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National Cooperative Highway Research Program

Right-Sizing Transportation Investments

A Guidebook for Planning and Programming

EXECUTIVE SUMMARY

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Cover photo description: The Big Four Bridge spanning the Ohio River in Louisville, Kentucky, was built for rail use in 1865. As of 2013, the bridge is now a greenbridge used by pedestrians and bicyclists. Photo credit: Shutterstock.com

GUIDANCE FOR RIGHT-SIZING TRANSPORTATION INVESTMENTS

Right-sizing transportation infrastructure is repurposing, re-using, or fundamentally re-sizing (either larger or smaller) an existing asset (or in some cases, plans for a future asset) for a newly understood economic function or purpose. As transportation and land markets have shifted over the decades, transportation infrastructure has often remained rigid—standing as long as a century or more but no longer generating the economic benefits that justified its construction. While transportation agencies have consistent investment cycles and processes for preserving existing assets, and for identifying and treating deficiencies through modernization and expansion, there are not processes in place to detect and evaluate opportunities to rightsize assets that are no longer in alignment with changing needs over time. The benefits of implementing right-sizing can include millions of dollars in life-cycle cost savings, enhanced land value and economic development from re-used land or assets, and delivery of more efficient overall system performance. Methods to identify and evaluate right-sizing opportunities can be applied within cyclical transportation agency processes such as asset management, programming, and long-range planning. Right-sizing methods can also be applied in project development when considering the purpose and need for projects or later when considering performance-based practical design options. The right-sizing guidebook offers practical elements for an agency to include in a right-sizing policy, as well as technical methods for identifying, evaluating, and implementing right-sizing solutions.

Why Right-Size?

The Tennessee Department of Transportation (DOT) implements an initiative to strategically relax design standards, saving the department over $170 million on the first 10 projects under the new policy. Rochester, New York, transforms an under-utilized sunken section of expressway into an at-grade "complete street," with private development creating over $250 million of value in the local economy in addition to millions more in life-cycle cost savings.[1] An initiative in Dallas, Texas, identifies opportunities to generate nearly $500 million in development by re-aligning routes and re-using highway infrastructure—boosting neighborhood property values by about $2.5 billion, adding 40,000 jobs, and increasing property tax revenue by $80 million.[2]

[1] *Interviews with agency staff.*

[2] Rogers, T. New TxDOT Report Says We Should Tear Down I-345. *D Magazine.* 10 June 2016. https://www.dmagazine.com/frontburner/2016/06/new-txdot-report-says-we-should-tear-down-i-345.

These are a few examples of the economic value that can be realized through right-sizing transportation assets. *Right-sizing* is a process, by which an agency re-assesses the size, extent, or composition of transportation assets to reflect the current economic reality. Right-sizing can involve rethinking the performance standards or function to which existing assets need to be maintained or, in some cases, finding an altogether better and higher use for the asset and the land on which it rests. Wherever a transportation system is over-built, in the wrong place, or configured in an inefficient way, there is a potential right-sizing opportunity. While it can take many forms, right-sizing transportation systems always corrects an economic problem, freeing land, government revenue, private and social capital, or other resources to create value in the economy.

Before and After: Rochester, New York, Inner Loop East

Source: Stantec Consulting Services, Inc., on behalf of the City of Rochester. "Rochester Innerloop 2013" (video screenshot). https://youtube/ZluEwhJx7nE. (Future development areas shown in purple.)

As shown in the preceding examples, agencies willing to invest in identifying and realizing right-sizing opportunities can be handsomely rewarded. However, implementing right-sizing as an agency investment strategy requires addressing difficult questions about transportation needs, sources of value, uncertainty, and equitable resource allocation. How can an agency identify and validate a right-sizing opportunity? Who gets to decide what an efficient or "right-sized" transportation system entails? How can the interests of different owners, users, and payers for infrastructure converge in support of a right-sizing opportunity?

The guidebook developed through NCHRP Project 19-14 offers a policy framework in which to address these questions, along with practical methods to identify, evaluate, and implement right-sizing initiatives (the right-sizing "toolkit"). This executive summary provides an overview of the concepts, guidance, and approaches fully detailed in the guidebook.

RIGHT-SIZING

Repurposing, re-using, or fundamentally re-sizing (either larger or smaller) an existing asset (or in some cases, plans for a future asset) for a newly understood economic function or purpose.

What Is Right-Sizing?

Transportation agencies are challenged to enact business processes for developing and sustaining an infrastructure portfolio of the appropriate size, function, and composition to serve changing economic needs. Agencies struggle to maintain aging transportation asset portfolios that were constructed for bygone eras, as new and emerging needs far outstrip available revenues. What once were appropriate solutions to transportation problems have, in some cases, become mismatched to the current reality of changing traffic patterns, growing life-cycle costs, environmental effects, and complex, evolving stakeholder expectations. Some agencies buried in life-cycle costs simply allow assets to degrade or they neglect emerging needs citing limited funding. Other agencies seek ways to strategically "disinvest" in some assets to make resources available for alternate uses. Still others seek jurisdictional transfers or private sector participation to keep pace. Technology can make infrastructure more flexible, raising questions about when costly expansion projects can be traded off against more affordable options like managed motorways, congestion pricing, transportation system management and operations, car-sharing and other solutions. Most solutions require rethinking how and why an agency can afford to own, maintain, and modernize its portfolio. In the face of these challenges, right-sizing offers a process by which a transportation agency can make intentional decisions to adjust the size, extent, function, and composition of its existing or planned infrastructure and service portfolio in response to changing needs over time.

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Right-sizing can be implemented as an agency-wide initiative and/or as an incremental action for specific programs or facilities. Right-sizing means seeking an appropriate level and type of investment that avoids over-investing or under-investing, over-building or under-building, and over-serving or under-serving the market based on customer and system requirements. Effectively applied, a right-sizing strategy will contribute to economically sustainable investments with diverse funding streams that create greater life-cycle value for society, when compared with other alternative investment strategies. Right-sizing addresses the fundamental mission of transportation agencies to deliver infrastructure and services that are financially sustainable, while also supporting desired levels and forms of economic development and well-being.

What Problems Do Right-Sizing Strategies Address?

Right-sizing as an investment paradigm is not a radical or even new concept, but a natural evolution in how transportation agencies make investment decisions. Right-sizing emerges from the confluence of existing decision paradigms, including value engineering, needs-based planning, and performance-based planning.

A FOCUS ON VALUE GENERATION. Value engineering—the systematic review and analysis of transportation projects to deliver needed function at the lowest overall cost—provides an important baseline upon which right-sizing can build.[3] Value engineering seeks to balance value delivered by transportation infrastructure with a justifiable level of investment. While value engineering is introduced as a transparent and technical balancing process, its implementation has revealed intricate challenges. Experience shows that balancing least cost with delivered value creates a challenge for agencies, as they need to account for both (1) the complex drivers and indicators of value in a transportation asset portfolio and (2) the value transactions inherent in transportation infrastructure investment decisions. Arriving at a

[3] FHWA. Value Engineering Final Rule. U.S. Department of Transportation, Sept. 5, 2014. https://www.fhwa.dot.gov/ve/.

decision-making paradigm appropriate for the complexity of these implicit transactions requires evolution beyond the simplifications of needs-based or even performance-based planning and programming. Specifically, it requires an evolution into a more value-based frame of decision making. The new guidance document is intended to lay the foundation for such a paradigm.

