
Guide for Development of Rest Areas on Major Arterials and Freeways

Third Edition



prepared by the AASHTO Task Force on Geometric Design
**American Association of State Highway
and Transportation Officials**



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American Association of State Highway and Transportation Officials

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Foreword

Most states have established rest-area programs including planning, design, construction operation and rehabilitation components, designed to meet safety and service needs of highway users. Not all these programs are fully implemented. Some states are reevaluating them, and through comprehensive and strategic planning are refining their programs to match current state transportation goals, objectives, and investment strategies. Nationally, a broad range of motorist services within rest areas have been developed on both the Interstate and National Highway systems. This *Guide* provides an overview of components necessary to establish and maintain a successful statewide rest-area program and describes the range of services to be provided.

Transportation officials must recognize the importance of rest areas. The primary responsibility of the state to persons using highway systems is safety, and rest areas are an important instrument for its improvement. Accident reduction is their primary function. Greater highway safety is the major benefit in establishing rest areas, through safe off-road locations for motorists to rest, sleep, change drivers, and check vehicle loads and/or minor mechanical problems. Additional benefits for motorists are relief from extended travel period time, increased comfort and convenience, and locations for public agencies to communicate with travelers.

In his National Cooperative Highway Research Program report on evaluation of roadside rest areas, G. F. King (1989) estimated that on rural interstate highways, absence of rest areas results in a 52 percent increase in shoulder-related accidents.

He also projected, based on motorist interviews at 13 rest areas in 5 states that “drivers who are fatigued and who enter a rest area represent an estimated 4.5 percent of the [total] traffic stream,” and that “reduction in [driver fatigue] accident rates due to the rest area is 3.7 percent.”

Well-designed, well-maintained rest areas also create positive images for out-of-state motorists and enhance quality of life for the state's own residents. They provide opportunities for state transportation agencies and tourism groups to communicate with motorists in promoting state and local programs, and to provide road and weather information and such directional services as maps, routing suggestions, traffic incident warnings, and road construction schedules.

Transportation managers must consider priorities for rest-area development and rehabilitation as integral to the highway infrastructure. To encourage effective funding decisions, regional and local transportation partners must be educated as to the safety value, costs-benefits, and motorist services provided by rest areas. Failure to establish and maintain support, well-coordinated at all levels of government, inevitably results in ineffective programs.

Once a rest-area program is established, then management, research, and planning must become continuing activities (1) to document user needs, (2) to identify issues impacting rehabilitation and new development, (3) to monitor issues and changes affecting program decisions, and (4) to establish mechanisms communicating program purpose, service needs, and benefits to state and local transportation planners.

Management's commitment to a rest-area development program should include establishing and supporting statewide program objectives, priorities, and funding levels (including construction, operation, and maintenance) as part of each state's overall infrastructure development objectives.

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Planning and Program Development

Rest areas are integral to highway systems and require a comprehensive, statewide investment-planning process. They are eligible for all the development and preservation funding sources available for the highways they serve. Rest-area development and preservation projects are subject to the same levels of highway planning, environmental documentation, and public involvement required for all other highway construction projects.

The essential first step in developing a successful rest-area program is a comprehensive planning and investment process. This requires that needs be identified, their impacts determined, solutions developed through an orderly planning process, and that planners state these solutions in terms of a program. Once this is done, there must be an investment strategy and commitment to the program by managers of the transportation agency.

This chapter discusses basic elements in establishing and maintaining a successful planning process for development of rest areas. The primary emphasis is on program considerations, including federal, state, and local regulations and operational guidelines, major planning parameters, and systems-analysis development to identify comprehensive needs. Comprehensive planning and program development should result in a thorough, well-coordinated, statewide rest-area system.

A. Program Considerations

1. Guidelines/Regulations

A comprehensive development program must incorporate federal rules, regulations, and design criteria, which should guide the entire process of program development and design. Knowledge of environmental statutes and regulations is also essential in protecting economic, social, and environmental resources, and integrating rest areas into their surrounding environments. AASHTO's *A Guide for Transportation Landscape and Environmental Design* (1991) provides additional guidance and technical information to assist transportation planners and designers in addressing environmental issues. The following significant laws and regulations affect rest-area design and development:

- *U.S. Code*, Title 23—Highways (23 U.S.C.);
- *Code of Federal Regulations*, Title 23—Highway (23 CFR);
- *Federal-Aid Policy Guide*, issued by the Federal Highway Administration (FHWA);
- *National Environmental Policy Act*, 42 U.S.C., 4321-4347; 23 CFR 771 as amended;
- *Environmental Impact and Related Procedures*, 40 CFR 1500-1508 CEQ Regulations;
- *National Historic Preservation Act* of 1966 as amended, 16 U.S.C.;
- *Americans with Disabilities Act* (ADA);
- *Clean Water Act*;
- *Safe Drinking Water Act* of 1974;
- Council of American Building Officials/American National Standards Institute (ANSI);
- National, state, and local building codes.
- *Federal Register*, Vol. 60, No. 154: Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federally Landscaped Grounds.

Funding usually can be obtained from federal sources. Under 23 U.S.C., all rest areas are eligible for federal funds for construction and rehabilitation. Those located on the National Highway System (NHS), and including the Interstate system, are eligible for NHS funding. All others are eligible under the Surface Trans-

portation program (STP). Use of federal funds is discretionary, depending on investment decisions by each state. State transportation programs also provide state-level funding for rest-area planning, design, construction, and operation.

