

Outsourcing of State DOT Capital Program Delivery Functions

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SUMMARY

The Outsourcing of State DOT Capital Program Delivery Functions was developed under the direction of the National Cooperative Highway Research Program (NCHRP) for the American Association of State Highway and Transportation Officials (AASHTO). This document was prepared as part of the “20-24 Series” of NCHRP Projects on the administration of highway and transportation agencies. The report is designed to assist State Departments of Transportation (DOTs) in assessing the outsourcing of their capital delivery functions.

Over the past several years, there has been an inexorable increase in travel demand with a concomitant increased demand for improving the transportation infrastructure and relieving congestion. In some cases, there have been special initiatives based on referenda and other state and local legislative actions resulting in a number of special new programs focusing on certain designated areas or corridors and including various forms of enabling legislation dealing with such subjects as new earmarked taxes, new bonding authority, public-private partnerships and other program innovations. In some cases this has resulted in the availability of more transportation funding resources in addition to generally increasing conventional state and federal sources. This has come at the same time in many states where pressures are great for maintaining constant state agency staffing levels and even mandating further “downsizing” in staff levels.

An obvious response to these pressures is to outsource work to private sector companies and even to other levels of government, such as county transportation agencies. Outsourcing, of course, is not new and many state DOTs have been engaged in it for years. Another current National Cooperative Highway Research Program (NCHRP) 20-24 task documents the current state of this practice. What is new is that some state DOTs have begun to outsource their capital program delivery functions, e.g. major facility designs and related PS&E production, major project construction supervision, and comprehensive, long term major area or system maintenance functions. Various versions of major design-build or design-build-operate projects often combine several of these elements. Although most states retain overall ultimate management responsibility of the delivery process, some are beginning to consider delegating some of that responsibility as well.

The objective of the study was to develop guidance for State DOTs on the outsourcing of major program responsibility. Recommendations for innovative practices in the management and outsourcing of program delivery functions were a primary focus. A review of current practices and an evaluation of the effectiveness, benefits, and concerns of the outsourcing of primary program delivery functions by DOTs were conducted.

The following general steps were completed in developing this report:

1. Contacted the AASHTO Standing Committee on Research (SCOH) members and conducted a survey of the current practices by DOTs for outsourcing program delivery functions.

2. Conducted a brief survey of the international community through contacting the U.S. DOT members of the PIARC Committees on Economic Development and Performance of Road Administration.
3. Completed a literature search on references on state DOT outsourcing programs.
4. Nominated a preliminary list of states and projects to consider as the case studies for the project. Selected the candidate states and projects based on review and recommendations from the project panel.
5. Conducted on-site visits and interviews with some states.
6. Collected information on the process for evaluating the effectiveness of outsourcing state transportation functions.
7. Studied the effectiveness, benefits and concerns of outsourcing of project delivery functions.
8. Suggested appropriate guidelines for outsourcing of capital programs.
9. Identified the areas of future research needed in outsourcing of capital programs

While outsourcing various tasks and functions has become routine for most state DOTs, the practice of outsourcing capital program functions is relatively new and more limited in implementation. For purposes of this study, the distinction between routine task outsourcing and the outsourcing of capital programs is important and includes for the latter the following specific characteristics:

1. It includes major DOT functions and services regarded as central to the main mission of the state DOT;
2. It includes programs that heretofore are traditionally NOT outsourced;
3. The programs outsourced are of considerable complexity and high dollar value;
4. The state DOT delegates significant decision making authority to the contract team.

Based on the study of the selected states that are engaged in successful outsourcing practices, the following fundamental reasons emerge for the need to outsource capital programs:

1. An accelerated program in the state DOT that has specifically designated funds or newly available resources to address a large identified need backlog (This report cites examples of this scenario in South Carolina and Louisiana);

2. States that utilize the concept of capital program outsourcing to devise a deliberate strategy for handling the transportation system's normal program growth (This report cites an example in Florida for this scenario);
3. States experiencing a blend of the above scenarios.

By far the most common type of capital program outsourcing is centered on some version of the design-build concept. The nomenclature associated with these programs varies somewhat from state to state and the degree of partial completion of the initial design also varies, from about 30% to something well less than that. Some projects include initial or long-term operations after project completion, including in one case the imposition of tolls and the repayment of bonds and compensation for engineering services through the collected tolls. This approach to projects seems largely reserved to major projects of both considerable financial size as well as difficult engineering challenges. The staff at one state DOT suggested that these features probably limited the number of such projects in their state at any one time, and also seemed to demand the services of their especially gifted in-house project engineers and administrators, the latter even though state forces were not formally engaged in the design process but presumably reflecting the special challenges of projects given over to this approach. All of these projects involved some type of joint venture team assembled of a broadly capable engineering firm and an equally well-qualified general contractor. Other common features include:

- Warranties Involved -- Some period of post-construction performance under traffic is expected.
- Incentives/Disincentives Featured -- nearly always schedule based.
- General Engineering Services

The outsourcing of specific maintenance functions, such as mowing, minor resurfacing projects, lane striping, ditching and other drainage facility repairs, is not new and is not considered a capital program outsourcing activity for purposes of this study. However some states, most notably Florida and also Virginia and the District of Columbia among others, have become engaged in what could be termed Asset Management System-based Maintenance contracts. Such programs include broad areas (e.g. an entire county, a multi-county area or state DOT district) or major systems (e.g. all rest areas and/or all Interstates or freeways in a state or in a large portion of a larger state). Principal features of these agreements include the following:

- Long Term Firm Fixed Price Agreements -- Terms of at least six years and as many as ten were noted. This was deemed essential to interest responsible teams in making the needed investments in equipment and training, and also to encourage optimal, long term solutions rather than sub-optimal "patches" or repeat fixes,
- Based on Performance Measures -- An example would be a mowed grass height of between 6 and 12 inches. These are general asset management performance measures based on the experience of the state and are contract provisions.
- Negotiated Contracts -- Teams are selected based on qualifications and cost and terms are competitively negotiated rather than simply selected based on low bid.

Outsourcing major capital program delivery functions, like the broad, “asset-management” performance measure maintenance agreements as found in Florida, Virginia and DC, or major design-build projects or large general engineering programs like those found in South Carolina, Louisiana, Virginia, Maryland, Utah and elsewhere, involves some delegation of authority and concomitant decision-making, which the leadership of some state DOTs may find somewhat discomfiting. On the other hand, techniques such as performance bonds, a “best buy” approach to team selection, the use of well thought out and objectively measurable performance methods or standards, a stress on clear and open communications, and other steps seem to have offset those potential risks and have led to generally satisfactory results.

Most of the states visited, particularly those utilizing some form of design-build, saw steady continued use of the approach for major, complex projects, but expected total expenditures assignable to this method to remain similar to its current proportion of the total. In other words, the program is expected to grow, but not much faster than the program as a whole. Reasons given for this included a belief that the combined engineering consultant and construction contractor community would not tolerate more growth in this area compared to conventional approaches. In addition, at least one state thought that these projects required more experienced and capable professional personnel in the state DOT than the average project, due mainly to the fact that these projects are intentionally the particularly challenging ones.

The question of cost impacts of capital program outsourcing is one that could only be approached subjectively in this study. With respect to design-build projects, the conventional wisdom among those interviewed was that the dollar cost to the agency appeared to be about the same as conventional approaches, but that design-build projects opened to the public much sooner. Time, of course, is money and therefore this suggests that indeed there is a considerable saving to the public in the form of user cost benefits due to significant schedule accelerations resulting from this outsourcing method. The dimensions of this benefit, and whether it is due to the method itself or to strong public acceptance of the project, the absence of controversial environmental disputes, or other factors cannot be discerned. In the case of asset management-based comprehensive maintenance programs found in a few states, in-house analyses indicate considerable cost efficiencies in one case and uncertainty as to cost savings in another.

Although there was considerable enthusiasm on the part of state DOT staff members interviewed in the course of this study, formal, rigorous evaluation models for these approaches versus more conventional methods were absent. In some cases, such as South Carolina and Louisiana, for example, there probably is no viable “conventional alternative” to the capital program outsourcing approach in the face of such significant program accelerations. On the other hand, there seemed to be relatively fewer than expected such evaluations anywhere. Those found are documented elsewhere in this report, but a possible useful research work product might be to conduct such rigorous evaluations for a selected number of specific efforts. The observation by several interviewees noted above, that design-build projects did not seem to save agency money but resulted in considerable user cost savings when compared to alternative approaches, is clearly a key question that could be examined in this way.

The experience of this project makes clear that the only truly useful source of relevant information is through interviews with personnel directly involved in the outsourcing experience. The concept of “capital program outsourcing” is a new one and not well defined in the literature nor in the minds of practicing professionals. Therefore, attempting to learn about such projects through secondary sources such as professional articles, ongoing or completed research and the like has proven to be relatively ineffective. Also, general unfamiliarity with the topic on the part of state DOT professionals appears likely to have suppressed the response rate to our initial outreach letters. And resource limitations necessarily limited the number and duration of field visits and caused a few states with potential promising leads to not be visited, such as Arizona, New Mexico and Utah.

CHAPTER 1. INTRODUCTION

The Outsourcing of State DOT Capital Program Delivery Functions was developed under the direction of the National Cooperative Highway Research Program (NCHRP) for the American Association of State Highway and Transportation Officials (AASHTO). This document was prepared as part of the NCHRP Panel on Administration of Highway and Transportation Agencies. The report is designed to assist state Departments of Transportation (DOTs) in assessing the outsourcing of their capital delivery functions.

Over the past several years, there has been an inexorable increase in travel demand with a concomitant increased demand for improving the transportation infrastructure and relieving congestion. In some cases, there have been special initiatives based on referenda and other state and local legislative actions resulting in a number of special new programs focusing on certain designated areas or corridors and including various forms of enabling legislation dealing with such subjects as new earmarked taxes, new bonding authority, public-private partnerships and other program innovations. In some cases this has resulted in the availability of more transportation funding resources in addition to generally increasing conventional state and federal sources. This has come at the same time in many states where pressures are great for maintaining constant state agency staffing levels and even mandating further “downsizing” in staff levels.

An obvious response to these pressures is to outsource work to private sector companies and even to other levels of government, such as county transportation agencies. Outsourcing, of course, is not new and many state DOTs have been engaged in it for years. Another current National Cooperative Highway Research Program (NCHRP) 20-24 task documents the current state of this practice. What is new is that some state DOTs have begun to outsource their capital program delivery functions, e.g. major facility designs and related PS&E production, major project construction supervision, and comprehensive, long term major area or system maintenance functions. Various versions of major design-build or design-build-operate projects often combine several of these elements. Although most states retain overall, ultimate management responsibility of the delivery process, some are beginning to consider delegating some of that responsibility as well.

1.1 OBJECTIVE

The objective of the study is to develop guidance for state DOTs on the outsourcing of major program responsibilities. Recommendations for innovative practices in the management and outsourcing of program delivery functions are a primary focus. A review of current practices and an evaluation of the effectiveness, benefits, and concerns of the outsourcing of primary program delivery functions by DOTs were conducted.

1.2 TARGET AUDIENCE

This report was developed for state DOT personnel involved with the planning, funding, and execution of capital highway programs. The primary target audience is chief executive officers and other top management of state transportation agencies. Other intended audience includes

state legislators, senior state DOT officials, and FHWA Division Administrators. Other state DOT officials that would benefit from reviewing this report include the senior planners, CFOs, technical directors in charge of highway design, bridge design, and right-of-way, construction managers, and district managers.

