (According to the website, the FOCUS program "unites the efforts of four regional agencies into a single program that links land use and transportation by encouraging the development of complete, livable communities in areas served by transit, and promotes conservation of the region's most significant resource lands. FOCUS directs financial assistance and other resources to Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs)." http://www.bayareavision.org/initiatives/PDFs/FOCUS_Brochure_12-08.pdf)

The MTC's work on the RTP and RTP update also shows their pursuit of livability goals (or as MTC refer to it – performance goals or targets).

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
The TLC program was initiated through a champion and organizational policy. A commissioner was very interested in providing technical assistance and grants to local agencies to help them better connect land use and transportation and create more complete communities. After developing the idea, the commissioner got the rest of the commissioners to agree with the idea and implement it as organization policy for the MTC. (Also, according to literature on the MTC website, "the TLC grew out of the MTC's first smart growth policy, adopted in 1996" when a Transportation/Land Use Connection Policy was adopted and subsequently followed by the TLC Planning program being created in 1997.))

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

It seems like the indicators and performance measures that the MTC plans to use have largely been developed with the recent update of the RTP and the 10 performance targets MTC have adopted in that plan. The targets will provide a way to forecast how projects can achieve the goals but also as a way to monitor the progress of projects after MTC are built.

a. Please describe these indicators or performance measures.

MTC have a myriad of performance measures, including:
-Travel time (with adjustments to valuation of nonrecurring delay)
-Direct user costs (vehicle operating/ownership)
-Collisions (injuries, fatalities, or property damage only)
-Health costs associated with changes in active transportation levels
-Emissions (CO_2, $PM_{2.5}$, PM_{10}, ROG, NOx)
-Noise
-Amount of planned affordable housing
-Amount of planned housing growth in areas served
-Walk/bike trips
-Transit trips
-VMT measured
-Reduces transit travel times
-Provides alternatives to the single occupant auto
-Implements safety improvements (for all modes)
-Consumption of open space or agricultural land
-Provides low-cost transportation options for low income households
-**Please see the document referenced in #4 for more examples.**

b. Which aspect(s) of livability do these indicators or performance measures track?

Four areas in #2 → aesthetics, land use, equity, public health.

c. What are common sources of the data for the indicators and performance measures you track?

MTC have a variety of sources.
-State DOT – traffic data (CalTrans)
-Bureaus of Labor Statistics
-FHWA surface transportation economic analysis model
-various FHWA models
-FHWA Cost Allocation Report
-Local area district Clean Air Plan
-California Center for Public Health Advocacy
-Federal government

d. What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?

-Resource requirements → The State DOT (CalTrans) used to be very good about having good traffic data, but over years because of budget constraints MTC have had to cut back on that. So not having robust / sufficient traffic data has been a challenge for MTC.

e. How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?

Yes, the MTC has used the results to assess and choose projects that make it into their long range [transportation] plan (LRP). The indicators or performance measure [results] are mainly used for information in order to determine if projects should go in the LRP; MTC doesn't necessarily use the results to prioritize projects. While favorable indicators or performance measure results are helpful to make decisions about transportation investments, some projects do remain in the LRP because of other reasons even when MTC does not meet the targets/objectives of the indicators or performance measures.

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
Yes. The MTC attempts to forecast these indicators for future alternatives in a couple of ways:
1) MTC has devised a way to evaluate major capacity projects - typically this means quantitatively evaluating them against the targets.
2) Benefit Cost analyses are also done for projects. This analysis or forecast model measures the impact of the project, and then looks at various land use scenarios and how that project collectively act with other projects and land uses in the area.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
Indicators and performance measures that MTC have are used pretty effectively in the way MTC have been set up.

Additionally, there have been limitations with the forecasting tool (in the case of scenario studies) to meaningfully fully distinguish between different projects at a regional scale.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
"I hope not." ☺

He said that the MTC just agreed a few months ago on the 10 performance targets that MTC are using right now. At the moment MTC are fairly satisfied with the targets (or indicators and performance measures), but as MTC go through the process MTC will probably find reasons to change them again. (The MTC decided on their current 10 performance targets this year when MTC were approved in February 2011.)

8. **N/A**

Section C: The Role of Context

9. **Can you identify any indicators or performance measures that would vary in their applicability depending on:**

a. **Density (rural, suburban, urban)? Please explain.**
For the most part, MTC would generally not choose indicators or performance measures that would vary in their applicability based on density.

But when the MTC staff monitors some of their safety related measures or indicators – MTC will look at density and the size of localities because density can be more of a factor in safety situations. For example, he said if you have 2 bike accidents in a location with a high density and lots of bike trips, that might not be such a big a deal; but if you have 5 bike accidents in an area with few bike trips, that might be something to be more concerned about.

But monitoring it is an issue of scale. It is probably more meaningful for safety related things (indicators/performance measures).

b. **Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.**

Nothing that he can think of.

c. **Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.**
No.

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
No, he hasn't really used those categories to differentiate between indicators and performance measures.

e. **Other? Please explain.**
Not off hand.

Section B: Searchable Database

10. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?**
-Since MTC mainly work at the regional level, MTC are not looking at other evaluation levels (i.e. MTC are not looking at the local level). So having the higher level (regional) definition or searching feature probably suffices for them.

-He also agreed that it would be very important to search by main program areas – public health, transportation, etc. But he said that within these main program areas, there would probably have to be further subdivisions. Transportation for example, within that area there could be mode-specific designations or groupings (searchable criteria) – such as highway or transit. (That way you could have measures divided out specifically for particular modes – on time ratio and fare box recovery (transit); queue lengths and level of service (automobile).) Transportation measures could also be broken down into other groupings such as measures that are not mode specific – VMT reduction and traffic congestion.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Muggs Stoll and Coleen Clementson
Organization(s)	San Diego Association of Governments
Interview Date and Time	November 3, 2011, 1:30 PM
Interviewer	Lindsay Maurer, Planning Communities

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   I'm not sure we have a specific definition of livability (at SANDAG). We have a regional comprehensive plan that provides a vision for the region's future growth and development. We discuss in that plan and our most recent regional transportation plan our sustainability future, based on focusing growth and development in areas where we're making investments in transportation infrastructure in a way that preserves our habitat, open spaces, and opportunities for people to live, work, and play. That's generally how we would define it. It's not specifically livability, but that's how we talk about a region's vision.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   I would say that both our regional transportation plan (RTP) and our regional comprehensive plan (RCP) address just about all of those on some level. We have a monitoring report that we tie to our RCP, which is a general plan for the region that rolls up all general plans for cities and the county. There is a list of things that we track—a series of performance measures related to urban form and transportation, housing, environment, economic prosperity, health, and "borders" (international/interregional context with surrounding jurisdictions). We address nearly all of the livability components. We do address some things in aesthetics with urban form, and land use is a big part of the RTP and RCP. We do more work on social equity than ever before. Public health is a brand new issue for us, with more comprehensive efforts due to ARRA. Accessibility and mobility have always been measured in our RTP.