- Federal funding programs

Interstate maintenance (IM). Interstate highways are NHS components. Existing rest areas on interstate highways are eligible for IM, NHS, and STP funds, and may be rehabilitated with IM funds. Construction of new rest areas, or addition of new sanitary (restroom) facilities where none exist, must be paid for with other funds, such as those available for the NHS.

Special federal funding programs. All or portions of planning, development, and reconstruction of rest areas may be eligible for funding under a variety of federal-aid programs. Funding has been obtained for all or portions of construction projects through highway beautification, scenic/highway, motorist/safety, and transportation/enhancement programs to fund educational and interpretive projects, and also historical, cultural, and natural-resource preservation projects.

Program managers must evaluate eligibility criteria for each of these programs to determine if individual rest-area projects qualify.

- State funding programs

State funding alternatives include state gas tax, and state, local, and private funding sources. Each state program manager must explore all alternative funding opportunities available for various types of area development and operation.

2. Developing a Statewide Rest-Area Plan

The primary goal of a rest-area development program is to establish and maintain a comprehensive system responsive to safety and service needs of commercial and recreational motorists. Comprehensive, ongoing, statewide rest-area program planning allows agencies effective management of their development, operation, and rehabilitation needs. Figures 1 through 4 show a sample statewide plan. Service levels and facilities differ between Interstate and National Highway systems. Quality of development also varies from state to state. Most Interstate rest areas provide basic levels of service, including paved parking lots separated by vehicle type, flush toilets, potable water, telephones, picnic facilities, highway maps and travel information, lighting, signing, trash disposal, and recycling. Some states provide rest areas or parking areas without toilets—services that meet only minimal motorist needs. All highway rest areas should provide safe stopping opportunities separated from highway traffic in an environment promoting relief from stresses of long-distance driving.

FIGURE 1. Existing Interstate rest areas (Photo Courtesy of Arizona Department of Transportation).



FIGURE 2. Interstate rest areas to be removed (Photo Courtesy of Arizona Department of Transportation).



FIGURE 3. Interstate rest-area master plan (Photo Courtesy of Arizona Department of Transportation).

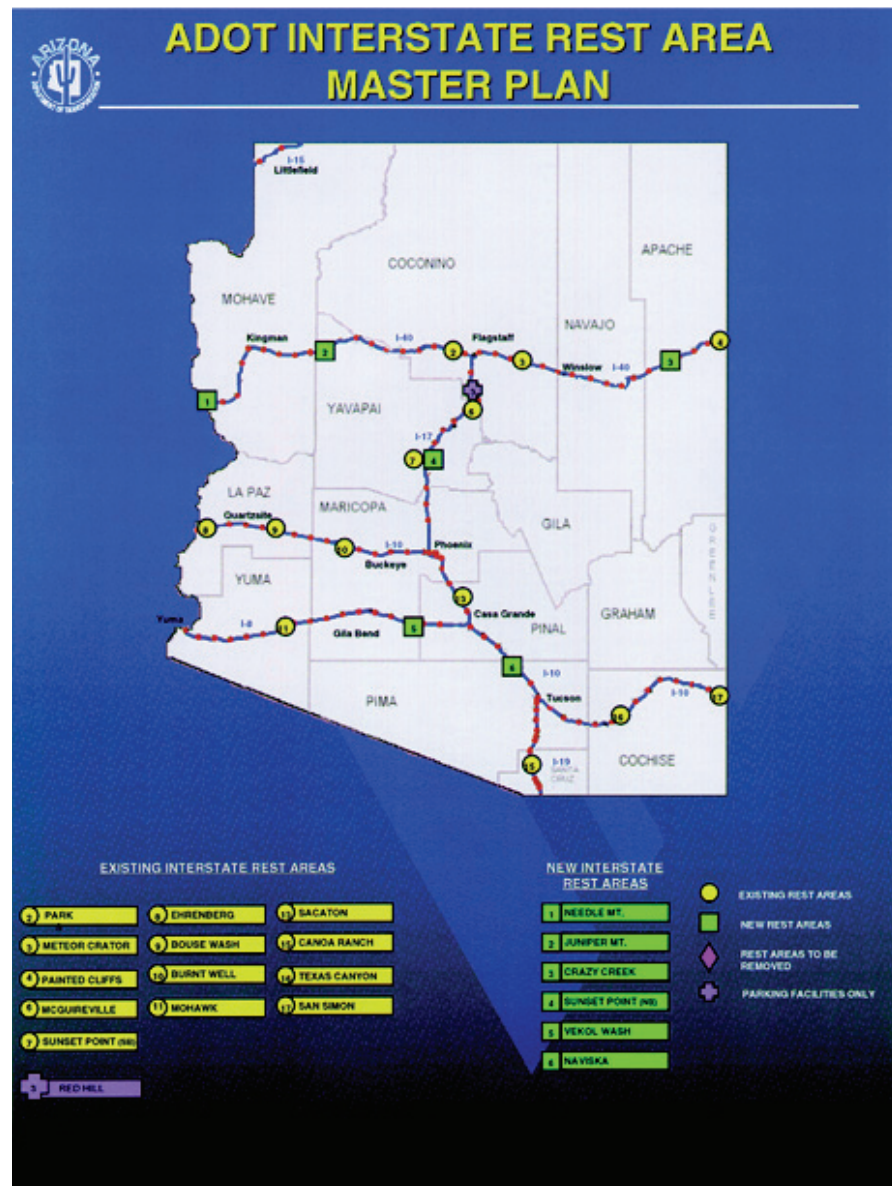
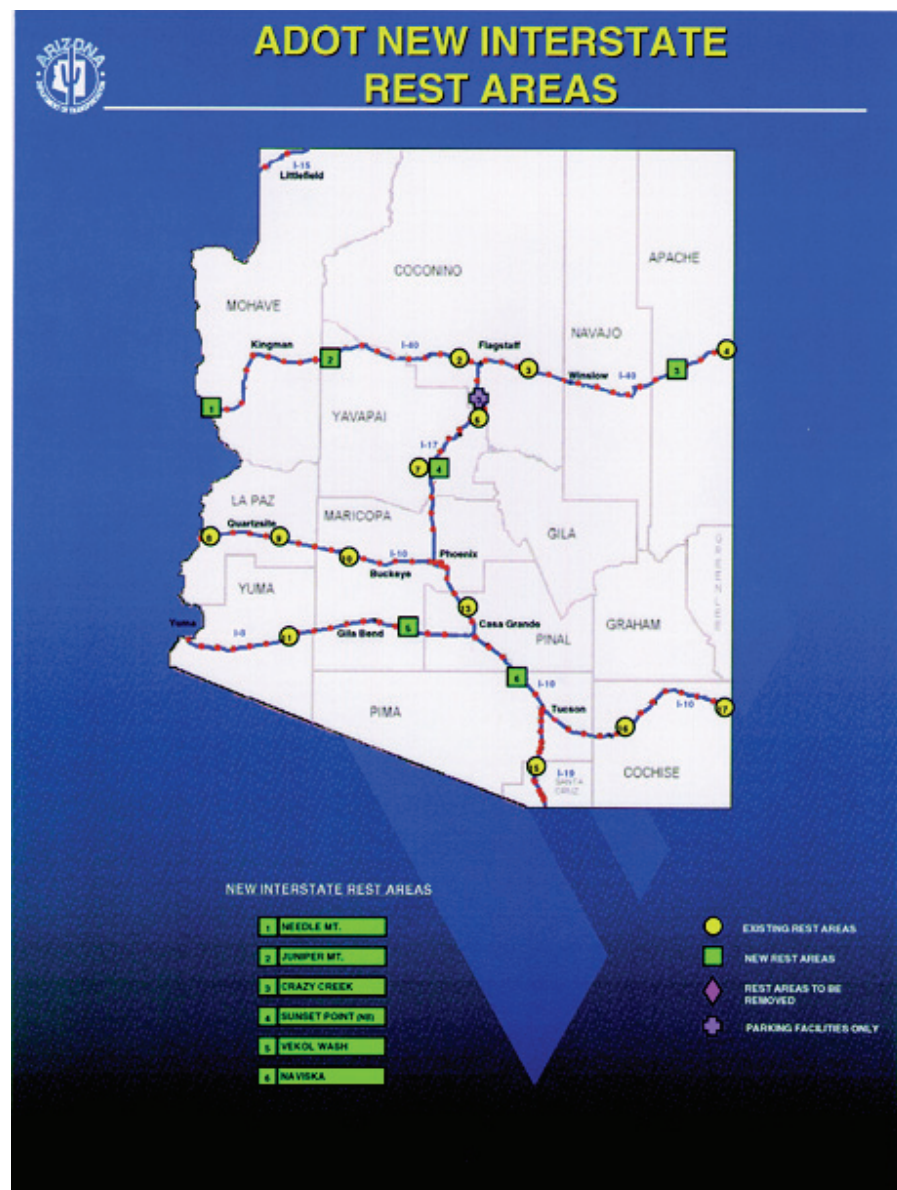