VALIDATING NEEDS. Under the long-standing needs-based planning paradigm, existing infrastructure has been developed through comparison of today's situation (or tomorrow's projection) to a set of minimum tolerable conditions. This may be based on a historical understanding of need that is backward-looking rather than forward-looking. Needs-based planning defines a *need* as any shortcoming in current performance (or projected performance at current build levels) relative to a set understanding of what is acceptable. Potential remedies are evaluated based on whether the outlay required is less than the cost of imposing the deficiency on system users. However, under needs-based planning, there is limited consideration given to validating needs or questioning whether projected deficiencies would actually occur. Typical needs-based planning does not necessarily consider whether today's remedy would suffice for future conditions or represent the best and highest use of all resources (public and private). The new guidance document offers approaches for validating an agency's understanding of needs.

As stewards of infrastructure that serves the public interest, transportation agencies generally cannot back out of risky investments, cut losses, invest elsewhere or engage in other rational behaviors with the same freedom as private asset owners. For this reason, transportation agencies are especially vulnerable to uncertainty, and inevitably must periodically follow a right-sizing process to account for change over time.

A FOCUS ON DESIRED PERFORMANCE AND SYSTEMIC OUTCOMES. The era of performance-based planning responds to funding constraints and growing multi-modal system complexity by shifting focus away from a simplistic view of needs and simply treating deficient infrastructure elements. Instead, performance-based planning looks more widely at the most efficient ways to achieve system performance outcomes. It considers the need to balance investment across different modes and performance areas. Implementing performance-based planning can make particular sense in an era of increased uncertainty surrounding future development patterns, transportation technologies, and comparative user needs. That form of consideration leads to questions of what is the "right-size" of an infrastructure asset, program, or service.

RIGHT-SIZING FOCUS ON ADDRESSING MISALIGNMENTS. Evolving one step beyond these foundational investment paradigms, right-sizing seeks improved alignment between the life-cycle cost, capacity, extent, condition, and function of a piece of infrastructure (or a program) and its intended current and future use. The concept of a "right-size" is not raised in any absolute sense, but rather refers to an overarching objective of striving for alignment between need and cost. This alignment is achieved by accounting for changes that have occurred since legacy infrastructure was designed or accounting for factors that were simply overlooked in the past. Right-sizing decisions pertain to reaching alignment between:

(1) The owners responsible for maintaining the infrastructure in the long term,
(2) The people or entities paying for the infrastructure,
(3) The people or entities using the infrastructure, and
(4) The people or entities making decisions about the infrastructure.

Right-sizing decisions refer explicitly to situations where there is either currently a misalignment of the above-mentioned interests, or in which changing conditions make it likely that such a misalignment will occur if planners do not address change in a strategic way. An example of a misalignment may be local land use changes and developer investments leading to the overuse of a state facility. In this case, opening local areas for new development may generate significant wealth for developers and tax base for municipalities, while imposing mounting expansion and life-cycle costs on a statewide transportation budget. In this example, value is clearly created and harvested, yet there is deficiency, inefficiency, and scarcity of resources supporting the infrastructure. The payers and beneficiaries are misaligned in this example, as are the payers and decision makers.

Figure 1 demonstrates the relationship between planning decisions (that intrinsically seek the "right-size" for any piece of infrastructure) and corrective right-sizing decisions, in which interventions are needed to bring (or sustain) infrastructure into a right-sized condition. Right-sizing decisions are defined by the recognition of a change in intended function or standard of the infrastructure. Consequently, right-sizing decisions can involve preservation, reconstruction, modernization, replacement, expansion, or enhancement projects.

Because right-sizing decisions are different from other investment decisions, the best practices from needs-based or even performance-based planning require adaptation to support right-sizing situations. Scenarios such as replacement with a downsized asset, deferred investment, implementation of flexible design standards or performance targets, or jurisdictional transfer are fundamentally different from the scenarios of preservation, expansion, and prioritization that transportation agencies are accustomed to considering.

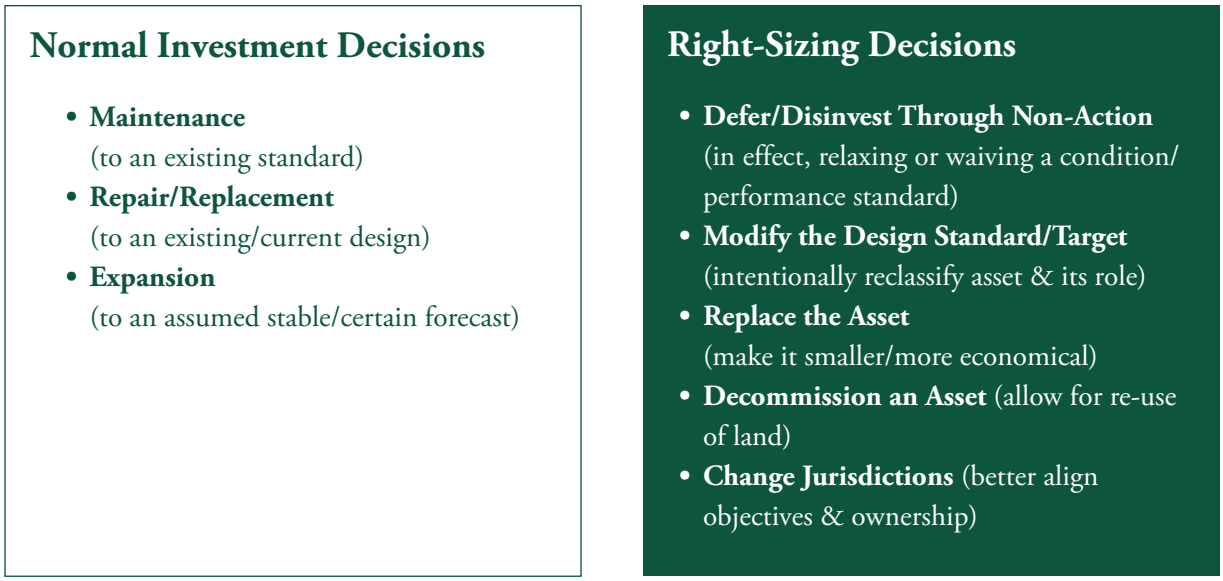

Figure 1. Distinguishing between normal investment decisions and right-sizing decisions.

Who Participates in Right-Sizing?

Effective right-sizing relies on a combination of three key elements:

- **INTELLIGENCE,** an understanding of changing conditions and needs that precipitate the need to right-size and the objectives of right-sizing,
- **AUTHORITY,** the ability to take the necessary actions in support of right-sizing, and
- **RESOURCES,** including ownership of relevant assets and services, as well as funding and staff resources to achieve right-sizing objectives.