   We have a comprehensive set of concepts that we try to track and address in all of our planning products. One that is evolving is public health—we are trying to identify new indicators that we could incorporate into our annual monitoring report. The challenge is finding indicators that have reliable data sources. That's one area that we hope to improve upon. The link between transportation and public health/health impact assessment is an emerging area. It has always been out there, but it hasn't been looked at in a systematic way. That's changing for us in San Diego, but it's accelerated by grants—we have a funding source to be able to focus on that as a region.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   We're going to be assessing that in the near future when we update the RTP. One of the challenges we have with all performance measures is deciding how many we should have. Do they become unimportant after a certain number? We are now using 39 measures, and we may add some for public health and social equity. I don't know if there's anything else that needs to be emphasized, although some issues (such as economics) may come out of discussions with the SANDAG board. We don't have 39 different subject areas; we have about a dozen, with multiple measures for each. We may look at what we've been tracking and which measures are best, then weed out the measures to get the most beneficial ones and reduce the overall number of measures without reducing the number of areas we're

looking at. There are many measures in the RTP as well, and our feedback indicates that it's complicated—users are swimming in data, and it's difficult to make decisions. We are trying to consolidate our specific measures without eliminating any focus areas.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☐ **Yes** ☐ **No**

   We haven't established goals or thresholds, although we are trying to set a baseline for some measures and track our trends in the future. It would be helpful for the board to make decisions on where to prioritize efforts and resources based on these trends.

   The California Air Resources Board (CAARB) did set greenhouse gas reduction targets that we are supposed to meet. We developed the RTP and a Sustainable Communities strategy as a component of this plan, and through these strategies we did meet the targets set by CAARB. All regions in California are subject to this law, but we're the first region in the state to approve a plan under the new law. Two other major MPOs in California are scheduled to adopt plans in the spring.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   Specific plans and initiatives include the following:
   - RTP
   - RCP
   - Regional Energy Strategy
   - Economic Prosperity Strategy
   - Climate Strategy

   All of the strategies listed above feed into our regional plans. I don't know that there's anything we do that isn't captured in the RTP or RCP, or both. These are umbrella documents. They still don't address everything, and we're currently working on a comprehensive update of these plans. We will spend some time scoping to see if other topic areas should be added, if any should be dropped, what should be prioritized, etc. We don't address education or infrastructure, and we don't do planning for water other than producing the demographic forecasts that water entities use. Other entities are responsible for some areas and we stay in a coordination role.

   We also prepare a Regional Housing Needs Assessment Plan. This was coordinated with the RTP approval last week, again as a component as the RTP. This plan clearly addresses livability, with allocations of above, above moderate, moderate, low, and very low income housing. The process requires *planning* for housing but not actually building it. The motivation is: if you don't plan for it, it's never going to happen. The first step is allocating as a region where housing should go and communicating this allocation to land use authorities. These authorities will use this information when putting together housing plans to be submitted to the state. This results in addressing housing needs that wouldn't otherwise be addressed.

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   All of the above. Legislation (SB 375) clearly drove the formal change to the RTP, including preparation of a Sustainable Communities Strategy within this plan. We've already been working on many of the legislation goals through the RCP—we are trying to encourage smart growth and development by focusing investments in already developed areas, moving from a highway to a transit emphasis, etc. We've been working on these things, but the legislation brought the issues into focus and created a legislatively mandated framework/format to put it in.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**

☒ **Yes** ☐ **No**

a. **Please describe these indicators or performance measures.**

The following performance measures are tracked via SANDAG's Regional Transportation Plan:

Goal	Performance Measures
Mobility	• Average work trip travel time (in minutes) • Average daily travel time (in minutes) • Average work trip travel speed by mode (in miles per hour) – auto, carpool, transit
Accessibility	• Work/school trips within 30 minutes in peak periods • Non-work trips within 15 minutes
Reliability	• Annual weekday projected number of accidents/fatalities per capita • Congested peak-period travel conditions • Congested daily travel conditions • Daily vehicle delay per capita (minutes) • Daily hours of delay on the regional freight network (hours per 1000 VMT)
Efficiency	• Out-of-pocket user costs • Total 25-year public and private travel costs
Livability	• Percent of peak-period trips within 1/4 mile of a transit stop • Percent of daily trips within 1/4 mile of a transit stop • Work trip mode split (peak periods) – drive alone, carpool, transit, bike/walk • Average trip distance (miles)
Sustainability	• Smog forming pollutants (tons per year) per capita • Total daily on-road fuel consumption per capita (gallons) • Systemwide daily VMT per capita • Daily Transit Passenger Miles per capita • Gross acres of constrained lands consumed for transit and highway • infrastructure (2000 to 2030)
Equity	• Average travel time per person trip (in minutes) – low-income population compared with non-low-income population, minority population, non-minority population • Work/school trips within 30 minutes – low-income population, non-low-income population, minority population, non-minority population • Non-work trips within 15 minutes – low-income population, non-low-income population, minority population, non-minority population • Homes within 1/2 mile of a transit stop – low-income population, non-low-income population, minority population, non-minority population

b. **Which aspect(s) of livability do these indicators or performance measures track?**
Mobility, accessibility, reliability, efficiency, livability, sustainability, and equity.

c. **What are common sources of the data for the indicators and performance measures you track?**
Common data sources for these measures include the U.S. Census and regional transportation demand models.

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**

No specific challenges were noted.