1.3 RESEARCH METHODOLOGY

The following general steps were completed in developing this report:

1. Contacted the AASHTO Standing Committee on Research (SCOH) members and conducted a survey of the current practices by DOTs for outsourcing program delivery functions.
2. Conducted a brief e-mail survey of the international community through contacting the U.S. DOT members of the PIARC Committees on Economic Development and Performance of Road Administration.
3. Completed a literature search on references on state DOT outsourcing programs.
4. Nominated a preliminary list of states and projects to consider as the case studies for the project. Selected the candidate states and projects based on review and recommendations from the project panel.
5. Conducted on-site visits and interviews with some states.
6. Collected information on the process for evaluating the effectiveness of outsourcing state transportation functions.
7. Studied the effectiveness, benefits and concerns of outsourcing of project delivery functions.
8. Suggested appropriate guidelines for outsourcing of capital programs.
9. Identified the areas of future research need in outsourcing of capital programs.

1.4 SCOPE OF CAPITAL PROGRAM FUNCTION OUTSOURCING

As stated above, outsourcing is not a new practice for state transportation agencies. According to recent National Cooperative Research Program studies, outsourcing in state highway departments has increased more than ten fold since 1950s. However, the practice of outsourcing capital program functions is relatively new and more limited in implementation. The outsourcing of capital programs as defined for the purposes of this report has the following specific characteristics:

1. It includes major DOT functions and services regarded as central to the main mission of the state DOT;

2. It includes programs that heretofore are traditionally NOT outsourced;
3. The programs outsourced are of considerable complexity and high dollar value;
4. The state DOT delegates significant decision making authority to the contract team.

1.5 ASSUMPTIONS

The key assumption in a project like this one is the applicability of findings obtained in a small sample of state DOTs to the broad universe of these state agencies. Fewer than half of the state DOTs responded to the email (see Appendix C) seeking examples of capital program outsourcing, which was sent to the state DOT chief engineers.. Some follow-up emails and other outreach efforts were undertaken and a few additional programs and DOTs were uncovered. Eventually, about ten states were identified with programs or projects seemingly meeting the adopted definitional criteria. The working assumption was that non-responding state DOTs had no programs meeting these criteria. A more vigorous outreach effort than was possible with this project might have yielded more possible examples. Also, there was an effort to update a survey on state DOT outsourcing in general done originally in the mid 1990s, which overlapped this project's data gathering phase and which may have inadvertently depressed the response rate.

In any case, the projects examined in detail through field visits and/or extensive telephone interviews varied significantly from one another in program details, due principally to the specific history and circumstances currently obtained in each state. Thus some care and judgment is advisable in terms of regarding some of the lessons learned as broadly applicable to other histories and circumstances.

1.6 BASIS OF ANALYSIS

As indicated above, all members of the AASHTO SCOH were contacted at the beginning of the project. Twenty-six states responded to the survey. From the states that had experience with outsourcing projects, the research team and the project panel selected ten states with initial candidate projects. More detailed information on the history, concept, contracts, and evaluation of outsourcing practices was collected from nine of these states. Five states were selected as case study states and site visits, interviews, and more in-depth analyses of their programs were conducted.

CHAPTER 2. OUTSOURCING PRACTICES

2.1 FUNDAMENTAL REASONS FOR CAPITAL PROGRAM OUTSOURCING

Outsourcing the management of capital program delivery, including project development and highway maintenance, is relatively new to DOTs. Based on the study of the selected states that are engaged in successful outsourcing practices, the following fundamental reasons emerge for the need to outsource programs:

1. An accelerated program in the state DOT that has specifically designated funds or newly available resources to address a large identified need backlog (This report cites examples of this scenario in South Carolina and Louisiana)
2. States that utilize the concept of capital program outsourcing to devise a deliberate strategy for handling the transportation system's normal program growth (This report cites an example in Florida for this scenario).
3. States that have adopted a blend of the above scenarios

2.2 FREQUENTLY FOUND CAPITAL PROGRAM OUTSOURCING METHODS

Each state has developed its own unique process and methods for outsourcing; however, three distinct methods of capital program outsourcing emerged in this study. Many variations of the design-build method were the most common outsourcing methods among the states that responded to the survey. Asset management system-based maintenance contracting is the other significant capital program outsourcing method identified. Though not necessarily connected with capital program outsourcing, public/private partnerships and innovative financing were frequently found in these programs and often were the distinguishing features that made program outsourcing seem natural.

2.2.1 Design-Build

By far the most common type of capital program outsourcing centered on some version of the design-build concept. The nomenclature associated with these programs varied somewhat from state to state and the degree of partial completion of the initial design also varied, from about 30% to something well less than that. Some projects included initial or long-term operations after project completion, including in one case the imposition of tolls and the repayment of bonds and compensation for engineering services through the collected tolls. This approach to projects seems largely reserved to major projects of both considerable financial size as well as difficult engineering challenges. The staff at one state DOT suggested that these features probably limited the number of such projects in their state at any one time, and also seemed to demand the services of their especially gifted in-house project engineers and administrators, this latter even though state forces were not formally engaged in the design process but presumably reflecting the special challenges of projects given over to this approach. All of these projects involved some type of joint venture team assembled of a broadly capable engineering firm and an equally well-qualified general contractor. Other common features include:

- Warranties Involved -- Some period of post construction performance under traffic is expected.
- Incentives/Disincentives Featured -- nearly always schedule based.
- General Engineering Services

2.2.2 Asset Management System-Based Maintenance Services

The outsourcing of specific maintenance functions, such as mowing, minor resurfacing projects, lane striping, ditching and other drainage facility repairs, is not new and is not considered a capital program outsourcing activity for purposes of this study. However some states, most notably Florida and also Virginia and the District of Columbia among others, have become engaged in what seems to be termed Asset Management System-based Maintenance contracts. Such programs include broad areas (e.g. an entire county, or multi-county state DOT district) or major systems (e.g. all rest areas in a state or all Interstates or freeways in a state or in a large portion of a larger state). Principal features of these agreements include the following:

- Long Term Firm Fixed Price Agreements -- Terms of at least five years and as many as ten were noted. This was deemed essential to interest responsible teams in making the needed investments in equipment and training, and also to encourage optimal, long term solutions rather than sub-optimal “patches,”
- Based on Performance Measures -- An example would be a mowed grass height of between 6 and 12 inches. These are general asset management performance measures based on the experience of the state and are contract provisions.
- Negotiated Contracts -- Teams are selected based on qualifications and cost and terms are competitively negotiated rather than simply selected based on low bid.

2.3 FREQUENTLY ACCOMPANYING CIRCUMSTANCES

2.3.1 Innovative Financing

A number of the programs encountered in this study involved one or more of several innovative financing techniques; the use of new, or at least heretofore untapped, resources in a particular locality (such as toll financing); and/or some form of public/private partnership arrangements. Examples include South Carolina, where a new bypass around a major community is being built through a locally established not-for-profit entity established under state enabling legislation and based on anticipated toll revenues. Also in South Carolina, a state bonding program was enacted enabling a program of projects found in the Transportation Improvement Programs (TIPs) of the several metropolitan planning areas of the states expected to require 27 years to implement to be compressed to seven years. The funds raised through bonding are expected to be repaid through future federal highway aid apportionments to the state. In Louisiana, an act of the state legislature, initially in 1989 and later adjusted and extended by the legislature in 2000, calls for a new fuel tax of four cents per gallon to be used for a specific package of some sixteen projects. Called the Transportation Infrastructure Model for Economic Development (TIMED) Program, it clearly is the fundamental driver in the capital program outsourcing efforts in that state. In Virginia, a new program aimed specifically at finding and entering into partnerships with private

sector entities was enacted several years ago and at least one project was undertaken with a locally formed not-for-profit entity formed for the purpose of the project. While some states are undertaking capital program outsourcing efforts as a strategy for accommodating normal program growth, some states are pushed toward this type of outsourcing because of locally developed funding approaches and private sector partnerships fueled by deep rooted public demand for transportation improvements.

2.3.2 Public Referenda and New Laws

In all of the above examples of innovative financing methods, the basic triggering event was a public referendum or new state law enabling the financing method and usually identifying a specific package of improvements, a schedule for accomplishing them and other details. In Louisiana, for example, some sixteen specific projects were spelled out in the TIMED legislation and in South Carolina, as noted, designated projects expected to require twenty-seven years to implement under the conditions then obtaining were compressed to seven years. In these and in other cases, the public was basically expressing impatience with “business as usual” and demanding an accelerated program. Capital program outsourcing seems like a natural candidate for part of the solution in such cases.

2.4 OUTSOURCING CASE STUDIES

2.4.1 Florida DOT

An “Asset Management System-Based Maintenance Services” Case Study

Over the past several years, there has been a steady increase in the Florida Department of Transportation’s (FDOT) annual budget allocation for product, product support and operations and maintenance activities. FDOT’s annual budget has increased from \$3.11 billion in fiscal year 1995-96 to \$4.50 billion in fiscal year 1999-00, representing an increase of 44 percent over five fiscal years. Similarly, the annual work program has increased both in terms of dollar value and complexity of projects.

With additional funding made available through *Mobility 2000*, an act of Florida legislative session in year 2000 for building roads for the 21st Century, the work program activities are likely to increase further. Also affecting the situation in Florida, the Governor has imposed a target staff reduction of 25% for all state agencies including the DOT. At the time of meeting with officials in Florida, this requirement had largely been met through normal attrition and planned retirements. Therefore, to meet the growing demand for services, FDOT has gradually increased its reliance on outsourcing to augment its in-house resources. FDOT has been a pioneer in the use of outsourcing generally, being one of the first to outsource maintenance services dating back to the mid ‘70’s. What is new in Florida is a growing program of capital program outsourcing, both in the form of a large and growing design-build program and, as described here, a growing program of broad, long-term asset management based maintenance contracts.

One of the characteristics of this new outsourcing program is to enter into a long term (from six to ten years) contract with what is usually a private entity for the management of all assets located within the right-of-way for an entire geographical area, such as a county, group of counties, or an FDOT district, or a significant portion of a roadway system. FDOT's Asset Management Contracts are based upon the use of performance specifications, which effectively transfer the day-to-day managerial and administrative responsibility to the contractor, with oversight by the Department. Performance specifications have been used rather than methodology specifications in order to reduce the Department's contract administration efforts to identify, assign, inspect and document work. These performance measures are drawn from Department experience and are often derived from asset management studies of various roadway, structural and rest area systems. Typical Asset Management performance measures and maintenance rating standards for Florida DOT are included in Appendix E.

To select a contractor, the Department solicits competitive sealed proposals. Evaluation of these proposals is based on the plausibility and innovative approaches of the technical work program description, experience of the team with the specific items included in the agreement, and reasonableness of the cost proposal. Currently FDOT weights the technical proposal 60% and the cost proposal 40%. While the lowest submitted bid may emerge as the selected team, the process is not a simple low bid selection.

Once the contract is executed, the Department monitors the contractor's maintenance management program and conducts evaluations based upon performance specifications established in the contract. The use of performance specifications, which transfer day-to-day managerial and administrative responsibility to the contractor, with oversight by the Department, is chosen because methodology specifications would require the Department to perform extensive contract administration including work identification, work assignment, inspection, and documentation, effectively negating many of the staff reduction benefits of this form of outsourcing.

The contractor will manage and perform all routine maintenance activities associated with roadway, structures, drainage, roadside, rest areas, wayside parks, vegetation and aesthetics, traffic services, structure inspection and incident management.

The scope of the project includes management and performance of routine maintenance of all components of the transportation facility currently maintained by the Department within, or associated with, the state road right-of-ways, including off-system local bridge inspection and other State Agency bridge inspection. Specifically the scope includes:

- All interchanges, crossroads and ramps to the point at which the right-of-way terminates or as shown by the Department through supplemental description.
- All overpasses over the transportation facilities out to the right-of-way line.
- All waterway and intermittent waterway canals to the right-of-way line including compliance with any permit requirements.

- All stormwater management and mitigation areas associated with the highway corridor including compliance with any permit requirements.
- All rest areas, wayside parks, recreational areas and weigh stations including sewage treatment facilities and potable water treatment facilities. This does not include weigh station scales.
- All structure inspection and routine maintenance. Structures include bridges, overlane signs and high mast weathering steel light poles. Also included is the inspection only of local and other state agency owned bridges.