If these prerequisites are not present in a single agency, right-sizing requires partnerships. Examples include collaboration between a state DOT and a city, or a metropolitan planning organization and member localities or private developers. Through partnerships, right-sizing has the potential to deliver a range of benefits including: greater cost-effectiveness and efficiency in asset management, enhanced economic development from more supportive transportation networks and services, improved understanding of needs through cooperation, enhanced ability for infrastructure owners to anticipate and adapt to change, and more sustainable long-term investment. To address the diversity of partners involved, right-sizing guidance addresses both the needs of state DOTs and other agencies and stakeholders that may initiate or participate in a right-sizing effort.

What Is a Right-Sizing Policy?

While agencies can selectively implement techniques from the right-sizing guidebook whenever there are opportunities to do so, the greatest benefits of right-sizing can be achieved when an agency develops a right-sizing policy. A right-sizing policy should not be understood as a revolutionary new program imposing its own set of criteria and rules on the entire agency at once. Instead, incremental strategies are recommended to integrate right-sizing objectives and opportunities into existing business practices using existing tools and available resources. The starting place will be different for each agency. Some agencies will prefer starting with a simple program involving only a single business process or method, such as incorporating a checklist of right-sizing questions at key junctures in the infrastructure life cycle (as described in Section 2.2 in the guidebook). Others may wish to start at a more systematic level, integrating economic and technological sensitivity into their transportation asset management plan (TAMP) or long-range transportation plan (LRTP). That approach will allow them to later use the results to introduce right-sizing into a host of programming and investment decisions, following a major plan update.

A right-sizing policy defines the agency's process for consistently identifying and addressing right-sizing opportunities, forming the needed partnerships, establishing objectives, considering options, and arriving at specific policy actions and investments to achieve and sustain right-sizing outcomes. Regardless of the entry point into right-sizing, an effective policy will guide the realization of right-sizing opportunities through different choices and possibilities as shown in Figure 2. A policy always begins with a process for initiating the assessment of a right-sizing opportunity. The opportunity can be evaluated to determine if there is indeed a misalignment between the infrastructure provided (or planned) and the value generated by that infrastructure. The policy then guides the agency through forming appropriate partnerships, establishing objectives, evaluating and implementing options, and monitoring progress.

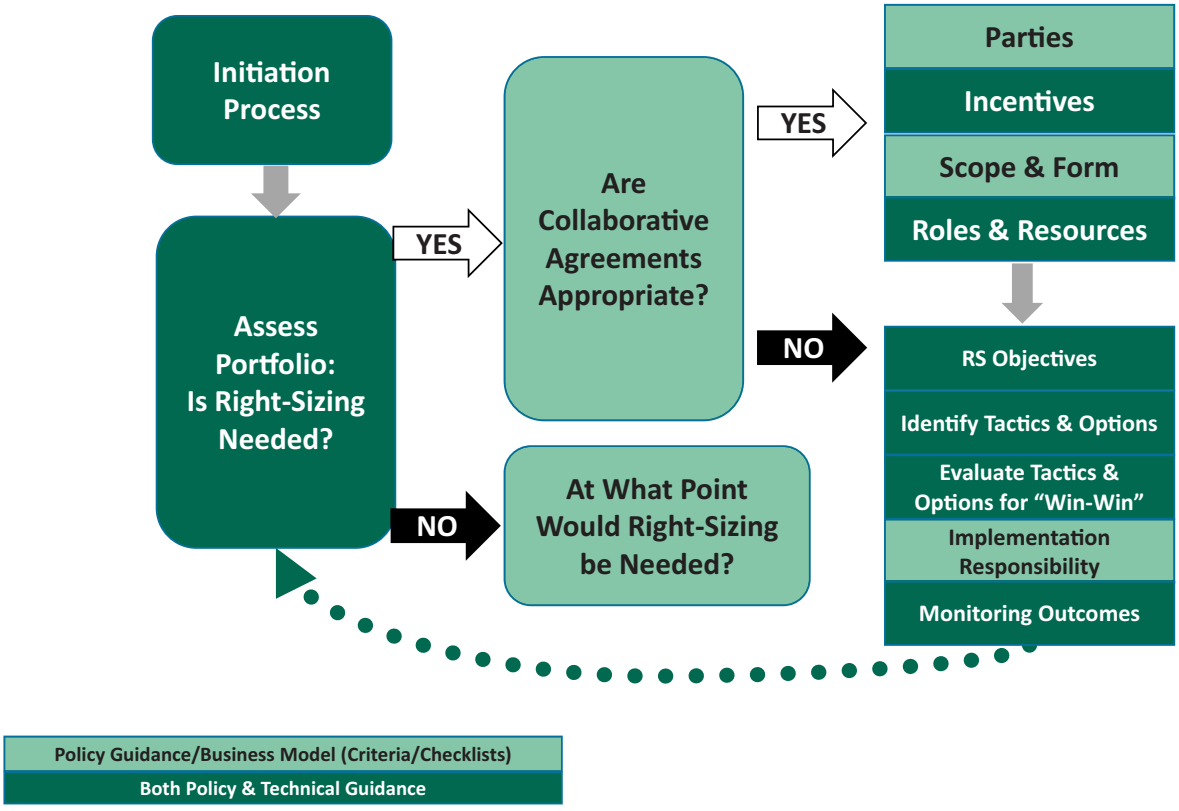

Figure 2. From initiation through the right-sizing process.

Agencies should anticipate revisiting right-sizing policy frequently, adding and modifying its provisions as agency capacities, partnerships, and needs change. As a starting place, the following sections outline key right-sizing policy components. These components are further detailed in the complete guidebook.

RIGHT-SIZING POLICY COMPONENTS

Establishing Right-Sizing Policy Goals

In establishing a right-sizing policy, an agency first needs to clearly articulate why the agency is implementing right-sizing. It is helpful to cite specific examples of problems the right-sizing policy is intended to solve and the expected benefits of solving such problems. To differentiate right-sizing from other policies, the goals should generally fall into one or more of the following categories:

- **REDUCE/MANAGE LIFE-CYCLE COSTS.** When this is a stated goal, it is helpful to include in the policy some statistics on (a) the role that life-cycle costs play in the agency's overall fiscal constraints, as well as (b) how trends in life-cycle cost affect the agency's ability to perform its larger mission. Right-sizing may entail not only reducing life-cycle costs relative to their current (or historic) levels but also reducing anticipated future life-cycle costs when system expansion alternatives are envisioned or regulating costs relative to the market served.

- **ACHIEVE BEST AND HIGHEST USES OF ASSETS AND REVENUES.** When this is a stated goal, it is helpful to include in the policy some examples of assets or programs that are suspected to be under-utilized or un-utilized, as well as input the agency has received pertaining to better and higher uses for them. The policy should briefly explain how and why the agency believes better and higher uses are available, and how right-sizing is envisioned to make the assets more valuable or to remove impediments to economic progress.

- **ALIGN FUNDING AND DECISION MAKING WITH USERS AND BENEFICIARIES OF THE ASSET.** When this is a stated goal, it is helpful to be specific about which assets or programs have such a misalignment, citing (a) the sources of revenues supporting the assets/programs, (b) the benefits believed to be accruing from the assets/programs, and (c) the locus of decision-making authority for their use. It is also helpful to identify parties affected by the misalignment.

A right-sizing policy need not have each of these types of goals. However, if high-level right-sizing policy goals cannot be tied back to at least one of the preceding three categories, then the agency should consider whether the policy really is within the purview of right-sizing or might be better characterized in some other way.