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
Each of these measures is tracked against a 2006 baseline value. Since this measurement effort began in 2006, the organization hasn't yet noticed anything to force a "course correction" for a transportation infrastructure investment area (with the exception of concern over the mode share for public transit).

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
A "reasonably expected" value of each performance measure in 2030 is forecasted to facilitate interpretation of trends. A "no-build" value is also forecasted to highlight the anticipated impacts of plan implementation.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
No new applications were noted.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
SANDAG would like to collect more measures related to public health and social equity.

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?**
Searching by livability goal makes sense and is a good place to start. Geographic scale makes sense as well—if you're a rural community, you don't want New York City's measures. You might want to not just include geographic scale, but state—I will be curious about what people in my state are doing because California has unique laws and a unique political context. What they're doing in Utah might be interesting, but maybe not as applicable in the state of California.

For data intensity, my concern is that most individuals or agencies looking at a tool would want non-intensive approaches. I think it's important to acknowledge this fact. For example, in California, Caltrans tries to roll up statewide data. We have multiple metropolitan regions that are very urbanized but we also have a huge rural component to our state. The metropolitan regions all have tremendous modeling capabilities, and their transportation and forecasting models are state of the art. The rural areas don't have those resources. It might be better to ask: what kind of modeling capabilities do you have? Somebody from a smaller rural area might be able to skip over tools that require full-blown transportation models in favor of approaches in which data is gathered more simply.

For a tool to be useful to us and to others in our region, it should allow us to narrow down based on sub-attributes of key livability topics, such as public health. It would also be helpful to have an assessment or description of the level of information required for some measures compared to others. For example, sidewalk density is hard to have on hand but we know it's important. It would be great to have a sense of what it would take to pull together the data. I don't know if this needs to be searchable, but it would be good information to have once you start choosing measures (rather than restricting the search). Even small areas might gain something out of seeing more complex performance measures, rather than

skipping over them. It may be better to have all the tools, then narrow down from there based on (non-searchable) data complexity.

It would be useful to see what similar metropolitan areas or comparably sized regions are doing, as added information once results are returned by the search. It would also be beneficial to see research related to the measures returned in a search.

It could also be helpful to search by data source (Census-based, etc.).

We as an organization try to avoid mode-specific approaches, although we understand that we sometimes have to work within specific modes. Therefore, it may be useful to search by transportation mode if measures are closely tied to that.

The tool could also include an international component—what are other countries doing and what can we learn from them?

Section C: The Role of Context

10. Can you identify any indicators or performance measures that would vary in their applicability depending on:

a. Density (rural, suburban, urban)? Please explain.
Density is significant, particularly when it comes to transportation. Rural entities will probably see the measures of highly-urbanized areas as very limited. Some legislation in California is perceived as focused on urbanized areas, which is frustrating for rural entities. Having measures for both rural and urban areas is very important. For issues such as sprawl, redevelopment, and infill development, the measures can be very different based on density and what kind of region you're considering.

b. Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.
Geographic scale is also very important. For example, we are often asked about the ideal jobs-housing balance and are asked to show this by jurisdiction. However, this makes more sense at a regional level, since people cross boundaries all the time to reach home and work. Issues such as the jobs-housing balance and the number of jobs per household make more sense at the regional level than the smaller jurisdictional level. Alternatively, our experience has been that walkability works best at a neighborhood level.

Habitat planning makes sense from a regional perspective and not necessarily from a smaller jurisdiction perspective—we can't expect smaller jurisdictions to provide habitat area, but we can in the greater regional / county area.

The region vs. corridor distinction is also very important. The transit mode share for our region is very small, but certain corridors during peak periods have much higher ridership that is much more indicative of the value of transit to the region. Assessing performance measures at that scale is important, particularly for transportation. A lot of regions are like ours—very few have only one component, and very few metropolitan regions have just heavy urbanization throughout. When you examine performance measures at a regional scale, you have to be careful about this complexity—regional measures run the risk of dilution.

c. **Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.**
[See response to Question 9]

d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
No built environment/infrastructure indicators or performance measures that could vary in applicability were noted.

e. **Other? Please explain.**
No other indicators or performance measures were noted.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Christine Eary
Organization(s)	San Diego Association of Governments
Interview Date and Time	October 28, 2011, 4:00PM
Interviewer	Matt Watterson, Center for Transportation and Environment

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   It would likely be the smart growth definition as relates to land use, transportation planning, compact development and providing a range of transportation choices.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   Primarily transportation, but also land use. We don't have land use authority, but we do work with jurisdictions on land use. We also work on issues like habitat conservation, which isn't something a lot of regional planning agencies do.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   We have just started working on public health, and in particular the role of active transportation. This morning a meeting was held for RTP approval and active transportation was a big part of that.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

   Our regional comprehensive plan is where you would find that information. (http://www.sandag.org/index.asp?projectid=1&fuseaction=projects.detail) We will update the plan starting next year, within that we've included smart growth goals. We will have a smart growth map within the regions. Our RTP, and sustainable community strategy (part of the RTP) also establishes goals. Colleen Clementson and Muggs Stoll will be able to talk about the sustainable community strategy.

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
   There are actually quite a few initiatives. On our regional comprehensive plan's website, visit the left hand side under Land Use Planning for a good list of references such as:
   - Regional Comprehensive Plan
   - Sustainable Communities Strategy
   - Housing
   - Smart Growth Trip Generation and Parking Study
   - Smart Growth Concept Map
   - Smart Growth Tool Box
   - TransNet Smart Growth Incentive Program
   - Pilot Smart Growth Incentive Program
   - Smart Growth Visualization Tools and Photo Library
   - Smart Growth Design Guidelines

- Healthy WorksSM (CPPW)
- Healthy WorksSM (CPPW) Pass-Through Grant Programs
- Regional Comprehensive Plan Performance Monitoring
- Community-Based Outreach Mini-Grant Program
- Intergovernmental Review

A lot of our livability related efforts have to do with actual implementation of plans I mentioned, especially directly implementing the RCP. We also have a smart growth toolbox to help with our smart growth development guidelines and parking guidelines. We have a smart-growth incentive program tied to the smart growth concept map. I'm also Project Manager for our biannual report on the RCP (http://www.sandag.org/index.asp?projectid=309&fuseaction=projects.detail)

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
Most of these things came out of our RTPs. Some, like the smart growth toolbox, came from the RCP, while others come from the parking and trip generation study.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

The RCP monitoring report I mentioned covers this, and to a lesser extent the performance measures in our RTP. In the future we're going to start monitoring our active transportation efforts.

   a. **Please describe these indicators or performance measures.**
   It depends on what you're looking at, but basically there are 39 indicators in the report and that all follow the basic outline of the RCP. Indicators are divided into subject areas: urban form, transportation, multimodal, housing, environment, public facilities, economic prosperity, and borders.