Although as noted above, these agreements are nearly always with private sector firms or teams of firms. However it is notable that FDOT has entered into essentially the same type of agreement with a county DOT. Again, the agreement is long term, fixed price, and based on agreed upon performance measures. One immediate benefit was the ability to close down one of two maintenance facilities for equipment and materials, as virtually all roads in the county became the responsibility of the county maintenance force, thus obviating the need for two facilities.

As a large majority of FDOT's core functions are being outsourced currently, substantial amounts of in-house resources are utilized for administering and managing these contracts on a day-to-day basis.

As of January 2003, the following summary published by the Florida Department of Transportation provides highlights of the status of the Asset Management Program in Florida:

Key Elements of Florida's Asset Management Program

- Contract for routine maintenance work and management services, *including planning, administration and management, inspection*
- Performance requirements
- Assumption of risk
- Long term contracts *6 to 10 years*
- Fixed lump sum monthly payments

Benefits of Asset Management

- Fixed long term price
- Cost savings
- Risk reduction
- Fewer contracts to administer
- Savings in administrative staff and resources
- Program stability
- Performance results

Type of Asset Management Contracts

- Corridor
- Geographic

- Facilities rest areas, *weigh stations and welcome centers*
- Bridges, *fixed and movable*

Typical Roadway Asset Management Contract Includes:

- All traditional maintenance activities
- Compliance with environmental requirements
- Incident response
- Natural disaster preparedness and damage repair
- Permitting
- Highway lighting and call box maintenance
- Customer service complaint resolution
- Formal inspection of bridges and safety features: *guardrail, attenuators, signs*
- Motorist aid service patrols

Status in January 2003

- \$370.8 million active work on 11 contracts, \$49.4.0 million annually
- Total savings for these 11 contracts is \$69.3 million, 15.7%
- \$151.9.0 million in additional work on six contracts will be advertised and awarded in the next fiscal year
- One of the active contracts is with a county government

Status Projected for July 2006

- 29 active contracts
- \$1.05 billion total contract amount
- \$145.9 million annual contract amount
- Contract duration 6 to 10 years, with one renewal option

Critical Success Factors

- Properly define scope: *easily understood by all parties*
- Use established measures
- Use established procedures and policies *including revisions throughout contract period*
- Incorporate existing component contracts
- Provide adequate start up time
- Base Contractor selection on technical proposal and price: *Florida 60% technical, 40% price*
- Coordinate development of contract scope with industry

Assurances to Guarantee Performance

- Annual performance bond
- Pre-determined reductions in payment for failure to meet established performance requirements
- Contract default

- Future contracting contingent upon satisfactory performance history (*technical proposal is part of selection criteria*)
- Proposals are made part of contract terms (*quality control plans, staffing, management approach*)

2.4.2 Louisiana DOTD

An “Innovative Financing” Case Study

The Louisiana Department of Transportation and Development (DOTD) Transportation Infrastructure Model for Economic Development (TIMED) Program was established by Act 16 of the 1989 Legislature. The original legislation, established by Act 16 of the 1989 Legislature includes:

- Sixteen major projects (constitutionally enumerated)
- Four cent additional gasoline and special fuels tax authorized
- Initial tax to expire in fifteen years (2005)

The sixteen TIMED programs included eleven highway construction projects, three bridge construction projects and two intermodal projects for the Port of New Orleans and the New Orleans Airport. With the completion of these projects the DOTD will:

- Connect major cities of Louisiana with a four lane highway
- Enhance economic development
- Include bridge crossings to promote connectivity
- Fund the intermodal enhancements

The purposes of the accelerated program include:

- Accelerate the construction schedule
- Finance the completion of the TIMED Program through periodic issuance of Fuel Tax Revenue Bonds
- Let all projects to contract prior to 2010
- Complete construction of the TIMED Program highway projects in eight years

Additional enabling legislations are the Act 64 of 1998, which extended the Act 16 Taxes until TIMED Projects are complete or debt is repaid, and Act 1 of 2000. These Acts:

- Allowed For Project Estimate Revisions
- Extended the opportunity to issue revenue bonds from 2005 to 2010
- Extended the allowable bond maturity term from twenty to thirty years

As of 2002, two highway projects and the two intermodal projects are considered complete and implementation continues on the remaining twelve projects. The implementation of the TIMED Program has resulted in the breakdown of the remaining twelve major projects into approximately 145 individual project segments of which approximately 95 remain to be

completed. Preliminary plans and basic designs have been initiated for each project segment. The current estimated cost to complete all pre-construction aspects of these projects is approximately \$2.5 billion based on 2002 estimates and the current scopes of work for each project segment. This estimate represents approximately \$1.8 billion in construction, \$354 million for right-of-way and utility relocations, and \$166 million for engineering. Construction administration and inspection costs are not included in these figures and could represent an additional \$180 million bringing the estimated program total to \$2.5 billion.

Significant factors distinguishing the Louisiana DOTD TIMED Program from the South Carolina model include:

- In Louisiana there are fixed revenues and a fixed list of highway, bridge and intermodal projects.
- In Louisiana, the PM serves as an extension of DOTD staff, and is not directly involved in design or construction supervision.

LADOTD “Bond Issue” Case Study

In order to accelerate the construction schedule, the Department has financed the completion of the TIMED program through periodic issuance of bonds through the State bond Commission Office. The Louisiana Bond Commission has approved the purchase agreement for the first \$275 million in a series of bond sales over the next six to eight years which will allow the Louisiana DOTD to complete the remaining TIMED projects in ten years.

The characteristics of the current bond issuance include:

- The amount of the first bond issue is \$275 million (30 year maturity, fixed rate, annual debt service)
- The bond issue meets requirements of the net state tax supported debt formula
- State Bond Commission has selected underwriters and bond counsel
- Three rating agencies have confirmed A1/A+ ratings
- Bond Commission unanimously approved the sale in August 2002
- The issue was completed in August 2002 (money in the bank)

Future additional bonds are scheduled to match program needs. The mode, term, and structure of the future issue will be determined based on then current market conditions. Potential for some variable rate application will be consistent with conservative balance sheet management and rating agency preferences. The goal is to maximize cash flow and minimize interest cost.

According to the Louisiana Secretary of Transportation, bonding out the remainder of the program will be beneficial in several ways. In addition to establishing a guarantee against inflation, the roads will be built for the public’s use much sooner than through the pay-as-you-go system of funding now in place.

Other stated benefits of the Louisiana TIMED Program include:

- It has been estimated that every dollar invested in transportation infrastructure returns \$2.60 in benefits.
- The Federal Highway Administration estimates that for every \$1 billion in highway investment, some 7,900 on-site jobs and some 19,700 off-site jobs are generated, and some 14,500 jobs are induced by the ripple effect
- Highway accessibility is also a leading economic development consideration, and four-lane highways increase safety and provide a number of other benefits.
- Recent record years of business at the Port of New Orleans are directly attributable to the TIMED expansions that were completed there.

LADOTD TIMED “Program Manager” Case Study

The Program Management provides consulting services to DOTD required for the timely and successful delivery of the TIMED Program. The Program Manager/Team assists the DOTD by managing all Engineering, Geotechnical, Land Surveying, Permits, Project Agreements, Environmental Clearances, Real Estate, Utility Relocations and Program and Financial Management Services required to complete the implementation of the TIMED Program.

The Program Manager services under TIMED program are to include the following:

1. Development of a Program Strategy

The Program Manager/Team is required to develop an overall strategy for execution and completion of the TIMED Program. The strategy addresses issues related to pre-construction activities including design standards, coordination between contract consultants, right-of-way activities and all items that influence project delivery schedules. The Program Manager/Team confers with DOTD to establish the program strategy. Procedures will be developed to address and re-mediate unexpected program issues in a timely manner.

2. Development of a Program Schedule

The preliminary program schedule is prepared by DOTD. The Program Manager/Team evaluate the preliminary program schedule and confirm or establish schedule milestone dates for all events necessary to advance each project to construction in accordance with the Program Strategy. Any issues anticipated to impact individual project schedules will be addressed by the Department and contract design consultants.

3. Program Development

- a. Program Manager/Team provide a system for tracking all project pre-construction and construction activities and projections of the outcome. The system will be easily understood and accessible by DOTD and contract consultants. Any

program management system used by the Program Manager/Team should be able to interface with the existing DOTD system.

- b. Project status reports are provided on a monthly basis to DOTD and contract consultants.
- c. Program Manager/Team establish a procedure to identify activities that fall behind schedule and will be responsible for establishing a Recovery Plan with contract consultants and DOTD.
- d. Program Manager/Team will be responsible for recommendations to the DOTD and its contract consultants to resolve issues that impact the program schedule and budget.

2.4.3 Maryland DOT

At the Maryland State Highway Administration (SHA) a number of project and program management activities that were traditionally performed in-house have been and will be contracted to outside entities. Significant and innovative on-going outsourcing efforts at SHA include the following:

A “Design-Build” Case Study

SHA has developed the Design-Build method as a means to meet the demands of a program demanding more projects, faster and within budget. The SHA approach to Design-Build has been to selectively allocate risk between SHA and the contracting community. SHA believes that risk should be assigned to those best able to manage the result.

A two-step selection process has been established to obtain the winning design-build team. The first step involves a technical proposal from which a short list is developed. The second step is a traditional low bid submittal from the pre-qualified teams.

The first step technical proposals are based on an Invitation for Bids package that contains project specific criteria and includes design plans completed to about the 30% stage. A Technical Proposal Review Committee reviews all proposals and rates each against the stated project criteria. SHA invites only those teams that achieve a rating equal to or better than the minimum score to proceed to step two – the low bid submittal stage.

In Maryland SHA experience, the cost of using Design-Build versus traditional contracting methods is nominal. Costs typically incurred during the design phase are shifted and incurred during the construction phase on a design-build project. To avoid surprises and improve the bidability of the projects, SHA procures the R/W, obtains preliminary environmental approvals and initiates utility relocation activities. The Design-Build team is responsible for final design and permitting, and overall project coordination. The result has been fewer field conflicts and a fast paced, high quality project.

SHA has seen many positive results from the projects in over the last four years. SHA has successfully advertised 10 Design-Build projects during that period of time at a total value of

\$122 M. This method reduced the average time for design and construction by approximately one year, as compared to the traditional design-bid-build method. The program has also consistently produced final products with less than 1% in change orders – significantly less than the program as a whole.

A “General Engineering Consultant” Case Study

In 1999, the SHA was given direction and funding (\$50 million) from the Governor to provide intersection improvements for immediate relief at some of the most congested intersections in the State. This was a very ambitious task requiring the SHA to analyze over 150 intersections, develop traffic solutions, prioritize them and have many of them under construction within two years. With the current project load the SHA did not have sufficient staff to assign to each project. The answer was to utilize a General Engineering Consultant (GEC) to fulfill the traditional SHA project manager role.

Most of the intersections were assigned to consultants to design. The SHA had approximately 25 intersections under design at the same time, all with very tight schedules. The GEC responsibilities included traditional consultant management functions (reviewing task proposals, negotiating work-hours and monitoring productivity), presiding over community meetings, tracking permit submittals, reviewing schedules and budgets, and reporting directly to SHA management with status reports.

This approach has worked well, particularly when the GEC has extensive experience with SHA internal operations. The SHA has since expanded the use of GEC consultants to a major project corridor – US 29 and to manage multiple Neighborhood Conservation projects (small community oriented improvement projects).

US 29 Corridor General Engineering Consultant

The SHA is using a GEC as a project manager for the US 29 corridor project. The GEC is handling project management and coordination issues between the section designers for the corridor (there are 4 different consultant firms doing the design of 8 interchange projects), as well as handling corridor wide traffic studies, corridor wide Maintenance of Traffic studies, and plan reviews for each milestone. The GEC is involved in the review of all aspects of each project from aesthetics to constructability issues. They are handling permit applications for all contracts and will be managing the coordination for the detail-build contract. The GEC contract on the US 29 corridor is \$4.5 million, overseeing over \$250 million in construction contract value.