Determining the Scope of the Right-Sizing Process

A right-sizing policy should clearly state (1) which asset classes, networks, services, or programs are subject to the right-sizing policy and (2) which business processes are involved. Asset classes may include facility types (such as low-volume roads or urban rail bridges) and may also be specified by geography (such as roadways serving a specific seaport or rail crossings in rural areas). Agencies may wish to begin by identifying only a few programs, asset classes, or business processes to include in the right-sizing policy, and gradually expand into other processes, as awareness and benefits of the right-sizing concepts become more familiar. As a general rule, it is better to err on the side of keeping the program narrowly defined and focused on the goals previously described, rather than risk the program appearing to be overly broad.

Establishing a Right-Sizing Initiation and Screening Process

A principal barrier to right-sizing efforts that has been cited by transportation agencies at all levels is the absence of a right-sizing initiation process. Most agencies have asset management systems to flag facilities that are ready for preservation treatments. Similarly, there are area transportation partnerships and performance evaluation methods that can be used to identify deficiencies in condition, capacity, safety, and environmental outcomes for under-sized facilities. However, there is not a generally accepted trigger for consideration of a right-sizing decision (as defined in Figure 1 on Page 5). An initiation process is essential because the available methods and tools for realizing right-sizing opportunities will never be applied if the issue is never raised.

Significant changes to infrastructure are most often initiated in a few possible ways: (1) when in the process of asset management, a practical design audit or review reveals a streamlined option or opportunity to reduce life-cycle cost; (2) when funding constraints lead to program level reconsiderations of funding levels or conditions and performance standards; (3) if a local community requests a change to better facilitate local uses of the infrastructure and surrounding land; or (4) if elected political officials place a facility on an agency's agenda. While these situations can lead to right-sizing-type decisions, the current treatment of such opportunities is often piecemeal and does not fully address the alignment or efficiency objectives of right-sizing. Moreover, there may be additional right-sizing opportunities that go unrealized because there is no place within agency business processes for the issues to be raised, either internally or externally.

Right-Sizing Initiation Process Must:

- Provide a clear avenue for entities within or outside the agency to raise a potential right-sizing opportunity.
- Not be limited to the creation of new projects or to the preservation of existing infrastructure.
- Have clear criteria for when an asset, facility, or system warrants a right-sizing process.
- Have clear roles, communication protocols, and timetables for initiating right-sizing.

In the first case (streamlining a project raised in asset management), the simple application of value-engineering or least-cost planning principles may be used to streamline a design (or even an entire program). However, that does not ensure alignment between users, owners, funders, and decision makers in a facility. A typical value-engineering audit or performance-based design review may identify the most efficient way to replace an existing asset with something offering lower life-cycle cost (assuming the same functional requirements as the original design) but may not consider

all the sources of value in the infrastructure from the standpoint of its users, funders, owners, and decision makers. For example, it may miss: (1) the value of a corridor segment as part of a community's main street amenity, (2) the potential value that an interchange or intersection may have for the future development of surrounding land, and/or (3) the role the facility may have in urban or regional growth management strategies, which can all be easily overlooked in a simple performance-based design or value-engineering review.

Similarly, when a city, county, or other entity requests a review of an existing asset or program, there is rarely a formal process (outside of jurisdictional transfer policies) for such outside entities to initiate a review of the alignment of interests in an existing infrastructure asset or program. It is even less common for efficient and equitable sources of funding to be part of the project development process. Even where such processes exist, there are no currently established methods for reconciling functional requirements for the asset or program among the user, funder, owner, and decision maker perspectives. There are also no established methods for assessing, evaluating, or implementing changes to enhance such alignment. It is not uncommon for a city, county, or developer to ask a state DOT to review an asset or program, only to have the DOT come back with a finding that the asset or program is efficiently performing its intended function (as defined by the DOT) and will not be changed. That type of outcome can exacerbate the frustration of the parties involved. Such reviews may also neglect the potential for cost-sharing arrangements across affected parties.

A right-sizing initiation process, therefore, is intended to provide a clear mechanism for consistently raising these issues. The guidebook proposes a two-pronged initiation strategy, providing for DOT-initiated right-sizing and external proponent-initiated right-sizing. These elements of the strategy are further discussed as follows.

DOT-Initiated Right-Sizing

A DOT can initiate right-sizing of its program as a matter of policy, through "built-in" right-sizing processes. The agency can also right-size individual projects based on initiative from staff, who may become aware of a right-sizing opportunity through the day-to-day operations of the department.

RIGHT-SIZING THROUGH FUNCTIONAL CLASSIFICATION. Whenever a state functionally classifies a roadway (or reviews a functional classification), there is an opportunity to enact some degree of right-sizing. This is because different functional classifications carry different design and performance standards that lead the agency to treat facilities differently. However, it may not always be clear to a DOT when a review of functional classification is in order. Even when such a review occurs, it still may not be clear what the new classification should be or what complementary improvements, changes, or agreements may be appropriate to support the new function. Agencies that have built-in cycles (e.g., every 10 years) of re-evaluating functional classifications may not currently apply a right-sizing lens to this process. Therefore, while functional classification is a right-sizing opportunity built-in to many DOT policies, in practice, review of functional classification may be understood as a policy instrument for implementing right-sizing efforts that are otherwise initiated and evaluated through tactics described in this publication and in the guidebook.

RIGHT-SIZING IN THE ASSET MANAGEMENT PROCESS. Right-sizing policies can be effective when an agency's asset management system identifies facilities nearing the end of their expected life and recommends preservation or replacement. This can occur in the TAMP and as part of the recurring asset management cycle. Specifically, it is recommended that agencies incorporate sensitivity tests of key policy assumptions that drive an agency's forecast of investment needs and anticipated conditions, as outlined in Figure 3 and Table 1. By using sensitivity tests in the asset management process, an agency can pinpoint assets whose investment needs and returns are the most sensitive to potential changes in economic or other conditions beyond the agency's control, and to its funding and performance standards. Additional detail on how to define and interpret alternative scenarios and the sensitivity of outcomes is provided in the guidebook.