Indicators from Regional Plan

1. URBAN FORM / TRANSPORTATION

A. Share of new units and jobs located in Smart Growth Opportunity Areas
B. Share of new housing units within County Water Authority water service boundary
C. Annual weekday transit ridership
D. Commute mode shares (single occupancy vehicles, carpool, transit, walking, biking, etc.)
E. Travel times and volumes for key auto corridors and key transit corridors
F. Miles of deficient roads on Congestion Management Program network
G. Annual hours of delay per capita
H. Regional crime rates

2. HOUSING

A. Housing Affordability Index (compares median home ownership costs to median income)
B. Percent of households with housing costs greater than 35 percent of income
C. Ratio of new jobs to new housing units
D. Share of new and existing units by structure type (single family, multifamily) and income category
E. Vacancy rates

F. Percent of households living in overcrowded conditions
G. Number of households on the waiting list for Section 8 (housing assistance) Vouchers

3. HEALTHY ENVIRONMENT

Natural Habitats

A. Habitat conserved within designated preserve areas (acres and percent of preserve area)
B. Percent of preserve area actively maintained (removal of invasive species, trash removal, fence repairs)

Water Quality

A. Number of beach closures and advisories per rainfall inch measured at Lindbergh Field
B. Impaired water bodies (miles or acres) based on Federal Clean Water Act 303(d) criteria

Shoreline Preservation

A. Beach widths
B. Lagoon health (salinity, dissolved oxygen levels)

Air Quality

A. Air Quality Index (number of days "unhealthy for sensitive groups" with AQI > 100)

4. ECONOMIC PROSPERITY

A. Regional unemployment rate compared to state and nation
B. Real per capita income
C. Regional poverty rate compared to state and nation
D. Employment growth in high-wage economic clusters
E. Educational attainment (Share of adult population with high school, college, and graduate education)

5. PUBLIC FACILITIES

Water Supply

A. Water consumption per capita and total
B. Diversity of water supply (share of regional water supply, by source)
C. Amount of reclaimed water used

Energy

A. Kilowatt hours of electricity used per capita at peak hours
B. Share of energy produced in-county vs. imported
C. Share of energy produced from renewable resources

Waste Management

A. Percent of waste that is recycled
B. Landfill space available

6. BORDERS

A. Border wait times for Secure Electronic Network for Travelers Rapid Inspection (Sentri) lanes, and non-Sentri lanes
B. Interregional commute volumes into San Diego from surrounding counties and Baja California
C. Participation in Sentri Lanes, pedestrian commuter program, Free and Secure Trade (FAST) program

b. **Which aspect(s) of livability do these indicators or performance measures track?**
Health, Safety, Environment, Economies, Transportation, Urban Form, Housing

c. **What are common sources of the data for the indicators and performance measures you track?**
There are a variety of sources, all of which are listed in the document. At least a 1/3 comes from the American Community Survey, which is nice because it's an annual survey. Some we collect ourselves, like the healthy environment indicators. I don't think we have any state data sources.

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
The state data source is CALTRANS. Some of the indicators were identified in the RCP itself, so that was before we even started doing any reporting or data collection. Some have fallen by the wayside because we couldn't collect or get data. Landfill capacity is an example of this. We've been able to report it, but we haven't had actual data only had anecdotal data. Data collection for border wait times is challenging but we should be able to get back on track. Overall, we were careful to choose indicators for which we knew could get reliable data. For the most part it's only been a problem with those noted indicators.

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
I would say SANDAG has not done so directly, but I don't think that's the intention of this report (RCP). It's more of a progress report on how we are doing as a region. It is more of a situational assessment: "are indicators getting better or getting worse?"

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
Not with this specific set of data.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
They are a means of measuring progress.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
We have started looking for measures to account for public health issues as a part of our healthy works grant for the CDC. There have been a set of indicators identified that will be in the next RCP. We will also start looking at active transportation (walking and biking).

8. **N/A – only applicable if "No" stated in response to Question 7.**

Section B: The Role of Context

9. **Can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    No density indicators or performance measures that could vary in applicability were noted.

    b. **Geographic scale (intersection, project, corridor, community, region, statewide)? Please explain.**
    Trying to build this into the search would be difficult and could reduce the number of choices offered. As long as you have some element of context, I think it would be good to have more choices than less. This wouldn't be the best way of organizing the tool and ensuring that enough choices are given for an informed decision.

    c. **Data requirements (highly sophisticated/complex vs. simple and user-friendly, etc.)? Please explain.**
    For us, it comes down to what we're using the data for. We're going to start working to create active transportation indicators and measuring transportation in general. I'm starting to sift through a lot of information on the west coast to see what is being collected on walking and biking. There are models that show demand at certain intersections. We're trying to report on walking and biking regionally, so that (intersection models) wouldn't be so useful for you to report. Some things we are looking to determine include return on investment, and the improvements are different for every project.

    d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**
    No built environment/infrastructure indicators or performance measures that could vary in applicability were noted.

    e. **Other? Please explain.**
    It's hard to visualize this one, but the way you have it broken down there looks pretty good.

    Example: There is a rural community, and bike crash data is received. This data isn't needed for a rural area, so ideally bike crashes would not come back as an indicator for a rural area. We're trying to figure out how you feel context would affect other indicators like that, based on their utility in different situations.
    It's better to have more choices than less, but it is still important to have those notes. I would want more choice along with disclaimers. It might be nice to know who used which indicators and where there are links to a report to know what was said about them in the actual analysis. I would rather get too much information back than too little.