The score of services for the General Engineering Consultant services for the US 29 corridor included:

1. Manage, coordinate, and oversee design and construction of all US 29 corridor activities acting as Project Manager/Agent for the SHA.
2. Development and oversight of the US 29 corridor aesthetic plan

3. Analyze given existing typical sections along the project corridor

Woodrow Wilson Bridge Project

In partnership with the Commonwealth of Virginia and the Federal Highway Administration, the State of Maryland has engaged a General Engineering Consultant to oversee the design and construction of the Woodrow Wilson Bridge Project. This bridge is I-95's crossing of the Potomac River and is located in Virginia, the District of Columbia and Maryland. The project encompasses the complete replacement of the existing bridge and the reconstruction and expansion of four interchanges, two on each side of the river, with a total cost of about \$2.4 billion.

To manage such a mammoth project, a joint venture of consulting firms oversees the design of the different features of the project by other consultants and provides construction inspection services. They also assist in right-of-way acquisition, utility relocation coordination, and environmental permitting. Minimal staff members from the different state agencies are involved in these project activities. From March 2002 to February 2003 a total of \$22 million is budgeted for the GEC contract altogether, with Maryland contributing about \$9 million and Virginia contributing about \$13 million.

2.4.4 South Carolina DOT

A “Public/Private Partnerships and Innovative Financing” Case Study:

South Carolina has engaged in a number of non-traditional methods and innovation to expand its road system, including innovative financing, design-build projects, and public/private partnerships.

To keep pace with growth of the state, South Carolina is expanding its road system in ambitious fashion. The South Carolina Department of Transportation (SCDOT) is accomplishing 27 years of road and bridge projects that had been placed in the several metropolitan planning area Transportation Improvement Programs (TIPs) in just 7 years, a task that involves putting aside conventional ways of doing business. South Carolina has implemented a number of innovative financing methods, such as public/private partnerships, financial partnerships with local planning organizations and new ways of leveraging future federal dollars. Using these innovative financing methods, South Carolina overcame a last-place position for federal fund apportionments to launch an unprecedented \$5 billion worth of road construction.

SCDOT has used the design-build method of contracting successfully on eight projects ranging in cost from \$3 million to \$531 million and ranging in type of work from bridge replacements to new freeway facilities. SCDOT has found design-build to be an effective and efficient project delivery method for use on selected projects. The state experience indicates that for projects that have full funding available, particularly through bonding or other financing methods, and time is critical, design-build contracting is a preferred delivery method.

Construction and Resource Managers:

Expecting to complete nearly 200 construction projects in seven years, which is at least 20 years under the agency's normal workload, SCDOT selected Construction and Resource Managers, (CRM) to assist them. A CRM is the term given to a firm, or a group of firms, that has experience and expertise in highway and bridge design and construction. After a detailed evaluation process, the SCDOT Commission voted to ask the staff to negotiate a contract with two consulting firms. The plan calls for the state to be divided approximately in half, with each firm assigned to one-half of the state.

The two CRMs report to SCDOT on the projects they have been assigned to help manage. The firms serve as assistants to the SCDOT Program Managers, who will continue to oversee every project.

The contract, signed by SCDOT in July 1999, calls for each CRM to assist SCDOT in more than \$760 million worth of road and bridge work to be completed within seven years. By partnering with the CRMs, SCDOT escaped the difficult task of recruiting an estimated 500 qualified employees to handle the additional workload and then laying them off once this one-time work program acceleration had been completed. It is believed that this is the first program of its kind of this magnitude in the United States. The FHWA has worked closely with SCDOT to administer this partnership and a number of other innovative financing programs.

A public/private partnership:

The idea for the Southern Connector, a 16-mile, four-lane road linking Interstates 85 and 385 in southern Greenville County surfaced in 1967. This toll road was completed in February 2001, nine months ahead of schedule. It is financed by The Connector 2000 Association; a local not-for-profit corporation set up to finance and operate the facility. It is the first public-private transportation project in the United States to be financed using a 63-20 (not-for-profit, as defined by the IRS) corporation. This unusual arrangement, which more commonly has been used to build other types of infrastructure, such as sports stadiums and sewer systems, allowed Connector 2000 to issue about \$200 million in toll revenue bonds. The state of South Carolina has no liability for the bonds. After the road was built, it was accepted into the SCDOT system. As part of the project, SCDOT is financing a one-mile, \$17.5 million connector to the toll road.

The State Infrastructure Bank:

The S.C. General Assembly created the State Infrastructure Bank (SIB) in 1997 to select and assist in financing major projects. Since its inception, the SIB has approved financing and begun development of nearly \$3.0 billion in projects.

Some have referred to the \$386 million SC Highway 22, a 28.5-mile road to give motorists a more convenient route to popular Myrtle Beach. The SIB-funded road stretches from U.S. 501,

10 miles north of Conway, to U.S. 17 in the Myrtle Beach area. It is four lanes from U.S. 501 to the future Carolina Bays Parkway, where it becomes six lanes to U.S. 17. This design-build project began in March 1998 and was completed in May 2001.

Other State Infrastructure Bank projects include the Carolina Bays Parkway, a six-lane, 20-mile highway linking SC 9 with US 501. The Carolina Bays Parkway, which will intersect with SC 22, is part of more than \$1 billion worth of projects developed in a partnership among SCDOT, the state of South Carolina and Horry County.

The construction contract for the Cooper River Bridge Replacement Project, the single-biggest project in SCDOT history, was signed in July 2001. Completion is scheduled for July 2006. State Infrastructure Bank assistance totaled \$325 million. The State Infrastructure Bank and SCDOT successfully obtained a \$215 million loan from the US Department of Transportation under the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA). The TIFIA program was established in TEA-21 and provides direct loans or loan guarantees for transportation projects exceeding \$100 million. The loan is to be repaid by sources of the State Infrastructure Bank, SCDOT, State Ports Authority, and Charleston County.

Interstate Upgrade Acceleration:

The SCDOT maintains a nearly 42,000-mile system includes more than 800 miles of interstate highways. In recent years, however, there has been no funding to add lanes or improve the interstate system.

Realizing the key role interstates play in economic development, the SCDOT took an innovative approach to help some of the worst congestion problems throughout the state. The SCDOT targeted interstate widening and interchange improvements that could be done in a short time without needing to acquire rights of way. The interstate widening projects are funded with State Highway Bonds and federal funds. All of these projects are expected to be finished within three to five years, instead of up to 15 years under standard funding methods. The program includes widening of Interstate 26 in the Charleston area, Interstate 85 in Greenville and Anderson counties and Interstate 77 in York County outside Charlotte, N.C. Seven interchange improvements are throughout the state, in counties such as Spartanburg, Richland and Lexington.

MPO/COG Project Acceleration Program:

This program takes advantage of federal laws that allow future federal highway funds to be leveraged through the issuance of bonds to build current highway system improvements. Eight of 10 Metropolitan Planning Organizations (MPOs) and Council of Governments (COGs) have partnered with SCDOT in this financing program to accelerate projects in these urban areas.

Finishing the projects earlier saves money by avoiding rising land costs in high-growth areas around urban cores.

The key part of this financing program is the issuance of State Highway Bonds, which supplement current federal funds during the construction period. A portion of each MPO's future federal fund allotments, or guideshares, will be used for debt service on the bond issues.

Each MPO and COG program is structured around specific construction projects. These projects are prioritized and "locked in" from the beginning of the program in an initial feasible financing plan. Next, these projects are managed as one large program to help increase efficiency.

The initial financing plan has assumptions about project costs, inflation, future interest rates, availability of federal funds, project time schedules, etc. These variables are managed throughout the construction phase to balance the sources of funding with the uses of funding.

The dollar amount of bond issues is not fixed, but there are two limiting elements of the program that are fixed:

1. The future amount of guideshares that can be pledged by the MPO for annual debt service on the bond issues is limited to a dollar amount that is no more than half of their 1997 guideshares.
2. Since bond issues will occur as needed during the construction period, the term of any bonds issued is limited. All bond terms will be structured to be paid off by 2022.

So, the dollar amount of bonds that can be issued for each program depends on interest rates and the timing of the bond issues.

By using innovative financing and the assistance of the CRMs, the 27-year construction projects of the MPOs and COGs are being finished in about 7 years. Furthermore, the normal dollar amount of the program is around \$350 million; with the acceleration program in place, the average acceleration program is about \$800 million. Putting several smaller projects under a large umbrella program makes for increased efficiency and lower costs.

2.4.5 Virginia DOT

A "Design-Build" Case Study

In July 1995, the Commonwealth of Virginia enacted legislation to authorize public-private partnerships to build, operate, and maintain transportation facilities, under the approval of the Virginia Department of Transportation (VDOT). This legislation is better known as the Public-Private Transportation Act (PPTA). When PPTA was signed into law, Virginia became the first state to allow contractors to submit unsolicited proposals for interstate maintenance and construction. The purpose of the PPTA was to "deliver transportation services and projects in a more timely and less costly fashion, thereby serving the public safety and welfare" (*Code of Virginia*, Section 56-558).

The Public Private Transportation Act of 1995 led to Design-Build-Finance and Design-Build projects—I-895 (a toll road opening this month South of Richmond) and Route 288 west of Richmond (now under construction), respectively. Both were the result of proposals initiated by the private sector to complete projects that were already under design.

I-895 is a project that provides an additional crossing of the James River. It connects I-295 on the east to I-95/Route 288 to the west. The project, a four lane divided roadway runs almost nine miles and has a total cost of \$330M. It is bond funded with toll revenues to repay the bonds. The bonds were issued through a 63-20 (not-for-profit, as defined by the IRS) corporation.

Route 288 provides a western crossing of the James River. It connects I-64 on the north in Goochland County, providing a continuation of the last sections of Route 288 in Chesterfield and Powhatan Counties. The project is valued at \$230M.

An “Asset Management” Case Study:

In October 1995, a maintenance contractor submitted the first unsolicited proposal under PPTA regulations to implement a public/private partnership for the maintenance of a portion of interstate highway in the Commonwealth of Virginia. The proposal was approved in December 1996. By establishing this agreement, this contractor became the first private firm to assume full responsibility of comprehensive maintenance of a significant portion of the State’s Interstate highway system. The agreement stated that the contractor would administer and maintain all assets, including incident management and snow removal, on 250 miles of Virginia’s interstate highway. Under the terms of the agreement, the contractor was awarded a fixed-fee, 5½-year contract at a total cost of \$131.6 million. The agreement required that all assets located within the interstate rights of way be maintained at or above a level of service defined by the outcome and performance targets specified in the contract. Since 1997, the contractor has managed maintenance projects for 250 miles of highway on portions of I-81, I-95, I-77, and I-381. The contractor provided all labor, materials, equipment, and services for a fixed price and a given duration. The Maintenance contract is with VMS of Virginia and includes all maintenance and operations including restoration and rehabilitation of bridges and pavements. It is now a ten-year contract with an annual value of about \$33 million. In June 2001, VDOT renewed the contract for 5 years at a total cost of \$162 million.

2.5 KEY FINDINGS AND RECOMMENDATIONS

The outsourcing practices are driven by a number of different factors in each state and the transportation infrastructure needs of the state along with financial, political, and legislative factors in each state determine the outsourcing practices for the states. Based on the outsourcing practice of the case study states in this report, the following are among the general key findings and recommendations of the outsourced capital program functions.