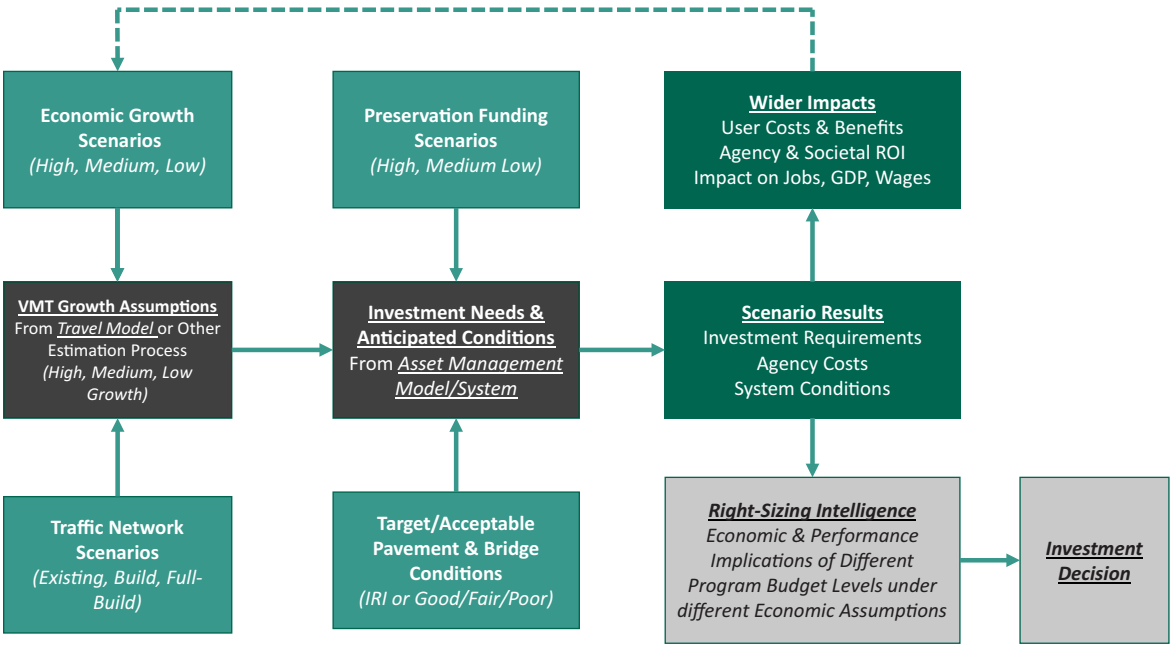

Figure 3. Applying right-sizing scenarios in the asset management process.

Table 1. Assumptions to guide right-sizing sensitivity tests in asset management.

Policy Assumptions	
Economic Growth	Consider high, medium, or low levels of underlying economic growth.
Transportation Network	Consider different transportation network build scenarios and their effect on the distribution of traffic across part of the network and thereby their exposure to costs of different levels of asset condition.
Target Pavement/Bridge Conditions	Consider the implications of relaxing current minimum tolerable conditions standards on both the transportation system user and agency costs.
Unit Costs	Consider different assumptions regarding cost escalation. The state may select high, medium, and low unit cost for different facility classifications based on historic cost behavior or input from the construction industry.
Available Preservation Funding	Consider different funding levels, which depend on available funding sources and agency discretion over how much of its overall revenue it invests into preservation programs.

RIGHT-SIZING IN THE STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP) PROCESS. In the STIP process, in which individual projects are invested for each program, a DOT may implement a right-sizing procedure of auditing proposed projects for inclusion in the STIP in several ways:

- Sensitivity testing of changes in project performance under different underlying assumptions, such as forecast traffic growth levels.
- Screening candidate projects before they are admitted to the program using the methods provided in the right-sizing toolkit. This approach can be used to identify where development trends, travel characteristics, or other factors may warrant a different type of project (Chapter 4 in the guidebook). These methods are designed to ensure right-sizing considerations are a consistent part of programming and that the scope of any given project is appropriate to the changing economic context.

RIGHT-SIZING IN THE LRTP PROCESS. The LRTP process generally focuses at the level of programs and strategic investment trade-offs. Right-sizing in this context may:

- Consider different economic and traffic forecasts when quantifying investment needs for each program in the LRTP and comparing among programmatic investment packages.
- Consider different congestion threshold targets in urban areas (see the Congestion Threshold Testing method described in Section 4.6 in the guidebook).
- Include within the scope of the LRTP a task to identify right-sizing candidate corridors, facilities or systems. This can be done through application of the Trip Length Analysis to Assess Modal Balance method (Section 4.1 in the guidebook) and the Roadway Utilization/Cost Screening method (Section 4.2). If there are corridors or regions of the state found to have an over-abundance of short-trip volume on major state facilities, or with exceptionally high preservation costs per trip carried, it can be appropriate to include recommendations for further study of right-sizing in the body of the LRTP.

NON-RECURRING RIGHT-SIZING: DOT DISTRICT OFFICE, MODAL OFFICE, OR CENTRAL OFFICE INITIATION. In addition to the preceding "built-in" or recurring processes, it is possible that a DOT may have a policy to initiate right-sizing based on corridor studies, special modal plans, or situations when a district engineer or modal office manager notices trends in performance (or receives customer feedback on that matter). It is essential that a department have internally consistent and transparent criteria for internally initiating and validating a right-sizing process. Table 2 presents examples of the type of criteria and information that a department may use to assess and validate the case for a district or modal right-sizing initiative.

Table 2. Example criteria to assess and validate right-sizing initiative.

Criterion	Example	Supporting Information
Repeated requests for exemptions to standards.	Requests for driveway access to a principal arterial have more than doubled in the last year.	Documentation of requests and associated building permits/land use changes.
Studies showing facility is under-utilized or un-utilized.	Transit agency completed a plan showing that only 5% of spaces at a park & ride lot are being used.	Documentation of utilization level.
Significant change in context since last improvement.	Major industrial park recently closed or relocated, and land is being converted to mixed use.	Documentation of precipitating event and associated changes in local planning/zoning.
Event raising legal or financial risk of status quo.	Reports of cyclists and pedestrians routinely using a highway culvert as a pedestrian tunnel.	Case reports of instances of this happening.

Proponent Initiated Right-Sizing

Cities, developers, counties, and other entities outside a state DOT often have the best understanding of development trends, opportunities, and other changes affecting the transportation asset portfolio. Given this knowledge, it can be beneficial for DOTs to provide avenues for outside parties to help initiate right-sizing projects. Consider the fact that state DOTs have processes for "proponents" or outside agencies (or even private or non-profit entities) to nominate projects to a STIP, or to apply for a jurisdictional transfer. In a similar fashion, it is recommended that states have processes for outside entities to also make nominations for right-sizing initiatives. The state may wish to solicit and accept right-sizing applications/requests at consistent and well publicized intervals, or it may take such requests on a rolling basis.

A standard application process for a right-sizing initiative should be available for all proponents. It is especially important to review right-sizing proposals using consistent and transparent criteria. Table 3 provides examples of potential guidelines for reviewing right-sizing proposals.

Table 3. Example review guidelines for right-sizing proposals.

Criterion Type	Key Evaluation Factors
Nature of Opportunity	Does the program or facility proposed for right-sizing affect the cost, condition, or performance of the agency's assets enough to warrant action?
Misalignment of Utilization & Demand	How does the utilization of this facility compare with other comparable facilities? Are the claims of "better and higher" uses supported by concrete proposals of better ways to use the land or resources or with examples of where such uses have been achieved elsewhere?
Potential Cost Savings	Are the sources and magnitude of cost savings given in the application quantified (or quantifiable)? Have there been studies (or is other objective information cited in the application) verifying how these costs accrue?
Partners & Beneficiaries	Do the intended beneficiaries agree with the proponent's assessment of the opportunity and, if so, is there indication of their willingness to participate in a right-sizing effort?