Section C: Searchable Database

10. **So from your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs?**
    A lot of it would come back to the data source, like the level of geography available, by city or county. The frequency is also important (data collected annually, quarterly, etc. and how often it is available)

Subject area is also important. We organize by RCP chapters: is it health, transportation or both? For me those would probably be the big three.

With regard to active transportation and SANDAG, urban form is important and it would be beneficial to slice those even further. For example, it would be helpful to be able to search for a higher classification and then drill down using a "nesting" scheme. Knowing the type of data (counts, surveys, etc.) would also be helpful.

There are also other things to consider. Specifically, it's one thing to have indicators and another to have the actual data source tied to those indicators. It's something we're experiencing now, and we've identified all the things we'd like to measure, so if you found those indicators it would be nice to know who's been using them and where you've found it with links to those reports. It would also be useful to know whether the data was modeled versus observed.

I think it is also going to depend on with how much you can manipulate by the search tool and whether flexibility is built in. For example, if you're not sure what indicators you are looking for, maybe hundreds would come up, but if you want to just look at Active Transport fewer would come up.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Ed Hug and Tom Bruff
Organization(s)	Southeast Michigan Council of Governments (SEMCOG)
Interview Date and Time	October 21, 2011, 2:30 PM
Interviewer	Lindsay Maurer, Planning Communities

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   Although SEMCOG has no formal definition of livability, the "Creating Success" initiative promotes six outcomes with some of the same words and underlying meanings as the six FHWA Principles. These outcomes include:

   - Fiscally sustainable public services
   - Reliable, quality infrastructure
   - Access to services, jobs, markets, and amenities
   - Desirable communities
   - Economic prosperity
   - Healthy, attractive environmental assets

   These outcomes constitute SEMCOG's definition of successful regions. Presented in terms of a statement, this could read: "Southeast Michigan is a region that wants to be economically prosperous, have desirable communities, …"

   Additionally, SEMCOG has developed "A Framework for Sustainability in Southeast Michigan," which "brings together various plans, policies, and programs for economic development, transportation, infrastructure, environmental quality, neighborhood and community development, and workforce development into a single document outlining the region's sustainability goals." These sustainability goals are as follows:

   - Move the economy forward
   - Stabilize neighborhoods and provide livable communities
   - Enhance and protect the environment
   - Achieve fiscal sustainability

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   As noted above, the two initiatives address economic prosperity, the natural environment, accessibility, public services, fiscal sustainability, and infrastructure.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   SEMCOG has several additional areas for which it would like to develop performance measures (primarily related to the natural environment—species diversity, green cover, etc.)

4. **Has your organization established goals or standards for livability? If yes, please explain.**

☒ **Yes** ☐ **No**
[See response to Question 1]

5. **What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.**
[See response to Question 1]

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
Not specified

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
☒ **Yes** ☐ **No**

   a. **Please describe these indicators or performance measures.**
   We have been collecting and using performance measures for a long time, but efforts have been fairly disparate—crash data, land use, etc. They have not necessarily been under a single bundle or umbrella. Several projects over the years and policy changes have shown that it's a good idea to put all of our performance measures under a single umbrella. Under the "Creating Success" initiative, we are now doing this.

   SEMCOG representatives met with the General Assembly earlier this year to discuss the "Creating Success" outcomes, which were well-received. Another part of this conversation was asking how the outcomes could be measured. Along the way, we also met with the SEMCOG executive committee, advisory committees, and agencies and other entities outside of SEMCOG. We also asked other groups within SEMCOG to provide potential measures. Through this process, we obtained a host of measures that we then gleaned to start identifying key performance measures. We don't want a huge database—we want a dashboard. To select measures, we asked: what are the actions that drive these measures, or that these measures drive? Are these the actions we're looking for? We also looked at conflicting measures, those that needed to be bundled, etc.

   We are now in the process of determining whether we have data, where it can come from, etc. Some data—including measures related to bridge condition, economics, crime, education, environment—are already up on our website.

   The current list of outcomes and measures is provided below:

Outcome	Performance Measures
Economic Prosperity	• Percent of population age 25 and over with a bachelor's degree or above • Percentage of population age 25 and over with an associate's degree • Change in real regional gross domestic product (GDP) • Real per capita personal income growth • Poverty rate • Labor underutilization rate (U-6) • Change in jobs • Industry concentration • Consumer confidence

Desirable Communities	• Percentage of 4th and 8th grade students at or above proficiency in Reading, Math, and Science (MEAP scores) • ACT scores • Violent crime rate • Property crime rate • Number/percentage of occupied housing units • Access to amenities such as entertainment venues, museums/cultural attractions, walking/biking facilities, parks, and sports venues • Access to services such as educational institutions, medical facilities/hospitals, libraries, and full service grocery stores • Migration rates • Voter participation rate • People's desire to reside in community
Fiscally Sustainable Public Services	• Community Fiscal Indicator Score – number that are fiscal neutral, fiscal watch, fiscal stress • Municipal credit rating • Number of region's local governments with multi-year budget • Local governments unfunded liabilities relative to budget • Citizen satisfaction with local government services.
Reliable, Quality Infrastructure	• Percentage of roads in good, fair, poor, condition • Percentage of bridges in good, fair, poor condition • Infrastructure utilization rate • Peak infrastructure service demand and total consumption – water, sewer, energy, transportation • Percentage of water and sewer system in good, fair, poor condition • Percentage of drinking water meeting standards • Transit ridership • Citizen satisfaction with quality/reliability of roads, water, and sewer systems
Healthy, Attractive Environmental Assets	• Percentage of time in compliance with air quality standards • Percentage of green cover • Volume of stormwater flowing into our waterways • Number of areas with known water quality impairments • Condition of macroinvertebrates (bugs) in rivers • Diversity of fish species • Number of known invasive species • Perceptions about outdoor environment making this a nice place to live
Access to Services, Jobs, Markets, and Amenities	• Percentage of households with access to jobs. • Percentage of households with reasonable access to amenities such as entertainment venues, museums/cultural attractions, walking/biking facilities, parks, and sports venues • Percentage of households with reasonable access to services such as educational institutions, medical facilities/hospitals, libraries, and full service grocery stores • Rate of export activity • Broadband accessibility • Residents' ability to get to jobs, amenities, outdoor environment/recreation, and services

These measures will be taken back to the General Assembly for review next week, followed by formal adoption.

b. Which aspect(s) of livability do these indicators or performance measures track?
[See table above for outcome categories]

c. **What are common sources of the data for the indicators and performance measures you track?**
Not specified

d. **What challenges has your organization experienced in collecting, analyzing, and implementing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?**
Not specified

e. **How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?**
Profiles for the region and individual counties and communities are provided on the SEMCOG website, with profile topics including housing, land use, population, transportation, etc. These have been live for 7 or 8 years and include trend data as well. The "Creating Success" website will likely be morphing into something that has a fairly clean, simple dashboard for elected officials and the general public.