2.5.1 Design-Build

KEY FINDINGS:

Table 1 includes some key findings for Design-Build practice:

Table 1 - Design-Build key findings

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| A small percentage (5-10%) of current construction projects are designated as design-build. |
| The design-build practice has proven itself for certain project types (complex, large dollar value, challenging technical problems) and its use in the states visited is steady or on the rise. It is not declining. |
| Large projects with flexibility, open options, and tough technical challenges which are likely to reward innovation are best candidates for design-build. |
| Many of the state DOT personnel interviewed in connection with this project indicated that design-build projects can offer significant time savings, but costs generally appear to be closely comparable to traditional methods. |
| Design-build construction method may require more experienced contract and program management staff at state DOT. |
| It is important for State DOT to independently verify contractor performance by carefully drafted performance standards specified at the start of the project. |
| Fewer change orders is among the benefits of this method. |

KEY RECOMMENDATIONS:

The key recommendations for the design-build outsourcing method are included in Table 2.

Table 2 - Design-Build key recommendations

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| Establish clear lines of communication between the state DOT responsible technical and contract staff and the contractor project manager and team. |
| Negotiate an effective warranty prior to initiating the project. |
| Include the draft contract with the RFP information. This will allow the contractor to be aware of all contract requirements and performance expectations before submitting a proposal. |
| Be open to revising the selection process to fit the project (e.g., fixed scope-low bid, fixed price-best value, two step RFQ/RFP process). |
| Include disincentives and a "no excuse" bonus for timely completion. |
| At least one state, South Carolina, has included a deliberate program of technology transfer from the design-build contracting teams to the permanent DOT staff. Where this is desired, it is of course important to include the technology transfer role from the contractor to the DOT staff as one of the requirements of the contract. |

2.5.2 Asset Management System-Based Maintenance Services

KEY FINDINGS:

Table 3 includes some key findings for Asset Management System-Based Maintenance Services practice:

Table 3 - Asset Management System-Based Maintenance Services key findings

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| This outsourcing method permits reduced permanent employee staff levels as the asset management responsibility is shifted to the contractors. |
| Non-state government agencies such as local government transportation agencies can participate in this method of outsourcing. |
| This approach is appropriate to meet large-scale system maintenance requirements. |
| The long-term fixed price aspect seems to foster innovation, as less expensive and/or longer lasting repairs are intrinsically rewarded. |
| These same attributes (long term, fixed price) also seem to lead to more optimal solutions in the long run. For example, the case was cited in the field interviews where a faulty rest area air conditioning compressor was repaired twice over some two or three months based on traveler complaints. On the third trip, it was replaced with a new one, probably leading to long term savings but a step often inhibited by a traditional annual budgeting process. |
| The method depends importantly for success on well thought out and rational performance measures. Though it probably cannot be proved, this asset management approach would appear to be inherently more efficient than most alternatives, such as, for example, three mowings per year. |

KEY RECOMMENDATIONS:

The key recommendations for the Asset Management System-Based Maintenance Services outsourcing method are included in Table 4:

Table 4 - Asset Management System-Based Maintenance Services key recommendations

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| Performance measures are key in outsourced asset management based projects. State DOTs must prepare carefully defined expectations, procedures, and details in advance of contract award. |
| In asset management based maintenance services, award may not be based on the traditional low bid but on a “best buy” evaluation of price and proposal. To do this effectively requires experience, sound negotiating skills, and may benefit from competitive negotiations with two or more finalist teams. |
| Safeguards for the state DOT, which include disincentives, penalties for underperformance, and performance bonds, are essential to the success of these programs. |
| Long contract term plus fixed price feature seems to encourage program efficiencies. This will benefit the state, as the contractor quality of work will improve to avoid repetitive short-term fixes to the assets under management. |

CHAPTER 3. EVALUATION METHODS

With the state DOTs facing the challenge of delivering more projects than ever, in a more complex environment and with the declining professional staff in numbers and experience, the need has emerged for not only more creative ways to deliver capital projects, but also for careful and comprehensive evaluation methods to ensure that project quality and delivery goals are being met.

3.1 PRACTICES

Few states have implemented a formal and structured evaluation process for their capital outsourced programs. The following case studies provide valuable lessons for evaluation methods and models for the outsourced programs.

Utah DOT “Design-Build Evaluation” Case Study

In April 1996, the Utah Department of Transportation (UDOT) requested approval from the FHWA to use design-build for the I-15 Corridor Reconstruction Project. The existing I-15 Corridor was built during the 1960’s to serve the projected needs through the 1980’s. An immediate need existed to reconstruct the corridor to correct the structural, criteria, and capacity deficiencies. The project involved completely removing and repaving 16 miles of the Interstate through Salt Lake City. The project began in April 1997 as the UDOT issued the notice to proceed to the contractor for the base price plus construction and maintenance option of \$1.352 billion, making it the largest single highway contract in the country.

The I-15 project goals were defined within the imperative of time, quality, and cost. As Salt lake City was awarded the 2002 Winter Olympic Games, the decision to complete the I-15 project by the end of 2001 before the Olympics drove the use of design-build as the best (and maybe the only) way to complete the project on time.

To evaluate the I-15 Corridor Reconstruction Project Design-Build, UDOT planned annual reports under a four-year project of evaluation and research starting in 1998. The purpose of the evaluation was to collect and evaluate information derived from the process used in the project and to provide the information to other agencies intersected in pursuing similar design-build projects. These evaluation reports were conducted by Carter & Burgess, Inc., an independent consultant, in cooperation with UDOT and contractor staff. The consultant’s report highlighted some key findings and lessons learned in the design-build process as follows:

Key Findings:

- Determine the availability of qualified and certified testing and inspection technicians in the area
- Evaluate and eliminate duplication of effort in the QC/QA program of the states and the contractor
- Determine the staffing level requirements for the state DOT

- Manage the perceived loss of control by state DOT staff
- Document the innovative outsourced process
- Manage perceived conflicts of interest between evaluation and production
- Evaluate the long term quality of the project
- Convey acceptance of “new” processes
- Consolidate office location for the contractor key team and the state DOT staff
- Execute earliest development of design standards and standard plans by the contractor to gain greater efficiencies in time and money
- Establish an audit tracking system in the beginning of the design-build process.
- Evaluate the public relations programs
- Evaluate the effectiveness of partnering process
- Evaluate innovative construction methods, materials, and design techniques
- Include specific performance criteria and measurement standards. Include outcome expectation, where the owner can define a method to achieve a specific outcome, a prescriptive specification is more appropriate than a performance specification
- Include measurement of specifications. The owner should perform a thorough assessment of the project and the desired outcome before deciding what type of specifications to use
- Include review of specifications. Where the owner does not have a track record of using performance specifications, it is vital that a thorough review of the performance specifications be conducted to remove ambiguities and unenforceable requirements
- Add an agreement to accept equal or better substitutions on methods, means and materials as a critical part to the success of the project
- Include a project task force. The use of the project task force composed of the owner and the contractor staff is critical to interpret the intent of the specifications.
- Add performance specifications with experience. As more experience is gained in the transportation industry with performance specifications, it is expected that more specifications will be developed and proven in practice
- Add warranty. A key is the need to have a warranty that the contractor knows will be enforced.
- Add award fee. The award fee can be more incentive based on performance above and beyond the required level
- Plan nighttime work. In fast track design/build projects, extensive night work could be involved, especially in concrete placement for bridge decks and roadway pavements. Agencies and contractors contemplating design-build where schedule is critical need to plan for additional staff requirements to meet this type of requirements

- Include contractor hold times. Consideration should be given to revise the specifications to require “hold” times at important stages of the project to permit time for owner review of the work before proceeding

Virginia DOT “Asset Management System-Based Maintenance Services Evaluation” Case Study

To evaluate the asset management contract discussed in Chapter 2, VDOT has turned to a state university and a private consultant to perform independent assessment of the maintenance contract. The main objective of the study by the university was to assess the cost-efficiency of the pilot contract by comparing the cost of the work done by the contractor to the price if the work had been contracted out by VDOT. The objective of the study by the private consultant was to perform an independent and objective evaluation of four maintenance asset groups (traffic, drainage, roadside, and shoulders).

VDOT program evaluation was twofold:

- To assess the interstate maintenance contract
- To develop an action plan based on the lessons learned in the assessment to ensure that VDOT maximizes the benefits of the contract

The State investigated the answers to the following three questions with the program assessment:

1. Is the contractor performing in accordance with the requirements of the contract?
2. What is the assessment of the quality of the contractor maintenance work?
3. How do the costs of work performed by the contractor compare with the costs of maintenance performed by VDOT?

Assessment Methodology:

To complete the assessment, the evaluation team reviewed relevant literature, obtained an expert legal review of the contract documents, interviewed stakeholders, and collected and analyzed performance data to determine if the contractor complied with the performance standards specified in the contract and the quality of their maintenance work. The study team also developed a methodology to compare VDOT costs with payments to the contractor.

The committee empanelled by the VDOT commissioner consisted of the director of operations, the four district administrators where the contractor operates, two district maintenance and one district maintenance and operations engineers, the state maintenance engineer, the program manager of the Contracts Section, and two members of the assessment study team. The committee developed the items included in the action plan. For VDOT to more effectively manage the contract, the commissioner directed the committee to (i) distribute authority for administration and management of the contract to the districts, and (ii) define the roles of the districts and the Maintenance Division.

Seven tasks were undertaken to conduct the assessment:

1. Review the literature relative to the contract between VDOT and the contractor
2. Obtain an expert legal review of the contract and associated documents.
3. Interview the stakeholders in the contract, including personnel from the contractor, industry, VDOT, and other Virginia state agencies, and interview representatives from other state departments of transportation who hold, or did hold, contracts with the same contractor.
4. Collect and analyze maintenance performance data to determine if the contractor is complying with the performance requirements specified in the contract.
5. Select appropriate sections of the Interstate maintained by VDOT to allow performance comparisons with sections maintained by the contractor.
6. Develop and demonstrate a methodology to collect and analyze maintenance cost data to allow comparisons between VDOT maintenance costs and the contractor costs.
7. Analyze the information and data collected to identify lessons learned for managing the VMS contract or similar endeavors.

Key Aspects of the Legal Review of the Contract Documents:

1. Are the documents well-drawn legal documents that give VDOT the protections it needs to ensure that it can hold the contractor responsible for the work to be performed?
2. How are the risks allocated to VDOT and the contractor?
3. In the event of some level of non-performance on the part of the contractor, who would be legally responsible?
4. What would be some “best practices” from a legal perspective that should be incorporated in these contracts in the future?

Maintenance Performance Comparisons Between VDOT and the Contractor:

To determine if the contractor is complying with the performance requirements specified in the contract and is performing quality maintenance work, asset condition assessment data was collected for the contractor-maintained interstate sections and the base comparison network of VDOT-maintained interstate sections. The study team collected pavement maintenance and rehabilitation data from VDOT and the contractor. In addition, the study team collected pavement international roughness index (IRI) data and Interstate bridge performance data.

These data sets were chosen because they were readily available and applicable to both VDOT and contractor-maintained Interstates. In addition, asset condition assessment inspections are identified as a condition of the contract with specific targets as measures of performance.

Asset Condition Assessment Data:

VDOT conducts an annual inspection of the assets maintained by the contractor to determine if the contractor is in compliance with the performance standards specified in the contract. The method to determine the number of sites to be inspected on each route is specified by a formula included in the contract. Neither the contractor nor the VDOT personnel were notified as to when the inspections would occur or which sites were randomly selected for inspection.

The contract specifies that each Interstate under contract will be inspected and summary results will be presented separately for each route, and that the evaluation will occur annually. The contractor inspects its assets quarterly, which provides a more detailed view of asset conditions over time.

The evaluation team used the summary data and the performance standards for each asset to determine statistically if there was sufficient evidence to conclude if a given asset on a given route complied with the performance standard specified in the contract. Two determinations were made in this analysis: (1) whether the asset inspected complied with the performance standard specified, and (2) whether enough sites were inspected for each asset on each route to allow a statistically valid conclusion as to whether a given asset passed or failed the inspection.