Managing Performance and Tracking Progress

While right-sizing objectives by their nature are realized in the long term, some right-sizing actions (such as a jurisdictional transfer) can occur within a matter of months. They may thereafter simply require monitoring and benchmarking of performance and cost changes against right-sizing objectives. By contrast, other right-sizing objectives (such as conversion of a major freeway to an urban arterial) may require disciplined and consistent actions by multiple entities over a period of years to achieve the envisioned cost savings or better use of assets. Figure 4 illustrates the spectrum along which right-sizing initiatives may fall. Each duration has its own risks, as well as potential tactics to overcome these risks as outlined in the guidebook.

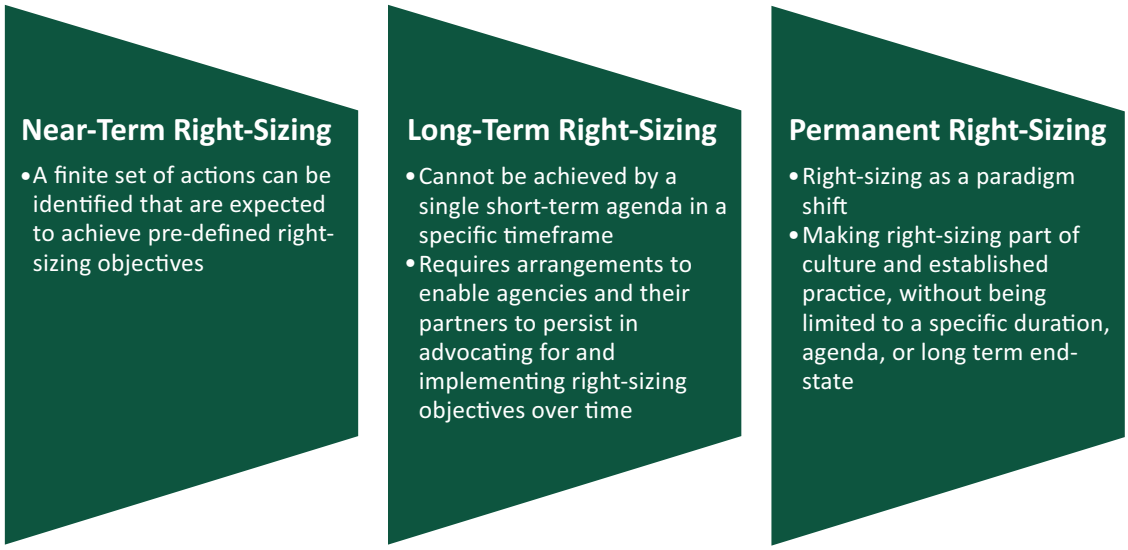

Figure 4. Spectrum of the duration of right-sizing.

ESTABLISH A MONITORING REGIME. Careful establishment of a monitoring regime is essential for any right-sizing success. Monitoring is especially important when right-sizing objectives are subtle and long term in nature. Such monitoring begins with intended outcomes and identifies key data sources and entities responsible for measuring and reporting outcomes over time. The monitoring strategy should also include clearly designating (1) the agency responsible for tracking, (2) an agreed-upon frequency with which reported outcomes will be compiled into a composite score card, and (3) junctures at which parties will agree to reconvene to consider incremental updates or adjustments to the right-sizing actions taken (see Table 4).

Table 4. Monitoring regime for right-sizing initiative.

Right-Sizing Policy Objective	Quantifiable Measures of Intended Outcome	Examples of Possible Supporting Data & Reporting Entity
Life-Cycle Cost Saving	• Annual or cumulative maintenance/preservation dollars saved.	• Owning Agency – annual O&M budget, predicted remaining life.
Better and Higher Use of Existing Assets	• Value of property made available for alternative use. • Value of economic activity enabled by the changed use of the asset minus any additional user cost.	• City or County assessor data – tables & maps. • City or County record of commercial or industrial building permits and build-out; or record of tourism/visitor events attracted.
Better Alignment of Costs, Benefits, and Uses	• Comparative dollar investment in the infrastructure by different partners relative to projected benefit or revenue streams. • Findings from use of the Stratified Return on Investment Calculator (as described in Section 4.4 of the guidebook).	• Municipal and County – record of revenues received (sales tax, property tax, impact fees and other sources) before versus after the change. • Private Business or Developer – reports of additional business occurring on or near the site. • Special Studies, undertaken by pre-identified right-sizing partners such as surveys or interviews documenting market reaction to the change.

Note: The monitoring strategy must specify frequency of reporting, entity responsible for compiling/distributing reporting, and criteria for reassessing right-sizing solution.

BUILDING UPON EXISTING CORRIDOR MANAGEMENT PRACTICES. Monitoring performance and tracking progress can be especially challenging when right-sizing objectives span multiple years and must survive political shifts over time. Any given agency's agenda may change based on elections, immediate needs, funding or other considerations. For this reason, the endurance of multi-year right-sizing efforts may require broad coalitions or partnerships to achieve long-term objectives. The experience of corridor management is highly instructive for the formation of right-sizing coalitions to achieve these long-term objectives. An agency can build on this existing body of practice, while adapting its methods to target the unique requirements of right-sizing (Table 5).

Table 5. Comparing right-sizing with corridor management.

Similarities	Differences
• Both types involve broad coalitions which exist to achieve stated objectives for a transportation system and endure until the objectives are satisfied. • Both types can be initiated by a study of the system in question to establish vision, goals, objectives, roles, and actions. • Both types can be implemented through joint powers agreements, compacts, memoranda of understanding, and other multi-agency agreements. • Both types rely on consistent long-term attention to selected performance objectives and long-term outcomes.	• Right-sizing coalitions and initiatives need not center on a specific corridor but may apply to any facility or sub-system. • Right-sizing coalitions and initiatives focus on making changes to achieve life-cycle cost savings, better and higher uses of assets or better alignment of ownership, funding, use and authority. Corridor initiatives focus more broadly on a range of performance outcomes. • Right-sizing initiatives may succeed without expanding or adding any new infrastructure, whereas corridor initiatives often entail an expansion or modernization building program.

ELEMENTS OF RIGHT-SIZING STRATEGY

While a structured right-sizing policy can enable an agency to consistently implement right-sizing over time, an agency must also be prepared for unique right-sizing challenges that may not be common to other business processes. Addressing these challenges, the guidebook outlines five key elements of right-sizing strategy: partnerships, scale and complexity, duration, uncertainty, and capacity building.

Partnerships

Figure 5 illustrates three factors needed for effective right-sizing. Partnerships enable agencies to gather intelligence, to ensure stakeholder buy-in for right-sizing goals, and to ensure the alignment of authority and resources needed to implement and sustain outcomes. The guidebook outlines (a) how to identify and engage partners, (b) how to identify right-sizing opportunities by sharing data and intelligence among partners (e.g., using municipal land use and value data to understand the changing market for transportation), (c) the importance of non-governmental institutions in providing a trusted and consistent voice regarding the efficient and productive use of resources, and (d) the unique role of MPOs and other regional bodies in both providing analytical support and convening key stakeholders in a right-sizing process.