We will first and foremost integrate the "Creating Success" outcomes into our work program and various other plans that we adopt (related to transportation, water quality, infrastructure, etc.). As we move forward and amend those plans, we will be thinking about how the work could impact these outcomes. They will be integrated into our work, and we are also looking for opportunities to integrate the outcomes into our partners' work—DOT, utility companies, etc. There are also non-transportation partners that we are engaging with this.

We are also trying to establish a feedback loop with the SEMCOG executive committee and other partners. This will allow us to give interactive, dynamic feedback.

We have a transportation investment prioritization process—a regional and county level tool. The first tool was for the long-range plan with a 20+ year horizon, but it has been enhanced to provide a 5 year horizon. The tool examines congestion, pavement and bridge conditions, non-motorized transportation safety, and transit. We collect a lot of the data and provide deficiency analysis back to communities. If we have a defined budget, we know how much we spend in different areas; with this tool, we know what the current condition is in those areas—we know what we're spending and what the results are. This tool allows us to look at other scenarios and compare them to one another. What happens when we spend our entire budget on transit, capacity, etc.? We presented five scenarios to the executive committee and the General Assembly, and allowed them to vote and propose their own scenarios. Through this process, we developed an "optimized scenario" to blend the various options and they selected something in between. This tool effectively facilitated adoption of a policy. Now, projects can be evaluated against this scenario for consistency. The tool was developed by Cambridge Systematics for FHWA, and we had them modify it to meet our needs (Asset Manager Software).

We are now considering whether we can we take this assessment tool—which is focused on transportation areas—and expand it to livability performance measures or areas?

f. **Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?**
Some factors are forecasted through the transportation investment prioritization process tool (see previous response).

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**

Not specified.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
We are in the process of developing new indicators and measures now. We have some new measures (percent of green cover, diversity of fish species, underutilization rate, etc.) for which we are currently trying to find data sources. Although data may not be available, these are good measures—and in saying that, we need to focus our attention on how we can get the needed data.

8. **N/A**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
It would be important to know data sources for performance measures, as well as caveats associated with using the data.

A good search option to have would be topic area—bridge, pavement, safety, congestion, etc. The topic area for these may actually be transportation. There are transportation performance measures, environmental performance measures, economic performance measures—it could be helpful to search by these topic areas.

Goals and outcomes are also important search criteria, but these should be distinguished from livability "types." You could condense a variety of outcomes into fifteen outcome topics, then define what those mean and allow users to query by outcomes and topic areas.

I don't know that density matters very much. Wouldn't you still want reliable, quality infrastructure? The topics may be the same, but the targets may differ in these places. Different counties have different stories to tell in terms of data—they may have different targets. The desire/outcome is the same, but the specific target may be something that differs. Density is important but maybe to a lesser degree.

Geographic scale goes along with that. You may have measures that vary geographically as far as corridor, intersection, etc., but I don't know if I would focus on that as much.

Outcome and topic area are the two main criteria I would like to see in a searchable database.

Once the tool provides a list of performance measures, it would be good to provide some examples or best practices of agencies that are using those measures. With this, I could look for an agency that fit my profile in terms of density, population size, etc. Hopefully a comparable agency/setting has examples that I can look up and follow up on.

It might also be helpful to consider various boundaries (school, county, etc.), as these are their own geographic entities when looking at shared services.

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**

    a. **Density (rural, suburban, urban)? Please explain.**
    We do have different measures depending on density. When tracking building permits and job locations, data is more easily available and quantifiable in urban areas. For various reasons, it is more difficult for us to get information in rural areas. There is not enough density to support some indicators, and a distinction based on density is therefore helpful.

    b. **Geographic scale? Please explain.**
    For the longest time, our pavement and road conditions data were only reported at the regional level. Part of the rationale behind this was that communities didn't want to be singled out individually. However, after more specific questions began to come in, we finally did break it down at the community level. We were expecting pushback but by that point people were expecting and wanted to see this information. In this sense and with sources such as the Census, not all data and measures are available at all geographic levels.

    Much of the available data is at the regional or state level at best. We run into datasets that are only at certain levels or timeframes—communities often collect based on population or desire to input data, so there are holes. Questions that we have to answer include: why is this a good measure? Where is the data coming from? How often is it updated? Are there geographic constraints? This will help us to identify gaps.

    c. **Data requirements? Please explain.**
    [See response to Question 9-a for data availability issues in rural areas)

    Some datasets are mature and robust at the state level, but less so in other locations. On a local level, data availability is affected by urban vs. rural location. Availability generally depends on community capacity.

    d. **Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.**

    e. **Other? Please explain.**

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No

FHWA Livability Performance Measures – Practitioner Interviews

Interviewee(s)	Paula Reeves
Organization(s)	Washington (State) Department of Transportation
Interview Date and Time	October 13, 2011, 3:00 PM
Interviewer	Lindsay Maurer, Planning Communities

Section A: Indicators and Performance Measures and their Use in the Decision-Making Process

1. **How does your organization define livability?**
   Washington State has had a Livable Communities Policy since 2000. This policy was developed and adopted by the State Transportation Committee and is consistent with what are now the six livability principles. The policy defines livability as follows:

   "Livable Communities provide and promote civic engagement and a sense of place through safe, sustainable choices for a variety of elements that include housing, transportation, education, cultural diversity and enrichment and recreation."

   The full policy can be found at the following link: http://www.wsdot.wa.gov/NR/rdonlyres/A94C2706-00C9-40C8-AACA-B71D9472A296/0/LivableCommunities.pdf.