KEY FINDINGS:

The highlights of the findings from the literature review, stakeholder interviews, the legal review of the contract documents, and the performance and sample cost analyses are presented here along with conclusions and lessons learned to address the above three questions:

- Revise the comparison sections to provide a more comparable network for comparison to the contractor-maintained sections.
- Collect asset location data for all assets located on the interstates maintained by the contractor and in the VDOT comparison sections to ensure that sufficient samples are inspected.
- Develop a report of the performance results and disseminate it to the contractor and to the VDOT field organization.
- Assure that the contract includes meaningful pavement performance standards so that the state's pavement maintenance and rehabilitation does not place the state at higher risk for increased costs for pavement replacement in future years.

- Do not use bridge condition assessment reports to assess the performance of the contractor.
- Collect more extensive data in order to develop a well-founded assessment of contractor's performance.
- Ensure that pavement and bridge structures are maintained for long-term performance at the lowest life cycle cost.
- Include incentives and disincentives to ensure timeliness of performance
- Adopt appropriate methodology to assess the cost-effectiveness of the contract. Collect appropriate data and conduct analyses periodically to ensure cost-effectiveness.

Louisiana DOTD "Financial Planning Evaluation Model" Case Study

Louisiana DOTD has developed a model to assess the future state of a financial fund and predict the impact of measures aimed at redirecting the fund to achieve its original goals. It uses linear programming to schedule funded activities and a spreadsheet to reproduce fiscal flows.

Any planned major transportation facility receiving federal assistance must undergo a Major Investment Study (MIS) (Federal Regulations, 1993). Part of an MIS is a financial analysis which includes an estimate of future revenue and expenditure from the fund over its lifetime.

One of the most common forms of financial analysis model used in transportation in the past has been one used to assess the financial feasibility of a project prior to its approval and implementation.

The procedure implemented in Louisiana was developed to provide coarse-level predictions of the future operation of funds. It uses linear programming within a spreadsheet to estimate future transactions within a fund. The most difficult part of developing a model of this type is in describing the operation of a fund in terms of the objective function, constraints, and input to the spreadsheet. However, the analyst has a wide choice of ways to describe the model within this framework and can tailor the formulation to suit the application. The advantage of using a model of this type is that it can be set up relatively quickly and easily, and that it can be used to analyze a wide range of policies and conditions quickly and cheaply. Considering the uncertainty that surrounds all predictions, a quick, cheap, broad-brush procedure seems to be an appropriate tool to get rough estimates of the future of a fund when it appears to not be meeting the goals for which it was established.

Louisiana DOTD "Outsourcing Assessment Model" Case Study

The decisions to outsource must be based on a logical, systematic process that considers costs, need to expedite, peak work volumes, unique skills, training and retraining, human resource

aspects, and the retention of strategic core competencies within the public agency. These are important pieces of information even when the decision is to not outsource the services in question. The information might indicate areas where the agency can improve its efficiency. Of course, the analysis can also identify areas suitable for outsourcing. The outsourcing decision should be made with consideration given to five factors:

- Economic impact
- Vendor service reliability and service quality
- Legal ramifications
- Impact on strategic core competencies
- Sociological factors

To consider these factors adequately, a comprehensive approach to outsourcing is preferable to a piecemeal one.

The LADOTD has developed an assessment tool as a systematic, objective procedure to evaluate the potential to outsource functions and activities currently performed by the Department. The tool is a computer-based model which evaluates the qualitative and cost aspects of contracting out activities and functions. The computer model assists public sector managers in decision making over the outsourcing of agency functions and activities.

The application of the model is limited to three activities in the LADOTD:

- Highway markers
- Highway striping
- Maintenance of rest areas

The model has been constructed so that the perspectives it considers and the criteria on which outsourcing is assessed may be altered by the user to allow it to operate in a variety of settings.

Instead of the *ad hoc* nature of most outsourcing analyses found in the public sector, the LADOTD model considers both cost and non-cost issues related to outsourcing and makes the process systematic and uniform for all types of activities being scrutinized for outsourcing.

Louisiana DOTD has developed a comprehensive model that addresses the warrants of outsourcing any function within the DOTD and to apply that model to one or more targeted functions for which outsourcing potential is envisioned by the department.

1. Identify DOTD strategic functions representing core activities that are vital to the organization
2. Develop a decision model of analysis of outsourcing opportunities and alternatives
3. Consider qualitative factors that are relevant to the outsourcing decision, and
4. Apply the decision model to one or more DOTD functions for which outsourcing potential is envisioned by the administration

The study will involve gathering information in five areas:

- Identification of all activities performed by DOTD
- The strategic core competencies that must be maintained within DOTD to be an effective agency
- Determination of the set of activities that potentially can be outsourced
- Development of a model to identify comparative costs of in-house versus contracted out services
- Identification and assessment of qualitative aspects should outsourcing occur.

The approach is to work with DOTD officials in identifying core activities (and closely related support services) that are vital to day-to-day operations of DOTD. A “generic” model will be developed to identify activities that should be considered for outsourcing or targeted for efforts to improve in-house efficiency.

The evaluation contributes to achieving a proper balance between public and private accommodation of transportation functions, thereby increasing effectiveness and efficiency while maintaining the optimal core competencies within DOTD. Moreover, the product of this research is a tool that can be used on an on-going basis to pinpoint DOTD functions where efficiency needs improvement or else outsourcing will take place.

KEY FINDINGS:

- Specific financial planning and forecasting models are available to evaluate special transportation funds
- In terms of the use of the computer model, it is critical to recognize that it is a decision support aid rather than a tool to prescribe outsourcing.

and capable professional personnel in the state DOT than the average project, due mainly to the fact that these projects are intentionally and particularly the challenging ones.

On the other hand, one state in particular, Florida, projects rapid growth in this form of outsourcing, especially in the asset-management system based maintenance area. The program has generated considerable enthusiasm at the senior staff level of the state DOT, with fewer complaints on the part of the public, responsive and pro-active contractors, and what the state believes to be reasonable costs for the services rendered.

The question of cost impacts of capital program outsourcing is one which could only be approached subjectively in this study. With respect to design-build projects, the conventional wisdom among those interviewed was that the dollar cost to the agency appeared to be about the same as conventional approached, but that design-build projects opened to the public much sooner. Time, of course, is money and therefore this suggests that indeed there is a considerable saving to the public in the form of user cost benefits due to significant schedule accelerations resulting from this outsourcing method. The dimensions of this benefit, and whether it is due to the method itself or to strong public acceptance of the project, the absence of controversial environmental disputes, or other factors cannot be discerned. In the case of asset management-based comprehensive maintenance programs found in a few states, in-house analyses indicate considerable cost efficiencies in one case and uncertainty as to cost savings in another.

4.2 TRENDS

As noted above, capital program outsourcing appears to be generally successful in those relatively few states where it has been tried. It thus appears to be here to stay as a new tool in the kitbag of state DOTs as they approach some of the challenges of the future. Notably, in many of the states that have used some variant of this form of outsourcing, some “externality”, i.e. a focusing event such as a referendum, a new act of the legislature, or a public acknowledgement in some way of a growing backlog of need and a feeling that “business as usual” is inadequate to the challenge, seems to underlie the decision to move in this direction. Examples include the “TIMED” program in Louisiana, the Construction and Resource Management (CRM) agreements and other program accelerations in South Carolina, and the Winter Olympics-induced acceleration of the massive and complex I-15 project in Utah. Some form of innovative financing usually accompanies these special programs, and, since there is an increased interest by state and local governments in special funding approaches, the expectation is that there will be more such outsourcing activities in the future.

Other states, though not many yet, have adopted the capital program outsourcing approach as a basic strategy for meeting future program needs, particularly in situations where staff levels will not be permitted to rise and may be lowered. In states where design-build has emerged as one of several general approaches to project development, it appears to be applicable to a portion of the project needs backlog, but that proportion is not likely to increase. Thus in such states, this form of capital program outsourcing appears likely to grow more or less in consonance with the construction program at large. Yet in other states, where agency staff reductions are an

important consideration, this form of outsourcing is seen as a key strategy for the future and will undoubtedly grow more rapidly than the transportation program as a whole.

In summary, therefore, some form of capital program outsourcing seems to frequently follow an indication of public impatience with the pace of transportation improvements. In the recent election there were some twenty or so referenda dealing with some form of transportation system improvement acceleration, and half or more were successful. These referenda are bound to continue and since capital program outsourcing will undoubtedly result from some of them, it seems destined to grow for this reason alone. Further, some states have learned to use this type of outsourcing as a routine solution to at least some problem types, and therefore will grow in line with overall program growth, and in some cases faster.

4.3 FUTURE RESEARCH NEEDS

Although there was considerable enthusiasm on the part of state DOT staff members interviewed in the course of this study, there was an almost surprising absence of formal, rigorous evaluation models for these approaches versus more conventional methods. In some cases, such as South Carolina and Louisiana, for example, there probably is no viable “conventional alternative” to the capital program outsourcing approach in the face of such significant program accelerations. On the other hand, there seemed to be relatively fewer than expected such evaluations anywhere. Those found are documented elsewhere in this report, but a possible useful research work product might be to conduct such rigorous evaluations for a selected number of specific efforts. The observation by several interviewees noted above, that design-build projects did not seem to save agency money but resulted in considerable user cost savings when compared to alternative approaches, is clearly a key question that could be examined in this way.

Also, the experience of this project makes clear that the only truly useful source of relevant information is through interviews with personnel directly involved in the outsourcing experience. The concept of “capital program outsourcing” is a new one and not well defined in the literature nor in the minds of practicing professionals. Therefore, attempting to learn about such projects through secondary sources such as professional articles, ongoing or completed research and the like has proven to be relatively ineffective. Also, general unfamiliarity with the topic on the part of state DOT professionals appears likely to have suppressed the response rate to our initial outreach letters. And resource limitations necessarily limited the number and duration of field visits and caused a few states with potential promising leads to not be visited, such as Arizona, New Mexico and Utah.

APPENDICES

- A. Acronyms
- B. Bibliography
- C. Copy of the State DOT Survey Letter
- D. Further Material on the Florida DOT Program
- E. Florida DOT Sample Asset Management Performance Measures

A. ACRONYMS

| | |
|---------|--|
| AASHTO | American Association of State Highway and Transportation Officials |
| CEI | Construction Engineering Inspection |
| COG | Council of Government |
| CRM | Construction and Resource Management |
| DOT | (U.S.) Department of Transportation |
| FDOT | Florida Department of transportation |
| FHWA | Federal Highway Administration |
| GEC | General Engineering Consultant |
| IRI | International Roughness Index |
| LADOTD | Louisiana Department of Transportation and Development |
| MIS | Major Investment Study |
| MPO | Metropolitan Planning Organization |
| MRP | Maintenance Rating Program |
| NCHRP | National Cooperative Highway Research Program |
| PIARC | World Road Association |
| PPTA | Public-Private Transportation Act |
| QC/QA | Quality Control/Quality Assurance |
| RFP/RFQ | Request for Proposal/Request for Quote |
| SAIC | Science Applications International Corporation |
| SCDOT | South Carolina Department of Transportation |
| SCOH | Standing Committee on Highway Research |
| SHA | State Highway Administration |
| SIB | State Infrastructure Bank |
| TIFIA | Transportation Infrastructure Finance and Innovation Act of 1998 |
| TIMED | Transportation Infrastructure Model for Economic Development |
| TIP | Transportation Improvement Program |
| VDOT | Virginia Department of Transportation |
| UDOT | Utah Department of Transportation |

B. BIBLIOGRAPHY

1. “Accelerating Completion of The TIMED Program”, Presentation by Louisiana Secretary of Transportation to Members of the Joint Legislative Transportation Committee, September 2002 (<http://www.dotd.state.la.us>)
2. Albright, D., Outsourcing Policy and Procedures for the New Mexico State Highway and Transportation Department. Research Bureau, New Mexico State Highway and Transportation Department. August 1998.
3. Baker, K. and Cluett, C., “Managing Change in State Departments of Transportation, Scan 6 of 8: Innovations in Organization Development as a Result of Information Technology.” *NCHRP Web Document 39 (Project SP20-24[14])*, Transportation Research Board, National Research Council, Washington, DC (June 2001).
4. Burke, B., “‘Smart Highway’ in Trouble Amid Allegations of Misspending.” *The Virginian Pilot*, September 20, 2002.
5. California Assembly Bill 405, Chapter 378, Introduced by Assembly Members Knox and Torlakson, February 12, 1999.
6. California Assembly Bill 2607, Chapter 340, Introduced by Assembly Member Knox, a bill increasing the number of permissible transportation projects to 12, February 25, 2000.
7. California Department of Transportation, *Caltrans Construction Plan to Save Motorists Time, Frustration*. Press Release. January 19, 2001.
8. California Department of Transportation, *Design-Sequencing Pilot Guidelines, Version 1*. June 2001.
9. California Department of Transportation and California Private Transportation Company, L.P., “State Route 91 Median Improvements, Orange and Riverside Counties, California.” *Amended and Restated Development Franchise Agreement, Includes Amendment I*, July 1993.
10. “The Case for ‘Outsourcing’.” *Innovation Briefs*, Vol. 11, No. 6 (November/December 2000).
11. *Case Study: New Zealand Long Term Procurement Strategy A Framework For The Future*, Draft for Steering Committee PIARC, World Road Association, Committee C15 Performance of Road Administrations. May 2002.