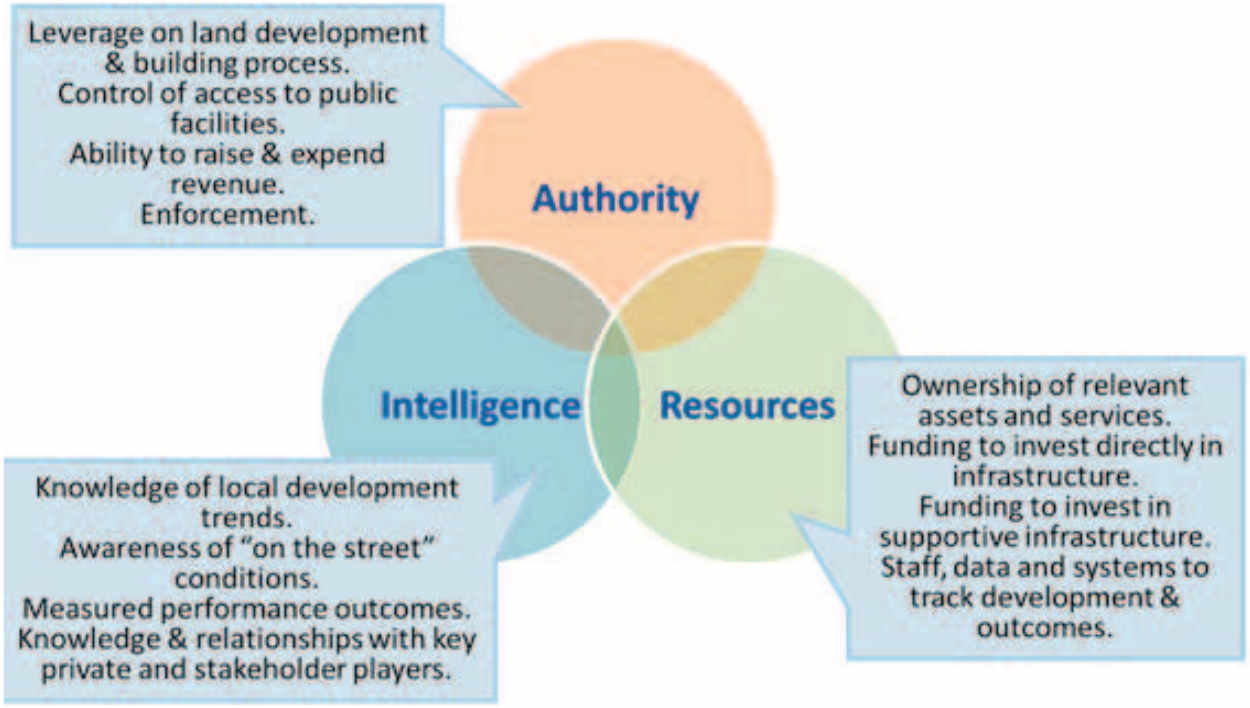

Figure 5. Right-sizing prerequisites.

Scale and Complexity

Right-sizing approaches should be tailored to the scale and complexity of the transportation portfolio and market served. A focus on area types can support a nuanced consideration of right-sizing opportunities, risks, and tactics. While the guidebook does not definitively define these area types, in the right-sizing policy discourse they have come to have the following meanings:

- **URBAN RIGHT-SIZING** pertains to densely populated and built-out areas, characterized by competing uses for land, money, and infrastructure and the balance of multi-modal needs, payoffs, and costs in a changing land and transportation economy with many mature assets and limited space. Right-sizing in urban areas can especially benefit from tactics that seek to leverage municipal and private resources, including coordination of infrastructure investment and funding with targeted redevelopment efforts.

- **SUBURBAN (OR NON-URBAN) RIGHT-SIZING** addresses populated areas where diffuse spatial patterns and business or jurisdictional arrangements impose significant efficiency challenges, but without the same options and clearly defined partners available in more dense urban settings. In this context, right-sizing may require coalition building to overcome jurisdictional fragmentation. Suburban communities or newly urbanizing areas also have the opportunity to apply lessons learned from more built-out areas when shaping infrastructure and financial mechanisms for greenfield development. Older suburbs may additionally be managing hard choices posed by large inventories of aging infrastructure but may nevertheless have emerging opportunities for more efficient land use and transportation combinations, based on changing demographics, land uses, and preferences.

- **RURAL RIGHT-SIZING** applies to areas where networks and populations are sparse, competing uses for infrastructure and land are limited, and sources of funding or partnership are also limited. Rural right-sizing discussions are characterized by needs for resiliency, service to pass-through traffic, and support for sectors such as agricultural or mining resources. In this context, right-sizing assessments must look beyond simple accounting of users or vehicles, to understand other indicators of value supported by infrastructure (e.g., acres of agriculture), as well as issues of criticality of connectivity, resilience, and vulnerability.

The guidebook outlines special considerations in evaluating right-sizing opportunities in each of these settings as well as recommendations for engaging partners and achieving right-sizing objectives.

Duration

When implementing any right-sizing effort, it is important to address the likely duration of the right-sizing activity. The guidebook outlines potential pitfalls and tactics to overcome them for each type of right-sizing: near term, long term, and permanent, as summarized in Table 6.

Table 6. Potential pitfalls/risks and remedies and safeguards by right-sizing duration.

Duration	Potential Pitfalls/Risks	Remedies and Safeguards
Near Term	• Right-sizing will be seen as just another incidental feature of a project, rather than a central rationale driving the scope. • Implementation of change does not ensure achievement of objectives, given that right-sizing benefits accrue over time.	• Consider alternatives to right-sizing when setting objectives. • Tightly specify objectives and scope. • Include a monitoring regime.
Long Term	• Right-sizing objectives will fall out of date if the initiatives go on for too long. • Over time, right-sizing coalitions may become a vehicle for purposes other than right-sizing, diluting the effectiveness.	• Work from a tight mission statement. • Begin with a comprehensive study. • Provide a primer for new staff members. • Include both governmental and non-governmental partners. • Establish clear criteria for changes in right-sizing actions and priorities. • Set benchmarks for updated assessments.
Permanent (Paradigm Shift)	• If right-sizing becomes a buzzword, there can be a tendency to characterize new equivalents of existing practices as "right-sizing solutions," even if they do not achieve right-sizing objectives.	• Specify right-sizing procedures incrementally. • Evaluate potential right-sizing actions against three core criteria: life-cycle cost savings; better alignment of benefits, funding, and control; and better and higher uses of existing infrastructure. • Appointment of an independent agency-wide right-sizing review board/task force.

Uncertainty

A principal reason why right-sizing is necessary is the rigidity of transportation infrastructure in the face of changing economic and technological realities. Two forms of uncertainty are particularly pertinent to right-sizing scenarios:

- **ECONOMIC (OR DEMAND) RISK** addresses the possibility that market demand may either (a) outpace the anticipated utilization of a facility (leaving a deficiency and imposing costs on system users) or (b) fall short of anticipated utilization (leaving the agency with sunk improvement and life-cycle costs into an asset that cannot generate enough societal value to justify its ongoing outlays).

- **TECHNOLOGY RISK** can occur when technological advances are under- or over-estimated. This too can lead to either an agency losing the sunk cost of an infrastructure improvement designed to mitigate a problem, when the problem is resolved by advanced vehicle or other technological change before the infrastructure improvement can generate its intended benefits, or to an agency failing to invest in enhancements to key infrastructure elements that will be required by newly emerging technologies.