FIGURE 4. New Interstate rest areas (Photo Courtesy of Arizona Department of Transportation).



The purpose in developing a statewide plan is to identify long-term requirements and commit agency resources and funding toward timely program implementation. Documentation of comprehensive program needs is critical in developing and operating a complete system, and in establishing funding priorities when constraints exist. Managers must base programs on needs, and implement them based on priorities, scheduling development and operational commitments to correspond to available funding. Because funding revenues fluctuate for all highway/transportation programs, needs must be well-documented and ranked by priority.

a) Integration with Highway Transportation Planning

Each state must integrate its rest-area system into its overall transportation planning and development program. Establishing an effective system requires comprehensive planning to define program framework. Ongoing planning is required to ensure facility development, operation, and rehabilitation that meets current and future transportation needs. Statewide system planning is essential for development priorities, funding considerations, and program and project scheduling.

Rest-area development is also an integral part of highway-corridor planning, construction, and maintenance. To qualify for federal aid, states must establish a statewide planning process to guide transportation investment decisions. This process must consider economic, energy, environmental, and social effects of transportation decisions. Each effect in turn must also be considered in program planning and site development decisions.

b) Investment-Planning Decisions and Priorities

Investment-planning decisions for development or rehabilitation of rest areas should be based on statewide transportation objectives. Development and rehabilitation projects compete with all other transportation projects for state and federal funds. To ensure that these projects are considered in funding investment decisions, the program manager must document objectives and evaluate needs in terms reflecting the state's transportation strategies. Needs, priorities, and transportation benefits associated with the program must be clearly explained if development and reconstruction projects are to secure necessary funding. Program objectives and recommendations must relate to state investment strategies to ensure approval and support.

Not all decisions should be driven by cost. Well-designed transportation-development projects should enhance surrounding environmental and cultural conditions. Quality in transportation system design and service has social and economic effects

for nearby communities. Quality design maximizes a facility's value for users. Enhancement of motorist safety, energy savings, and enrichment of the quality of life are public benefits to be considered along with funding decisions.

The *Surface Transportation Assistance Act* of 1982 permitted states to install and operate vending machines at Interstate rest areas, under the *Randolph-Sheppard Act* of 1936. Many states operate their vending programs in partnership with Randolph-Sheppard agencies. The public appreciates this service. Profits from on-site vending are shared through operating agreements. States may also share in profits from on-site vending.