   WashDOT also has sustainability efforts underway; these are separate, but they are obviously connected to livability. These initiatives relate primarily to greenhouse gas emissions, stormwater management, and other environmental initiatives.

   Additionally, Washington has a state law that defines statewide goals for VMT reduction. The Governor has established Executive Orders along with this law. The law can be found at the following link: http://apps.leg.wa.gov/rcw/default.aspx?cite=47.01.440.

2. **Which component(s) of livability does your organization work with most frequently (e.g. aesthetics, land use, equity, public health, etc.)?**
   WashDOT's work addresses transportation and how it fits in with livability. We most frequently work with mobility, accessibility, and multimodal options. We also address public health and have a partnership with the Department of Health (called "Active Communities") to administer grants every other year.

3. **Are there other components of livability that your organization would like to see emphasized in the future? If yes, please list or explain.**
   ☒ **Yes** ☐ **No**

   We need more connection to the housing piece—there is currently a lot of talk about transit-oriented development and pedestrian-oriented development.

   Another big research project has to do with VMT reduction. There is a state law to set goals for VMT reduction, but we are still struggling a bit to determine what will have an impact.

4. **Has your organization established goals or standards for livability? If yes, please explain.**
   ☒ **Yes** ☐ **No**

The Livable Communities Policy sets forth a statewide goal, a policy statement, strategies, outcomes, and performance measures related to livability. These are listed below:

Statewide Goal: Transportation plans and actions will support and encourage partnering with local communities to achieve our mutual interests in promoting livable communities.

Policy Statement: Transportation will foster livable communities in transportation projects within rural and urban areas by working with its partners to:

- Foster multimodal transportation systems that enhance communities. Promote mobility for the workers, students, shoppers, visitors and products of communities and neighborhoods. This mobility should include, as appropriate, a good mix of public transit, bicycle and pedestrian facilities, with adequate roadways, rail, and ferries.
- Develop collaborative transportation actions sensitive to community values. Collaborate with local residents and officials to enhance the community's livability. This can mean the addition of sidewalks, traffic-calming features, safe pedestrian crossings and landscaping to improve the environment.
- Coordinate access to funding. Provide access to federal and state funding which supports livable communities.

Policy Strategies (major strategies/categories only; sub-strategies included at link listed above):

- Foster multimodal transportation systems that enhance communities
- Develop collaborative transportation actions sensitive to community values
- Coordinate access to funding

Outcomes and Performance Measures

- *Outcome*: Effective Community-Based Design
    - *Outcome Statement*: Integrated community design, land use and transportation investments improve the quality of life.
    - *Performance Measure*: WSDOT will work with local communities to increase communities' satisfaction with the creation and implementation of community based designs for our transportation projects.
    - *Performance Measure*: Biennially, WSDOT will survey communities to assess their level of satisfaction with the creation and implementation of community based designs for our transportation projects.
- *Outcome*: Collaborative Decision Making
    - *Outcome Statement*: Collaboration occurs between federal, state, regional, local and private sector partners.
    - *Performance Measure*: Four to six years in advance of a project start, WSDOT will notify local communities and appropriate federal, state, regional and private sector partners of the opportunity to collaborate on the creation and implementation of a transportation project.
    - *Performance Measure*: Biennially, WSDOT will measure this by the advance time given and number of partners involved.

5. What specific projects, plans, or initiatives has your organization pursued that relate to livability? Please describe each effort and the aspect(s) of livability addressed.

- WSDOT Livable Communities Policy, 2000
- CSS Executive Order, 2003
- Gray Notebook, 2003
- Design Guidance and Training, 2005

    - *Understanding Flexibility in Transportation, Washington*
- State Funding for Pedestrian & Bicycle Safety, 2005
- AASHTO Environmental Excellence Award, 2006
    - *Best Organizational Integration of Context Sensitive Design*
- State Bicycle and Pedestrian Plan, 2008
- ADA Policy, 2008
- Project Scoping Process Update to include bicycle and pedestrian safety, 2008
- Statewide Complete Streets Bill Passes – HB 1071, 2010-11
- Main Street Highways Initiative (see Question 7a)
- Statewide Vehicle Miles Traveled Reduction Goal (State Law – RCW 47.01.440)
- Washington State Climate Policy, Laws, and Executive Orders (http://www.ecy.wa.gov/climatechange/laws.htm AND 2010 Sustainable Transportation Report - http://www.wsdot.wa.gov/SustainableTransportation/report.htm)

6. **How were these projects initiated (e.g. mandate, organization policy, plan, "champion," etc.)?**
   A lot of our efforts have come through legislation—through the State Legislature and the State Transportation Commission. But Washington also has strong grassroots, community-driven efforts. We have statewide advocacy organizations for biking, walking, etc. that are organized locally.

7. **Does your organization collect any indicators or performance measures to track progress towards livability outcomes?**
   ☒ **Yes** ☐ **No**

   a. **Please describe these indicators or performance measures.**
   There are many, but I will highlight a few and send the rest.

   WashDOT's "Gray Notebook" is a quarterly report to the Washington State Legislature on performance. This report categorizes measures by goal and may have some areas that are worth looking at for this project. It also contains a "Performance Dashboard" that presents a condensed set of key measures. The Gray Notebook can be found at the following link: http://www.wsdot.wa.gov/Accountability/GrayNotebook/navigateGNB.htm (see pages 6-7).

   The Main Street Highways Initiative is connected to Complete Streets. We've gone through our state highway system and applied filtering criteria to come up with a subset of segments (500 miles in total) that act as "main streets." We will now be able to track changes we make on these segments. We also looked at our projects along these segments over the past 10 years and found that the main street segments were significantly more likely to have scope, schedule, and budget changes. By doing more community-based design, we can save an average of about $9 million per project. Thus, we looked at budget performance geographically and related the findings to livability and community involvement. Communities want more complete streets when it comes to these highways that function as main streets.

   In line with state law, we are also collecting VMT measures. VMT changes will be tracked and reported on an annual basis. The law sets forth goals for 2020, 2030, and 2040, so we will measure to see if we're getting there.