The guidebook outlines how to use traditional net present value estimates and benefit–cost ratios (or other multi-criteria scores) under different economic or technology assumptions, in order to integrate right-sizing into prioritization decisions. Comparing projects with respect to upper and lower bounds of benefit–cost ratios, as well as the estimated present value of net benefits (or disbenefits) under each scenario, can reveal the comparative vulnerabilities of projects to economic and technological uncertainty. Furthermore, by considering variability in the net present value of societal benefits,[4] it is possible to consider the potential magnitude of over-spending or under-spending. Such analyses can help integrate risk into the decision-making process, supporting a conversation about drivers of risk and the overall risk appetite within the policy environment.

Capacity Building

Right-sizing transportation infrastructure requires engineers, planners, agency managers, and partners to extend beyond the comfort zone of their core expertise, experience, and immediate jurisdiction. Practitioners in state DOTs are not generally accustomed to understanding the value of their assets in terms of "best and highest use," competitive market forces driving the value of their investments, or concerns about the tax base or owner profits resulting from a project. Likewise, municipal and county planning and public works agencies are not accustomed to the challenge of balancing performance targets and scarce revenues across a multitude of programs, statewide area types and complex federal and state funding rules. Private developers, while increasingly willing to participate in transportation funding and decision making, are often not savvy about how the rights of vulnerable populations, accountability to elected officials, and funding eligibility considerations play into the motivations of public sector partners.

Building staff capacity in the market-based principles, practices and reasoning of right-sizing partners is likely to engender a greater culture of efficiency among agency staff. In such a culture, right-sizing principles can more naturally synchronize with (and enhance) other agency business practices. To this end, the guidebook outlines a series of right-sizing knowledge areas that can be the target of right-sizing capacity building goals, as summarized in Table 7.

Table 7. Right-sizing knowledge areas.

Right-Sizing Knowledge Areas	Capacity Building Objective
Business Managerial Accounting	Enable transportation agency staff to recognize similarities and differences between how needs, alternatives, and outcomes are understood within their agency in contrast to how they will be viewed by right-sizing partners more dependent on changing market realities.
Business Negotiation	Give transportation agency staff proficient understanding of internal and external economic and business objectives to enable them to evaluate options and exchange right-sizing proposals and counterproposals with partners.
Comparative Public and Private Sector ROI Metrics	Enable agency staff to understand how private sector users of the transportation system evaluate the size, extent, and composition of assets or programs in relation to how the transportation agency may view them internally.
Intergovernmental Affairs	Enable agency staff to readily identify and suggest ways that partner agencies can collaborate in a right-sizing process and also understand the value of right-sizing proposals or alternatives within the context of local needs.

[4] *Present value of benefits minus present value of costs.*

Two approaches to implementing this capacity building within an agency are

1. Developing and implementing a ***Right-Sizing 101 Workshop*** to create a general understanding of right-sizing, key roles and how the agency is approaching it.

2. Forming ***Cross-Training Partnerships*** with participants from state DOT staff, municipal planning and public works staff, economic development organizations, and land or real estate development communities. The objectives of such partnerships are to (a) familiarize agency staff and allied organizations with the concept of right-sizing; (b) educate staff about the right-sizing knowledge areas; and (c) create working relationships between state DOT staff, county/municipal staff, and private businesses around the topic of right-sizing. The partnerships can include multi-year certification tracks or simple collaboration in mutual "lunch and learn" events or seminars.

THE RIGHT-SIZING TOOLKIT

In the course of the NCHRP Project 19-14 right-sizing research effort, the research team conducted extensive outreach with staff at DOTs and other transportation planning organizations around the country. From that outreach, along with review of existing practices, the research team found that while practitioners do not see major gaps in the raw data, methods, and tools available to support right-sizing scenarios, there is a need for targeted methods and tools to support integration of right-sizing decisions into agency business processes. The right-sizing toolkit is offered in response to those needs. It represents custom applications of methods, tools, and resources that are widely available in the typical DOT environment to specifically address questions related to right-sizing. The tools and methods can be used to identify and diagnose right-sizing situations, evaluate right-sizing scenarios, and make a plausible business case for a right-sizing decision or policy (Table 8).

Table 8. Methods included in the right-sizing toolkit.

Method/Tool	Right-Sizing Decision-Support/Problem Addressed
Trip Length Analysis to Assess Modal Balance	Support transportation planners in looking beyond aggregate volumes to understand how different trip-making patterns may point to a reconfiguration of the balance between modes.
Roadway Utilization/Cost Screening	Systematic screening procedure for identifying outliers in the road network that impose disproportionately high life-cycle costs for the level of traffic (or other metrics of utilization) that they serve.
Development-Sensitive Safety Analysis	Assist practitioners in anticipating where changing land use and traffic volumes and safe travel speeds may signal a need for new safety counter-measures.
Stratified ROI Calculator	Provide a consistent decision-support framework for considering differential return on investment from the perspective of multiple entities involved in a potential right-sizing scenario.
Funding and Development Awareness Method	Identify the full community of potential funding entities (public and private) with potential incentive to invest in a transportation system or facility, based on improved awareness of surrounding development trends.
Congestion Threshold Testing	Support right-sizing in the context of growing areas by facilitating a conversation about diminishing marginal returns and relaxing congestion threshold targets.
Asset Deficiency Mapping Method	Assess the spatial network implications of decisions to relax pavement performance standards.
Project Scoping Method	Reduce the risk of over-build or under-build by incorporating information about multiple types of performance deficiencies, as well as possible sensitivity of needs to different economic and technical futures into the project scoping process.
Roadway Spacing Analysis	Create networks with sufficient mobility and connectivity for intended future land use and supported activity.
Performance-Based Practical Design (PBPD) Checklist	Provide for systematic review of an agency's STIP to determine whether projects could be additionally rightsized through PBPD.

Often these methods can be applied using available data and technology in transportation departments, within existing business processes, to help right-sizing opportunities become an integral part of decision making. The methods and tools recommended in the guidebook build on the existing state of the practice. They offer considerable flexibility and open-endedness in terms of their ability to be tailored to the needs of particular right-sizing situations or agency capabilities. Table 8 summarizes the methods included in the right-sizing toolkit.

Table 9 provides some guidance for including right-sizing tools and methods in the scope of specific agency business processes. Even agencies not developing right-sizing policies can incrementally work from this table to add right-sizing components to selected business processes.

Table 9. Right-sizing methods and typical DOT business processes.

Right-Sizing Tools and Methods	DOT Activities					
	State/MPO LRTP (Planning)	State/MPO STIP/TIP (Programming)	Modal Plans	Asset Management (Ongoing)	TAMP/Asset Management Plan	Corridor Study
Trip Length Analysis to Assess Modal Balance	●		●			●
Roadway Utilization/Cost Screening	●	●		●	●	●
Development-Sensitive Safety Analysis		●	●			●
Stratified ROI Calculator		●	●			●
Funding and Development Awareness Method		●	●		●	●
Congestion Threshold Testing	●	●	●			●
Asset Deficiency Mapping Method	●	●		●	●	●
Project Scoping Method		●	●		●	●
Roadway Spacing Analysis	●		●			●
Performance-Based Practical Design Checklist		●				●

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