23 U.S.C. 111 prohibits commercial development at travel information centers or rest areas. It also prohibits private commercial development located on the Interstate system. Several states nevertheless now have "privatized" rest areas constructed on toll roads, and others are studying public/private partnerships at interchanges on land adjoining Interstate rights-of-way. Development of these facilities requires significant planning, market and cost analysis, public review, and service-level determination as well as considerable attention to design elements beyond the scope of this *Guide*.

c) A State Action Plan

Development of a statewide program requires sound approaches to planning, location, design, and maintenance. Successful programming includes documentation of program objectives, identification of service corridors, systems-analysis to calculate projected demand for services in each highway corridor, needs assessment and ranking, and a funding strategy. Program managers should document these statewide objectives in an action plan, and communicate them to administrators, rest-area managers, and other transportation program managers.

The state action plan should include these elements:

- *Program objectives.* These should be redefined and evaluated each time they may be affected by new state or federal laws and policies.
- *Highway service network.* This should be developed and updated at least every ten years, or whenever scheduling major highway-corridor construction or reconstruction.
- *Needs assessment and ranking.* This should rank new-construction or rehabilitation projects and should be regularly updated.

- *Investment programming.* Funding requests for projects should be coordinated annually and integrated into the state's highway investment programming and funding process.
- *Documentation of safety benefits.* Highway safety benefits provided by rest-area use should be documented.
- *Service distribution goals.* These should be evaluated periodically.
- *Provisions for customer use and satisfaction surveys.* This also should be surveyed regularly.
- *Distribution of highway-safety and customer-satisfaction information.* This information should be shared with transportation investment and policy decision-makers and with the public.
- *Public costs and benefits.* This information should be documented and monitored to determine the most effective ways to develop, operate, and fund rest areas.

The action plan should include program size, service levels, and recommendations concerning the proposed number of rest areas to be developed on the highway service network. Their distribution should be based on the desirable spacing interval of 100 km (60 mi) or about 1 hour between stopping opportunities. Locations of interchanges with nearby commercial services should be examined as possible alternative stopping opportunities. Adjustments in siting are necessary in high-volume traffic corridors and where unique service or environmental considerations exist. The action plan should also state the overall desired service levels and quality of facility development.

The action plan should include systemwide service levels for design and maintenance to establish quality standards ensuring user safety and satisfaction. Many state transportation agencies include some of the following components in their systems: staffed travel-information centers, museums, interpretive and educational displays, computerized tourist-information kiosks, advertising display boards, bulletin boards, weather-information phones or displays, road-condition information, historic markers, vending machines, and recreational vehicle (RV) dump stations. These components provide added value to rest areas and promote highway safety and tourism.

Program implementation requires management commitment to continuous planning, review of safety and service distribution, evaluation of customer service and satisfaction, marketing, monitoring of program costs and benefits, and researching alternative funding options. Additional planning actions may be required to ensure

that the program is responsive to motorist safety and service needs, and that investment decisions are based on current safety and benefit information.

Nationally, motorist-service needs and state program objectives will vary, but states should establish program objectives that include safety, motorist comfort and convenience, and educational, tourist, and traveler information services.

Once facilities are built, commitment to their operation and maintenance is essential. The operational level should be determined by volume of use, location, and desirable quality of service. Prompt maintenance of deteriorated or damaged components is necessary for maximum preservation of the original investment and to minimize facility downtime for users. Means to ensure continuous operation and maintenance must be considered.

Each state may want to consider building a periodic review cycle into the action plan. These reviews can be the basis for keeping the rest-area system up-to-date by identifying improvements that can be met incrementally.

3. Needs Assessment

Most state rest areas were built early in the Interstate program. Today, transportation agencies pose many questions about these older facilities. Should a rest area be upgraded because it has reached its useful life expectancy? Should it be upgraded and expanded to meet needs of an ever-increasing traveling public? Are there gaps in a state's system that need to be filled by location and construction of new facilities? Should an area be closed or relocated? Needs assessment can answer these questions.

One major program objective is cost-effective operation and maintenance of a comprehensive system to meet safety and service needs of the traveling public. To meet this objective, it is critical that states preserve their capital investments, and extend the useful lives of rest areas, while minimizing future maintenance and operations costs and facility downtime. This will limit adverse reactions from the traveling public. Needs assessment determines program deficiencies and funding investment priorities.

Needs assessment has four primary analysis components: (1) identification and evaluation of issues affecting design, operation, and service demand, (2) corridor spacing and service needs, and (3) individual area capacity, design, and condition, and (4) recommendations.

Program managers assess system needs by identifying and evaluating major issues in motorist use and facility operation, evaluating goals and service objectives, preparing systems analyses, and documenting facility condition and health and safety deficiencies. Program managers must study and compare locations, service levels, design, and condition of existing rest areas. They should identify system deficiencies in terms of the state's current program goals, design, and service criteria to determine the degree to which each area meets system needs. Priorities can then be established using this information. It is important to document program elements, evaluation methodologies, and analysis criteria used to identify facility needs and development priorities.

Investment recommendations are based on needs assessments of existing facilities. Recommendations should address modifications to existing facilities, objective bases for project selections (ranking of needs), recommendations to increase operating efficiencies, and identification of obsolete or improperly located facilities to be replaced, relocated, or eliminated.

a) Issues Evaluation

Issues affecting administration, planning, funding, service, and design should be investigated and their potential impacts assessed. This information can be used to review and revise criteria for location, size, and function. Development of a strategic plan must be based on realistic assumptions derived from examination of issues and trends, supported by the state's transportation agency and the public.