   The Governor's Office is also collecting indicators for transit, biking, and walking. Ms. Reeves provided these indicators in a spreadsheet, which has been saved in the interview documentation folder.

b. Which aspect(s) of livability do these indicators or performance measures track?
The measures track a number of aspects (see above). These most commonly address mobility, safety, and the natural environment.

c. What are common sources of the data for the indicators and performance measures you track?
We look at a lot of GIS data—all crash locations, damage/fatality information, and other data are geocoded. For the Main Street Highways Initiative, we use a two-step screening process using GIS data (including a visual survey of image logs) to classify segments based on location (within city limits), functional class, collision history, year of incorporation, percent commercial, frontage, on-street parking, number of lanes, sidewalks, speed limits, building setbacks, etc.

d. What challenges has your organization experienced in collecting and analyzing these indicators or measures (e.g. data needs, resource requirements (time, money, staff), etc.)?
Transportation agencies have historically focused on the motor vehicle. We have just about every data needed for motor vehicles. When it comes to other travel modes, we have less data available. It is a challenge to find resources and convince people that collecting data for other modes is a useful effort. WashDOT started a count program to count people walking and biking through volunteers across state. We are also looking to get electronic counting to augment this.

Other obstacles include time, money, and historic obligations. The data collection process is very engrained and hard to change, especially for large agencies. However, collaboration helps. We've found that collaboration on data collection leads to more opportunities than just the intended purpose.

There are also line item transportation projects in the state budget that have never considered the issues we are now considering. There are dedicated dollars for these projects, and they won't go away.

e. How has your organization used these indicators or performance measures to make decisions about transportation infrastructure investments?
We are just on the tip of the iceberg with this. The main street highway segments have good potential and will probably play into grant selection. If projects are proposed on these segments, the Main Street Highways Initiative will help us to select and prioritize. When we identify the cost schedule and budget changes required more often on these, this has good potential to save money.

Projects that create more VMTs will now be hard to justify, while those that reduce VMTs are going to be more desirable. Over time, there will be a prioritization process, but it will take a while because we have a transportation budget with line item projects over the next 16 years.

f. Does your organization attempt to forecast these indicators in any way for future alternatives analysis (at any scale, from plan down to project-level)?
The only attempts at this have been in research projects and case studies. It is in the works, but it hasn't fully made it into our project selection processes.

WSDOT and the City of Seattle are partnering to forecast indicators in a two-phase project. The summary of the first phase can be found at the following link:
http://www.wsdot.wa.gov/NR/rdonlyres/476AE40D-53B2-42D4-93D2-6EB14284EEFB/0/ResearchNote_7651_Redo81611.pdf.

g. **What are some of the ways that these indicators or performance measures could be used more effectively in the decision-making process?**
We are moving forward with a prioritization process (see above), especially related to main street highways. For these, we are looking at changes and cost overruns and finding out that they occur in communities for reasons that have to do with livability. This may lead us to do some planning differently, with more community-level design work that we don't currently do.

h. **Can you think of *new* indicators or performance measures that your organization could collect to measure livability outcomes?**
I think we need to learn a lot more about the relationship between land use and transportation. Indicators for that would be useful—measuring infill, economic indicators, real estate values, economic vitality, etc. I think the six principles are right on the money. If indicators for those areas were available, we could really benefit from having something particular associated with those. We've always looked at transportation for transportation's sake—volume to capacity ratio, etc. But we need to be looking at transportation as a way to meet broader goals—economic vitality, etc.—and developing indicators that get us that.

We could also use studies and performance measures that look at the different functions of transit services—BRT, intra-city, circulators, etc.—land use ways of looking at transit. Any time we can tie transportation purposes to land use and understand that relationship more, it's beneficial.

8. **N/A**

Section B: Searchable Database

9. **From your perspective as a practitioner, which attributes would be most important to you in searching for indicators and measures that best suit your needs (e.g. livability goal, data intensity, geographic scale, etc.)?**
I definitely like the idea of a breakdown by livability goal. That will help us a lot, especially in determining how our grant program is doing.

I like the geographic scale idea because while we are currently doing a lot at the corridor level, we are hoping to move toward sub-area planning.

Those are the two most important.

I'd also like to see how sustainability fits in with this. If you look for indicators that are focused on sustainability, I know that a lot of states are thinking about performance measures for this. There is enough interest (and requirements) to look at those issues and pull out those indicators—this would be good to highlight.

Section C: The Role of Context

10. **Given the varying contexts of different communities, can you identify any indicators or performance measures that would vary in their applicability depending on:**

a. **Density (rural, suburban, urban)? Please explain.**
When we did the Main Street Highways work, we found that expectations are different from rural to urban. An example is bicycle and pedestrian safety. In Washington, 90% of bicycle and

pedestrian collisions occur in urban areas. Motor vehicle safety is more of a concern outside of urban areas. For safety, we need different levels to distinguish urban and rural. In a rural area, a separate path connecting areas may be fine, while more accommodations may be needed in urban areas. They have different needs. The same is true for mobility.

b. Geographic scale? Please explain.
We really struggle with the VMT requirements because measuring on a project basis is difficult. Even breaking it into regions is challenging. VMT indicators really need to be looked at in an area. This is going to be a challenge for us.

A lot of land use measures might go beyond a corridor too, and we're accustomed to looking at corridors. This is a big shift and different performance measures are needed for those scales. The corridor scale definitely needs to be looked at differently. It will be interesting to see how greenhouse gas issues are addressed at the project and corridor levels. This points to the need to do sub-area planning instead of corridor planning.

c. Data requirements? Please explain.
The challenge is that performance measures are still going to be needed regardless of data availability. We need to have a tiered approach with opportunities for those that are well-equipped (with a lot of data available in GIS) and can do more, as well as more simple tools for those less well-equipped. Measurement is challenging in places that don't have resources. This tiered approach might also lead the places that don't have data to get the data they need.

d. Built environment/infrastructure (e.g. single-family, multi-family, mixed use, street grid type, etc.)? Please explain.
See comments above.

Closing and Next Steps

As the project moves along, there will be additional opportunities to provide input on draft products, including a "beta testing" period for the searchable database. Would you like us to contact you when this opportunity is available?

☒ Yes ☐ No