12. Comer, E.A., "Archaeological Assessment of Proposed Wetland Mitigation of Site MC-01 Burtonsville, Montgomery County, Maryland." Prepared for Rummel, Klepper and Kahl LLP, Baltimore, MD (May 2002).
13. Deis, D.R., Watson, E., Wilmot, C.G., "Designing a Comprehensive Model to Evaluate Outsourcing of Louisiana DOTD Functions and Activities", *Louisiana Transportation Research Center*, June 2002
14. Dembeck, C., "A New Plan for Outsourcing: Value, Not Low Cost, Decides Who Gets Work." *FederalTimes.com* (May 6, 2002).
15. District of Columbia, Department of Public Works, *DC Streets Fact Sheet*.
16. Drennon, P.W. and Higgins, J., "I-15 Corridor Reconstruction Project, Design/Build Contracting Initial Report, Special Experiment Project 14." *Utah Department of Transportation Report No. 98.06* (October 1997).
17. Edelman, M.A., Holler, C.M. and Reynolds, D., *A Comparative Cost Analysis of State Government Outsourcing: An Iowa Case Study of Drivers License Issuance in Rural Counties*. July 1997.
18. Florida Department of Transportation, *Alternative Contracting Program Preliminary Evaluation for July 1, 1996 – June 30, 1999*, Submitted by Office of Quality Initiatives.
19. Florida Department of Transportation, *Asset Management Summary*. January 27, 2003 (document available online).
20. Florida Department of Transportation, "Chapter 6 – Alternative Service Delivery Strategies." Organizational and Operational Review of the Florida Department of Transportation. January 2001.
21. Florida Department of Transportation, "Chapter 22 – Lump Sums Project Guidelines." *Plans Preparation Manual, Volume 1-English*, Revised January 2002.
22. Florida Department of Transportation, *Scope of Services, Highway Asset Management Contract*, Rev. May 1, 2002.
23. Florida Department of Transportation, *Scope of Services, Rest Area Asset Management Contract*, Rev. April 29, 2002.
24. Flowers, D. and Otto, S.L., *Arkansas Combines Best Practices for an Innovative Interstate Rehabilitation Program*.
25. Fong, L., "The Design Sequencing Pilot." *California Department of Transportation Journal*, Vol. 2-Issue 1 (July-August 2001).

26. Gillespie, J.S. and Kyte C.A. “Review and Update of Virginia Department of Transportation’s Cash Flow Forecasting Model”. *Transportation Research Record 1576* (1997).
27. Grasso, V.B., “Defense Outsourcing: The OMB Circular A-76 Policy.” *CRS Report for Congress*. Order Code RL30392. Updated January 23, 2001
28. Hagerty, M., Long-Term IT Outsourcing, *Outsourcing Desktop Initiative for NASA (ODIN)*. Microsoft PowerPoint presentation, July 21, 2000.
29. Hancher, D.E., Werkmeister, R., “Managing Change in State Departments of Transportation, Topic 2: Innovations in Private Involvement in Project Delivery.” *NCHRP Project 20-24(14)*, Department of Civil Engineering, University of Kentucky (April 2001).
30. Healy, T.J. and Linder, J.C., “Outsourcing in Government: The Path to Transformation.” *The Government Executive Series*, Accenture, February 2002.
31. Heckman, M. and Robinson, M., *Privatization of Maintenance for the District of Columbia’s National Highway System*. Microsoft PowerPoint presentation.
32. Louisiana Transportation Research Center, “Designing a Comprehensive Model to Evaluate Outsourcing of DOTD Functions and Activities”, Research Project – 00-2SS, October 2000
33. “Models of Financing the Construction of Federal Trunk Roads in Germany with the Private Sector.” *Federal Ministry of Transport, Building and Housing, Division S 17*, Bonn, Germany, August 5, 2002.
34. Nebraska Department of Roads, *Transportation Enhancement Program: Application Guidelines*
35. Postma, S., Carlile, F., and Roberts, J., ”Use of Best Value Selection Process for the I-15 Design/Build Project.” *Utah Department of Transportation Report No. UT-98.16*. Prepared by Carter & Burgess, Inc., Salt Lake City, UT (July 1998).
36. Postma, S., Cisneros, R., Roberts, J., Brantley, R., Anderson, D., and Boyd, B., “I-15 Corridor Reconstruction Project Design/Build Evaluation 2000 Annual Report.” *Utah Department of Transportation Report No. UT-01.08*. Carter & Burgess, Inc., Salt Lake City, UT (June 2001).
37. Postma, S., Stevenson, D., Schroeder, J., Roberts, J., Brantley, R., Wangelin, G., and Whedon, R., “I-15 Corridor Reconstruction Project Design/Build Evaluation 1999 Annual Report.” *Utah Department of Transportation Report No. UT-00.04*. Carter & Burgess, Inc., Salt Lake City, UT (March 2000).

38. Postma, S., Stevenson, D., Turner, P., "I-15 Corridor Reconstruction Project Design/Build Evaluation 1998 Annual Report." *Utah Department of Transportation Report No. UT-98.10*. Carter & Burgess, Inc., Salt Lake City, UT (December 1998).
39. Postma, S., Stevenson, D., and Warner, L., "Design Process I-15 Evaluation Design/Build Project 1999 Final Report." *Utah Department of Transportation Report No. UT-99.13*. Carter & Burgess, Inc., Salt Lake City, UT (September 1999).
40. "Preliminary Investigation Review Report." *US 29 (Columbia Pike)/Greencastle Road*, Prepared for Maryland State Highway Administration (July 2001).
41. South Carolina Department of Transportation, *27 In 7 Peak Performance, Mid-Term Progress Report July 2002*.
42. State of Arizona, Governor's Office for Excellence in Government, *Competitive Government, A Tool for Developing an Effective Management Strategy*. Program Handbook, Version 4. June 2001. (www.governor.state.az.us/excellence)
43. "Submittals 1&2 Review Comment Report." *SHA Contract No. MO8675170 US 29 from North of Dustin Road to South of Blackburn Road*, Prepared for Maryland State Highway Administration (July 3, 2002).
44. Warne, T.R., *Survey of State DOT Practice: Outsourcing and Private Sector Utilization, NCHRP 20-7(158)*, 2002
45. Whitesel, A.L., "The Big I- I-25 and I-40 System-to-System Interchange Albuquerque, New Mexico – A New Management Model." *New Mexico State Highway and Transportation Department (NMSHTD)*, 2001.
46. "US 29 Corridor: MD 100 to I-495 ITS Work Zone Planning Study." *Draft Report*, Maryland Department of Transportation State Highway Administration (June 2002).
47. "US 29 Traffic Simulation Ultimate Conditions (2007) MD 198 to Tech Road Montgomery County, Maryland." *US 29 Improvements Report*, Prepared for Maryland Department of Transportation State Highway Administration, Baltimore, MD (May 2002).
48. U.S. Department of Transportation, Federal Highway Administration, *2001 Contract Administration Scan, Executive Summary*.
49. U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration, "Reaching Cost-Effective Solutions Through Better Decision-Making Techniques." *Communications for Intelligent Transportation Systems Successful Practices, A Cross-Cutting Study*. FHWA-JPO-99-023, EDL #11488, FTA-TRI-11-00-02. November 2000.

50. U.S. General Accounting Office, “Appendix – Leading Commercial Practices for Acquiring Information Technology Services.” *Information Technology – Leading Commercial Practices for Outsourcing of Services, Report to the Chairman and Ranking Minority Member, Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate.* GAO-02-214. October 2001.
51. van Barneveld, R., *Management of Main Roads, The New Zealand Experience.* The World Bank Road Management Workshop, Budapest, September 1998.
52. Virginia Department of Transportation, *Comprehensive Agreement to Design, Construct, and Warrant Route 288 Project.* APAC-Virginia, Inc. and Koch Performance Roads, Inc., December 18, 2000.
53. Virginia Department of Transportation, *Comprehensive Agreement to Develop and Operate Route 895 Connector.* Virginia Department of Transportation and FD/MK LLC, June 3, 1998.
54. Virginia Department of Transportation, “Exhibit F – Master Indenture of Trust Between Pocahontas Parkway Association and Crestar Bank as trustee.” *Comprehensive Agreement to Develop and Operate Route 895 Connector.* Virginia Department of Transportation and FD/MK LLC, July 1, 1998.
55. Virginia Department of Transportation, *Conceptual Proposal for Development of I-895 Richmond Connector Public-Private Transportation Act of 1995.* Prepared by Fluor Daniel and Morrison Knudsen Corporation, November, 1995.
56. Virginia Department of Transportation, *Detailed Proposal for Development of I-895 Richmond Connector Public-Private Transportation Act of 1995.* Prepared by A Fluor Daniel and Morrison Knudsen LLC, July 24, 1996.
57. Virginia Department of Transportation, Maintenance Division, *Report on VDOT’s Comprehensive Agreement for Interstate Asset Management Services, VMS Operations for 1999/2000.* December 2000.
58. Virginia Department of Transportation and VA Route 288 Public-Private Partnership, *Final Report on An Action Plan For Distributed Authority To Promote Effective Administration And Management Of VDOT’s Contract With VMS, Inc.,* August 2002.
59. Walton, C.M., “Emerging Models for Delivering Transportation Programs and Services: A Report for the Transportation Agency Organization and Management Scan Tour.” *NCHRP Research Results Digest Number 236,* Transportation Research Board, National Research Council, Washington, DC (March 1999).

60. Wilmot, C.G., Deis, D.R., Rong, X., “Assessing Outsourcing Potential in a State DOT”, *Transportation Research Board*, 2003
61. Wilmot, C.G., Naghavi, B.N., “Evaluating the Performance of existing Local Transportation Funds”, *State and Local Government Review*, vol. 32, no. 1, Winter 2000
62. Witheford, D.K., “Outsourcing of State Highway Facilities and Services, A Synthesis of Highway Practice.” *NCHRP Synthesis 246*, Transportation Research Board, National Research Council, Washington, DC (1997).

C. COPY OF THE STATE DOT SURVEY LETTER

Dear AASHTO SCOH Member;

Science Applications International Corporation (SAIC) has been contracted by the AASHTO-sponsored National Cooperative Highway Research Program (NCHRP) to conduct Project 20-24(18), Outsourcing of State DOT Delivery of Capital Programs. The project title is intended to refer to activities and functions that are frequently of high dollar value or represent significant program responsibilities, but have not been traditionally outsourced by State DOTs. This type of outsourcing constitutes one response to the twin pressures on DOTs of staff downsizing in recent years together with continually growing responsibilities during the same period. The outcome of this study will be recommended guidelines for transportation agencies interested in non-traditional, innovative, and experimental practices in the management and outsourcing of capital program delivery functions. As with all NCHRP projects under the "20-24 series," the targeted end user of project results will be top management of transportation agencies.