Issues affecting design and motorist use include:

- obsolete truck-parking lots and turning radii
- overcrowded truck-parking and misuse of sites as staging areas to schedule deliveries
- overcrowded car-parking lots and buildings during peak travel periods
- accessibility for people with disabilities
- personal safety and lighting
- new recycling and environmental laws
- impacts of construction and winter closure on motorist safety and tourism
- increased user expectations for services (such as vending machines and travel information)
- pet-exercise areas

- overnight parking
- impacts of tour bus and RV parking.
- need for “assisted-service” restrooms (permitting restroom users to be helped by a family member or assistant).

State planners should survey public opinion and customer satisfaction to evaluate levels of service and operational and maintenance effectiveness. Vandalism or illicit uses may affect operation or design of some or all sites in a system. Each state should consider all these and other issues specific to that state in its strategic planning process.

b) Corridor Analysis

Several factors influence spacing distribution along highways:

- extension of spacing recommendations from 50 km (30 mi) to the current 100 km (60 mi)
- expansion of urban development beyond rest areas originally intended to provide orientation and directional services to motorists *before* entering an urban zone
- addition of new high-volume-traffic highway corridors that provide alternative routes bypassing existing sites
- location of state travel-information centers at border entry points and near tourist areas
- right-of-way considerations

A systems-analysis process identifies existing and future needs for each corridor. This process determines these needs based on traffic volumes and percent of highway traffic likely to stop at regularly spaced intervals. Using such an analysis, each route is inventoried and evaluated to determine the level of facility development required to meet desired-service needs. The analysis provides basic planning direction for the development program. This information is used to recommend new development, upgrading of existing facilities, or their relocation or elimination. The primary objective is to identify the need for rest areas, determine how that need can best be met, and make best use of available funding.

Systems-analysis formulas consider traffic volumes, percent of vehicles stopping, design-hour usage, traffic distribution, peak-usage factors, spacing intervals, and vehicles-per-hour per parking space. Data from these variables are incorporated

into systems-analysis formulas to determine car and truck/car-trailer parking-capacity needs for each site. Usage-survey information should verify the numerical values used for planning purposes. This process has resulted in established constant values for some formula factors.

The systems-analysis process should be used for each highway corridor, in concert with the current 100 km (60 mi) recommended spacing. These results can then be compared with distribution of existing facilities to determine service needs and deficiencies. The system should be evaluated as a whole to ensure equitable comparisons so that limited funds are effectively invested to meet critical needs, such as service demand and facility preservation.

Spacing studies should include evaluating use and location of those areas spaced less than 50 km (30 mi) apart, as well as other locations not meeting state program objectives. Service-capacity needs should be determined at such sites. Greater spacing results in the need for larger sites, greater vehicular capacities, larger and more concentrated site impacts, and longer driving times between safe stopping opportunities, which could result in more shoulder stops. Desired locations of key facilities, such as travel-information centers and critical service facilities, must also be identified and incorporated into the analysis process.

Other variables used to locate new rest areas may result in eliminating or relocating existing facilities, thus limiting changes in spacing recommendations within a corridor:

- unique site qualities, including scenic views and historical, cultural, or natural features
- utility availability, including potable-water-supply and suitable wastewater disposal
- environmental effects of alternative sites
- geometrics of highway access
- right-of-way considerations

Based on desirable spacing, proximity to urban areas, service demand, and location requirements, transportation planners determine whether motorist needs can be met if existing areas are eliminated or relocated when new facilities are built or others are expanded. Inadequate spacing can be corrected when new facilities are built or older ones are closed.

c) Site Reevaluation

With passage of time, substantial changes have occurred in geometric-design standards and guidelines, water and wastewater regulations, building codes, accessibility requirements, and environmental protection. These changes, along with relative age, require states to prepare comprehensive, uniform studies of existing service capacity and conditions at each existing area.

The purpose of such a statewide study is to identify and rank existing site deficiencies and capacity needs before establishing investment recommendations and priorities in long-range planning.

A statewide study requires comprehensive on-site review and evaluation to document existing deficiencies. It identifies levels of rehabilitation required to maintain an effective standard level-of-service at each site, now and for the next 20 years. An interdisciplinary team should participate in each site review to ensure that each rest area is evaluated effectively. The primary team members should conduct on-site reviews statewide to minimize variations in judgment, and should use standardized data-collection forms to ensure uniform review of all site elements. Regional operations staff, custodial services staff and supervisors, and travel-information-center staff should be on-site during such visits to identify operational problems and describe ongoing deficiencies and recent maintenance histories.

Visual observations may be adequate to establish the condition of site elements, building features, and structural elements, and condition of pavement, turf, and landscaping. However, on-site testing is necessary to verify the operation of all mechanical and electrical systems and controls.

The team should identify critical health and safety concerns at existing areas. These concerns include presence of asbestos materials, deteriorating furnaces and ventilation systems, deficient wastewater and water-treatment systems, and building-code compliance. In addition, many geometric and alignment problems may exist at some sites, including inadequate stopping distances, poor turning radii, deficient acceleration and deceleration ramps, inadequate lighting, and the need to accommodate many large vehicles.

On-site investigations provide information necessary for comparative analysis of deficiencies and needs in order to identify sites warranting comprehensive rehabilitation. Six categories of critical deficiencies in conditions and service needs must be inventoried to establish uniform base-line information:

- capacity

- geometric design of the highway, ramps, and parking facilities
- building(s)
- site
- travel-information centers
- pavements

Each critical deficiency is further defined by threshold criteria as determined by each state. These criteria should identify critical deficiencies directly affecting level of public service or operation. The team should document critical deficiencies using threshold criteria specified for the statewide evaluation. The evaluation can also generate a list of immediate and short-term maintenance needs. Individual site reports can be prepared to summarize conditions and rehabilitation needs at each area. Based on comparative needs, regional operations staff can identify and rank their maintenance work to correct problems and extend operating lives of facilities. Using field-evaluation information, the evaluation team can complete a comparative analysis to establish a priority ranking of comprehensive rehabilitation needs. It is important that field evaluation ensure thorough, equitable assessment of each area and document the scope of deficiencies.

d) Recommendations

Transportation agencies should develop strategies for future capital investment and rehabilitation, based on program goals. Planners should estimate costs for all capital-investment and contract-rehabilitation work. Cost estimates of improvements are necessary for effective investment planning. Costs of development depends on-site size, climate, services to be provided, and degree to which capital expenditures are used to reduce maintenance costs.

Operations budgets are stretched farther each year. Operations funding objectives should be to rehabilitate specific systems so as to minimize downtime and emergency repairs. Ongoing commitment to effective operation, maintenance, and repair is critical. To maximize funding benefits, it is important to consider the level of rehabilitation that a facility should receive, based on statewide program objectives and long-range planning recommendations for the specific site. Operations managers should evaluate site conditions and schedule replacements, when appropriate, to minimize expenditures for corrective work on obsolete systems. However, emergency repairs should be completed to meet critical health and safety requirements.

A computer database will better manage information and allow for ongoing, accurate comparison with project development needs and priorities. This database

should be linked to other existing databases, such as those for traffic projections, highway programming schedules, and maintenance repair work. Availability of current data will allow program managers to monitor service needs more effectively, and improve the timing and quality of program-investment recommendations.

Comprehensive, systemwide recommendations for investment planning may include the following:

- replace or expand areas that fail to meet current design standards and user-capacity needs
- correct health and safety deficiencies at various sites to comply with state and federal laws, and protect employees, motorists, and the environment from adverse effects
- rehabilitate existing facilities (e.g., buildings, pavements, lights, signs, water and wastewater systems, and site elements) to extend useful lives of rest areas for an additional 20 years, so they continue to serve at levels expected by users
- relocate or eliminate rest areas that are inappropriately located to meet the desired service spacing
- construct new rest areas to augment the system and meet motorist service needs
- investigate public/public and public/private partnerships and alternative funding programs

These steps are essential in developing comprehensive planning and investment recommendations to establish a successful program.

4. Developmental Guidelines

The first step in developing a comprehensive system is to identify and define developmental guidelines. These provide a sound foundation for a system and must be established before starting the planning, location, and design phases of development. Developmental guidelines should address:

- types of traffic the system will serve
- site-spacing intervals
- tourism and information services
- special site opportunities
- range of services provided

- maintenance required
- utilities provided
- concurrent construction opportunities and funding strategies
- security
- opportunities for combining facilities or functions

a) Traffic Types

What traffic will the system handle? What are the proportions of commercial, recreational, and through traffic on the route to be served by a rest area? Proportions of traffic types will affect proper size, design, and operation. For example, spacing, size, and character of services needed for a commercial or commuter route may be quite different from those for a recreational route. Estimated percentages of traffic stopping at information and welcome centers may vary from state to state. Generally, the range is from 12 to 15 percent of travelers stopping at welcome centers, 8 to 13 percent stopping at areas on recreational routes, and 5.5 to 9 percent on routes having broader use. Those serving heavy commercial traffic may have to accommodate large numbers of truck-trailers of varying lengths. Availability of truck stops, brake-check areas, and weigh stations should also be considered—such facilities may provide alternative stopping opportunities for commercial drivers, and will affect individual site design as well as system needs. Consider the various regulations and restrictions for commercial traffic and drivers—these may affect the numbers of commercial vehicles stopping and their lengths of stay.

b) Spacing and Capacity

What spacing will best serve the type and volume of traffic? Consider the distances between existing free, noncommercial stopping opportunities. How far apart are towns, interchanges, and motorist services? Travel time between stops, terrain, alignment, and ease of driving should also be considered. Ideally, spacing should provide a stopping opportunity wherever fatigue or monotony are likely. As noted earlier, the recommended spacing intervals are 100 km (60 mi) or about 1 hour between stopping opportunities. Presence of alternative stopping opportunities and services, their physical accessibility, and hours of operation affect this spacing. When existing areas are to be upgraded and retained in the system, consider whether new interchanges, recent urbanization, or new services really render existing areas unnecessary.

Rest areas on low-volume highways with long distances between communities may present additional security issues that need to be considered. Locating them within

or near substantial communities can help with policing efforts and may make them more inviting to motorists.

Spacing and size are related. Generally, closer spacing reduces patronage at each facility, and allows for a smaller, more intimate design scale than is possible at larger, widely spaced rest areas. Fewer, more widely spaced areas require greater individual capacity, and, therefore, more acreage to accommodate parking and sewage disposal. Physical characteristics of available sites should be considered when determining appropriate size and spacing. Large rest areas may allow certain efficiencies in design and operation, but small facilities may be more appropriate for recreational and scenic routes or environmentally sensitive sites.

Minimum and maximum sizes should be established. It is easy to underestimate the size and space needed. A small facility may attract substantial use and quickly become overburdened and obsolete. If a facility is too large, walking distances may become uncomfortable. Also, consider the construction and operational benefits of developing facilities in nearby pairs, each serving opposing directions of travel.

c) Tourism

Will tourism be an important element of the program? Will welcome centers or map stops be located at entrances to the state, at entrances to major recreational areas, before large urban areas? Will information displays or centers be parts of the entire system?

Rest areas provide important opportunities to orient tourists and introduce them to local historical, ecological, scenic, and recreational features. They also provide opportunities to inform travelers of commercial services and attractions, while supporting the local tourism-related economy. Well-maintained welcome centers located at state borders also provide good first impressions, making travelers feel welcome and appreciated. Sizing calculations may need to be adjusted for those providing tourist information, for the length of stay may be substantially increased.

d) Special Site Opportunities

Often sites can be found having unique and attractive natural features that can be enhanced through sensitive design. Look for opportunities to develop sites with outstanding views, water elements, geological features, or natural vegetation. High-quality locations provide surroundings that can be visually integrated with rest-area development. Good site selection and design should provide opportunities for travelers to experience and interact with the natural environment as pedestrians

(Figure 5). They should be able to experience the unique character of each area safely and at close range.

FIGURE 5. Utilization of natural amenities (Photo Courtesy of FHWA).



e) Range of Services Provided

What types and levels of services should be provided? Basics include drinking water, restrooms, trash receptacles, map and information displays, pay telephones, and benches and tables. Typically, they provide 24-hour service, all-weather parking for all vehicle types, lighting for nighttime safety, and shade trees or shade structures. Optional but commonly provided facilities include more extensive landscaping and lawn, sanitary dump stations, pet-exercise areas, newspaper-vending machines, food-and-beverage vending machines, fitness stations and exercise trails, interactive-computer kiosks (Figure 6), tourist-information facilities, historical or environmental interpretation, scenic overlooks, and artwork.

FIGURE 6. Interactive-computer kiosk and tourist-information center
(Photo Courtesy of FHWA).



f) Maintenance Required

What type of maintenance is planned? Will they be open 24 hours daily, year round? Will facilities be staffed all day, all night? How frequently will they be cleaned? Will custodial and grounds-maintenance work be performed by regular highway-maintenance crews, special crews, or contractors? Will there be a caretaker, host, or manager? Maintenance activities and requirements should be carefully considered at this stage of program development. On-site storage buildings, caretaker housing, trash-dumpster enclosures, service-vehicle parking, and other maintenance facilities affect space requirements and site layout. Consider providing dual restrooms at each area to allow at least one for each sex to remain open during cleaning. Individual unisex units also permit continued use during cleaning. Be sure

that system budgets and design standards provide for adequate maintenance. Public/private partnerships and interagency agreements should be considered, where appropriate.

g) Utilities Provided

How will utilities (water, electricity, wastewater disposal, telephone service, etc.) be provided? To what extent will they affect site location and design? Will municipal water or septic systems be available? Or will wells, soil-absorption systems, or treatment plants be used? Can wastewater-disposal systems be expanded or improved should need arise? Wastewater-disposal systems affect maintenance requirements and rest-area size, and account for a significant proportion of construction costs. If on-site treatment facilities are used, consider any regulatory requirements for monitoring and reporting wastewater discharge. If sanitary dump stations are provided, consider the need for separate treatment facilities to handle chemical-laden wastewater.

h) Concurrent Construction and Funding

Will there be opportunities to construct facilities concurrently with highway construction or reconstruction? Right-of-way acquisition, grading, and paving can be significantly more economical when scheduled along with roadway construction. When building or upgrading rest areas, several may be built under one contract to standardize construction, obtain economies of scale, and save money.

i) Security

Safety and security of users is of utmost importance. Site location, on-site visibility, lighting, and emergency telephones must be considered. Appropriate law-enforcement agencies should participate in system planning and design to assure that sites are located and laid out for maximum safety. Consider possible roles of caretakers, site managers, security guards, state police substations, and frequent drive-through surveillance.

j) Combining Operations

What opportunities exist for combining rest areas with other operations, such as truck weigh stations, inspection stations, state police substations, and information centers? Consider joint development or operational agreements with other agencies that may be responsible for compatible facilities. Construction and operational costs can sometimes be shared, resulting in efficiencies and improved user services.

Opportunities may also exist for joint public/private partnerships in their construction and operation.

B. Systems Analysis

In initial planning and design of Interstate highways and parkway systems, analysis of the overall proposed highway system is required to determine needs for rest areas. Systems analysis is the process used to determine existing and future needs of the overall system. It is based on the percent of highway traffic likely to stop at regular intervals along the roadway system. Parameters considered in systems analysis include existing and projected traffic volumes, annual-usage-survey data, and the recommended spacing interval. The maximum number of parking spaces for both cars and trucks must be decided early in the process.

A comprehensive, long-range strategic plan for investment in the system will result in comparison of program objectives, systems analysis of projected 20-year capacity needs, desirable spacing, and current issues concerning location of existing facilities and their condition. Systems-analysis calculations can also be used to project numbers of site users, requirements for restroom facilities, water and wastewater system sizing, approximate usable site acreage required, and other site amenities necessary for site operation.

1. Traffic Volumes and Types

Existing and projected traffic volumes can generally be obtained from each state's traffic forecasters. As noted earlier in this chapter, the proportions of commercial, recreational, and through traffic must be established and considered. Traffic-counting devices can be installed at existing rest areas, and the data run through computers to classify vehicle types entering every 15 minutes. These traffic volumes are the average daily traffic (ADT) volumes commonly projected for all highway-related planning. Traffic projections are normally established for 20 years beyond the expected year of construction. Existing and projected traffic volumes provide bases to establish future needs and site considerations.

2. Annual-Usage Surveys

Annual-usage surveys at selected locations can provide current design data, and also information required for detailed design of future rest areas. Annual surveys identify the current percent of vehicles stopping, types of vehicles visiting the facil-

ity, average number of persons per vehicle, length of stay for each vehicle, and other pertinent information for decision-making as to the location and size required. Surveys should be made on a 24-hour basis and provide an hourly breakdown for each factor. The survey should consider any seasonal variations affecting usage due to changing weather conditions, atypical percentages of tourist traffic, etc. It may be necessary to survey more than once a year, or to survey during greatest visitation to gain a thorough picture of annual use.

Usage surveys should include rest-area designers, allowing them to observe and relate to user activities and overall functions of the rest area. The interaction of pedestrians with vehicular movements within the rest area must be considered. These observations and considerations can be applied in developing new rest areas or reconstructing existing sites. A sample rest-area usage-survey form is shown in Figure 7.

FIGURE 7. Rest-area usage survey.

REST-AREA USAGE SURVEY	
DEAR MOTORIST:	
THE _____ DEPARTMENT OF TRANSPORTATION IS DETERMINING WHAT SHOULD BE THE SPACING OF THE REST-AREAS ALONG THE HIGHWAY AND WHAT FACILITIES THEY SHOULD PROVIDE TO SATISFY YOUR NEEDS. ONLY YOU CAN SUPPLY INFORMATION WE NEED TO PLAN REST-AREA FACILITIES. PLEASE ANSWER THE FOLLOWING QUESTIONS.	
DAY OF WEEK _____	VEHICLE TYPE _____ NUMBER OF PEOPLE IN VEHICLE _____
DATE _____	TIME IN _____ VEHICLE _____
LICENSING STATE _____	TIME OUT _____
WHERE IS YOUR HOME (CITY OR COUNTY)? _____ (STATE) _____	
REST-AREA USE	
1. WHAT WAS YOUR CHIEF PURPOSE FOR DRIVING INTO THIS REST-AREA? (check only one)	
1. _____ Use restroom 2. _____ Dispose of sewage 3. _____ Water	
4. _____ Just to rest 5. _____ Use travel information board 6. _____ Telephone	
7. _____ Eat/Picnic 8. _____ Dispose of refuse 9. _____ Other _____ (Please specify)	
2. HOW MANY PEOPLE IN YOUR PARTY USED THE FOLLOWING?	
Rest-room facilities _____ Drinking water supply _____	
3. WHICH OF THE FOLLOWING FACILITIES WERE USED BY YOUR PARTY?	
1. _____ Picnic table 2. _____ Travel information 3. _____ Electrical outlet	
4. _____ Picnic shelter 5. _____ Trash receptacle 6. _____ Telephone	
7. _____ Vending machines 8. _____ Other (Please specify) 9. _____ None of these	
4. DO YOU HAVE ANY PETS TRAVELING WITH YOU? _____ NUMBER _____	
5. DID YOU STOP AT ANY OTHER REST-AREAS THIS TRIP? YES _____ NO _____ WHERE _____	
IF YOU ARE CURRENTLY ON VACATION OR PARTICIPATING IN RELATED RECREATIONAL OR SOCIAL ACTIVITIES, PLEASE COMPLETE THE FOLLOWING QUESTIONS.	
1. Will you or did you spend your vacation or related time in this state? Yes _____ No _____	
2. If you answered "yes" to the previous question, where did you or will you stay near? (City or Lake) _____	
3. How long are you planning on staying in this state? _____ Days	
4. Will you be camping or using campground facilities? Yes _____ No _____	
REST AREA COMMENTS _____	

PLEASE RETURN TO PEOPLE AT REST AREA EXIT - THANK YOU!	

3. Recommended Spacing Interval

Spacing intervals for sites should be based on an approximate 1-hour drive between successive locations. Urban development can also be considered in deciding on sites. Long-distance travelers and commercial drivers may appreciate opportunities to stop for directions, tourist information, or other services before entering a large urban area. Existence of other nearby available roadside services may affect spacing decisions.

4. Maximum Parking Spaces

It is desirable to avoid developing rest areas that resemble shopping-center parking lots. These can produce environmental impacts, such as increased air and noise pollution, on surrounding areas. Obviously, the larger the facility, the more maintenance will be required. Maintenance capability and willingness to commit resources should be considered when deciding the size of the facility to be constructed. Other potential factors affecting parking-lot capacity include water-supply and wastewater disposal.

Number of parking spaces will also dictate minimum site size required for each location. Rest areas in some states are as large as 35 hectares (ha) (86 acres), but such sites are generally considered too large. A minimum site size of 5 ha (12 ac) is preferable. Sites up to 15 ha (37 ac) are generally manageable and provide ample room for such site development as picnic areas and landscaping. The number of parking places can thus be adjusted by site size and desired development.

5. Systems-Analysis Procedure

Traffic volumes, usage surveys, and spacing intervals can be included in a systems-analysis formula to determine parking needs for cars and trucks within a highway section being studied. Once parking needs have been established, existing areas within that section can be examined. Analysis of existing parking spaces along a route, size of existing sites, and other factors will determine whether a new rest area is built or an existing site upgraded. Similarly, each highway section can be analyzed, and a statewide system of rest-area recommendations identified for development or upgrading. The forecast design-hourly volumes (DHV) for each section are also similarly determined and collectively averaged.

The first step in systems analysis is to identify study sections along a specific highway route. Each study section is referred to as a design section length (DSL). The base spacing interval of 100 km (60 mi) is referred to as the base section length