The research team requests your assistance in this project by providing us information and contact persons for any major innovative capital outsourcing programs in your state. We are not looking for much detail at this point. A very brief description along with rough estimates of the costs involved in the outsourcing effort will be sufficient. We would also request the name, phone number, and email address of a knowledgeable point-of-contact as we plan to follow up on a limited number of these in pursuit of additional information with phone calls, email exchanges and, in a limited number of cases, personal visits. Your response via return email to me in the next few days will be greatly appreciated.

According to a recent NCHRP project, State DOTs outsource many different activities, but are reluctant to outsource major program responsibilities and to adapt or adopt more creative procurement processes like design-build, the use of general engineering consultants to manage multiple projects, turnkey contracts that give entire control for project delivery to the consultants, and highway maintenance asset management contracts. State DOT questions and concerns about outsourcing various functions include:

- Are related in-house "core competencies" put at risk through outsourcing?
- Can the public safety and interest be protected, especially those dependent on police powers that cannot be delegated such as traffic control and eminent domain?
- Are there applicable lessons to the world of transportation from success stories of outsourcing at the federal level in NASA and the Department of Defense?
- Are there experiences abroad that might be applicable?
- What guidelines can be gleaned from both the state DOT's and the outside world that should be followed to assure success and prevent problems?

I realize that you and your agency receive numerous such requests. However, I hope this is not too inconvenient; the State DOTs collectively fund the NCHRP and results are intended for your use. Therefore, if you would, please respond very briefly by return email to the following three questions. A response by April 29, 2002 will be appreciated.

1. Has your department engaged in any outsourcing programs for services and functions that might be characterized as non-traditional, innovative, or experimental? If not, please let us know anyway. We have

outsourced two programs that I know of that I would call non-traditional; however, several other states have also outsourced these same programs:

2. If so, would you please provide a brief description of one or more outsourced activities in a few sentences each, together with a rough estimate of the annual or total dollar value involved? Feel free to attach such descriptions to your return email from an existing document or source, if convenient.

3. Finally, please provide us the name, telephone number, and email address of someone familiar with each described outsourcing program, so that we may follow up on some of them for more details and observations on successes, failures and lessons learned. It is only through these follow-up contacts that we will be able to develop and refine guidelines that will benefit all the states.

If you have any questions, please send me e-mail at David.J.Hensing@SAIC.com or call me at (703) 676-0802.

Thank you for your participation.

D. FURTHER DETAIL ON THE FLORIDA DOT PROGRAM

FDOT ALTERNATIVE OUTSOURCED SERVICE DELIVERY STRATEGIES

In a report developed by KPMG Consultants for the FDOT, the Department's alternative service delivery functions are summarized as follows:

FDOT outsources a majority of its core functions, including planning, engineering design, right-of-way appraisal, construction, construction engineering inspection, highway and bridge maintenance, and toll collections, to augment the internal resources. FDOT acquires these services from consultants, contractors and private vendors using various contracting methods – professional services, construction and maintenance contracts, and contractual services. In addition to various conventional contracting methods, Florida Statutes, Section 337.025, allows FDOT to employ innovative techniques of highway construction, maintenance, and finance for highway projects where:

- Innovative techniques could help the FDOT in controlling time and cost increases on construction projects
- FDOT could identify the anticipated benefits of using such techniques to the traveling public and the affected community

FDOT, through the Alternative Contracting Program, has applied a number of innovative contracting concepts for highway construction projects. Examples of innovative techniques include, but are not limited to, state-of-the-art technology for pavement, safety, and other aspects of highway construction and maintenance; innovative bidding and financing techniques; accelerated construction procedures; and those techniques that have the potential to reduce project life cycle costs.

The statutes limit the use of innovative techniques to a total contract value of \$120 million annually for minor design-build and for bid averaging method (BAM) contracts (*BAM contracts are used for state funded projects, as the Federal Highway Administration does not authorize BAM projects for Federal Aid funding*). The statutory cap of \$120 million for innovating contracting methods is not applicable for major design-build contracts with an estimated construction cost exceeding \$10 million per phase.

FDOT also uses various alternative contracting methods for construction projects. Florida Statutes, Section 337.11(4) allows FDOT to use time-plus-money (A+B), lane-rental, design-build, no-excuse bonus, lump sum, and incentive/disincentive contracts. Most alternative contracting methods involve financial incentives to the work with the exception of lump sum, design-build and bid average method.

Since 1996, FDOT has used various alternative and innovative contracting methods to reduce the overall project cycle time. FDOT continues to closely monitor and evaluate the results of

these construction projects. Preliminary results suggest that “the use of alternative and/or innovative contracting methods offer distinct time and cost advantages over conventional contracting methods.”

FDOT conducted an independent study on various outsourcing opportunities and alternative/innovative contracting techniques to improve the current program, project and/or service delivery methods. Some of the recommendations of the KPMG Consultants include:

“Expand the use of alternative/innovative contracting methods for construction contracts:”

Alternative and/or innovative contracting techniques for highway construction are helping to minimize the inconvenience and disruption to the traveling public, area businesses and residents by delivering construction projects faster and often cheaper compared to conventional contracting methods. Florida Statutes allows FDOT the necessary flexibility to take advantage of alternative and innovative contracting methods for construction projects, where use of these contracting techniques provide positive benefits to the traveling public and the affected community by reducing time and disruption associated with construction projects.

Since fiscal year 1996-97, FDOT has awarded more than 380 construction contracts using various alternative and/or innovative contracting techniques. A+B, incentive/disincentive, liquidated savings, lump sum and no excuse bonus contracts make up a large majority of alternative/innovative contracts.

The analysis of completed contracts indicated that on average, alternative/innovative contracts had lower time and cost overruns when compared to the average time and cost overruns for all construction contracts. Additionally, the construction engineering inspection (CEI) costs, as a percentage of contract value, for alternative/innovative contracts were lower compared to conventional contracts.

The study recommends that FDOT expand the use of alternative/innovative contracting methods for highway construction contracts. It also recommend that FDOT propose the following change in Florida Statutes:

- Increase the current annual maximum limit of \$120 million for innovative highway projects to \$250 million
- Develop standardized formulas and guidelines for determining financial incentives for various alternative contracting methods
- Develop specific criteria for selecting candidate projects for innovative/alternative contracting methods
- Ensure that standards, policies and procedures pertaining to alternative and innovative contracting methods are consistently applied throughout the state

“Expand the use of Asset Management-based contracts for highway maintenance:”

FDOT spends approximately 11 percent of its annual budget – more than \$350 million – on highway operations and maintenance activities. The maintenance budget, distributed among eight districts based on defined formulas, is used for performing routine highway maintenance activities that preserve the State Highway System while maintaining safe and comfortable driving conditions. Examples of routine highway maintenance activities include, bridge inspection and maintenance, mowing, ditch cleaning, fence repair, guardrail, pot hole patching, pavement repair, concrete repair, herbicide, traffic control, rest area maintenance, permitting, and access management among others.

FDOT recently entered into a seven-year Asset Management-based contract, worth \$10.5 million annually, for routine highway maintenance of 253 miles of interstate I-75 covering five districts. The Asset Management contract covers all elements of routine highway maintenance activities, including maintenance and security of rest areas, drinking water supply and wastewater treatment and disposal. The contractor is responsible for meeting FDOT’s performance measures for highway maintenance.

FDOT estimated that performing routine maintenance activities on 253 miles of I-75, using a combination of in-house maintenance staff and conventional contract maintenance services, would have cost the Department approximately \$12.3 million annually. Under the Asset Management contract, FDOT would be able to realize a net saving of approximately \$1.8 million annually.

As presented above, the Asset Management concept for highway maintenance allows FDOT to consolidate individual contracts for various highway maintenance activities, along a section of highway, into a single performance-based contract. Concern regarding the Asset Management-based contract is that it limits the opportunity for smaller contractors to compete. FDOT could overcome this concern by requiring the prime contractor to sub-contract a set percentage of the maintenance activities, measured as a percentage of the total contract value.

“Consider grouping of professional services contracts to establish enhanced regional coverage:”

FDOT outsources many professional services, including planning, engineering design, right-of-way appraisal, and construction engineering inspection, to augment in-house technical resources. FDOT acquires these services through competitive negotiation – the process requires a competitive selection of the consultants based on qualification, followed by negotiations to establish a fair, competitive and reasonable fee for the desired services. The current process for awarding professional services contract is time consuming and resource intense.

The current situation presents FDOT an opportunity to combine several professional services contracts into a single large contract serving multiple projects (e.g., preliminary engineering for multiple projects on a single corridor or for projects located within certain geographic proximity) within a particular district and/or serving multiple districts

(e.g., instead of two/three adjoining districts issuing their own contracts for planning or CEI, a single contract for planning or CEI serving multiple districts could be awarded).

Historically, FDOT has prepared specifications packages for design plans prepared by engineering consultants. Construction contractors indicated that a high percentage of construction claims and cost overruns are related to conflict and/or ambiguities between engineering plans and specifications. FDOT has recently started to transfer the responsibility for specifications preparation work to engineering design consultants, as part of the new consultant design contracts, on a selective basis. Full implementation of this initiative is targeted for beginning of the state fiscal year 2003.

The study recommends that FDOT consider including the following right-of-way acquisition related activities as an integral part of the preliminary engineering contract services:

- Preparing initial Right-of-Way maps and plans
- Identifying affected property and performing title search
- Contacting affected property owners
- Conducting appraisal of properties
- Support FDOT in property acquisition negotiation with property owners

Giving engineering design consultants the responsibility for selected right-of-way related activities would ensure better coordination and improved communication between the engineering design and the right-of-way activities. The engineering design consultants could further outsource these services to sub-consultants; however, they will be responsible for coordinating right-of-way related activities.

“Promote the use of alternative QA/QC concepts for construction and maintenance projects:”

FDOT’s Materials Office is responsible for performing research, testing, inspection, and chemical analysis of materials and products used in the transportation infrastructure. The Materials Office establishes the criteria for materials and manufactured products used in construction and ensures that all materials and products used in the construction and maintenance of Florida’s roadways and bridges meet governing specifications and standards.

In the survey of the peer state transportation agencies, FDOT has the highest number of materials and testing staff compared to its peer state agencies. In addition to the material testing, FDOT resident engineers and consultants closely monitor the quality and workmanship of highway construction and maintenance projects. In fiscal year 1999-00, FDOT allocated approximately \$210 million for construction engineering inspection activities (includes both in-house and consultant CEI).

The study recommends that FDOT promote the use of alternative Quality Assurance/Quality Control concepts for highway construction and maintenance projects.

The alternative QA/QC concepts discussed below are successfully applied in the construction and other industries (e.g., automotive, construction, technology, etc.), and are broadly used by various state transportation agencies and private sector firms.

Examples of alternative QA/QC concepts for highway construction and maintenance projects, include:

- **Performance-based specification** – this method requires the contractor to monitor materials quality and construction workmanship to accomplish specified level of performance. As such, the level of state supervision/inspection and materials testing is somewhat less compared to the traditional construction project.
- **Pre-qualifying materials suppliers** – under this concept, the state transportation agency would work closely with materials suppliers to establish the procedures for performing the quality control, sampling, testing, and record keeping. The certified materials suppliers would be responsible for performing QA/QC checks, in accordance to established procedures. The state transportation agency would accept materials/products supplied from by the certified suppliers.
- **Performance warranties/guarantees** – this concept makes the contractor responsible for ensuring that the final product meets the specified performance standards. Warranties for materials and workmanship are common in the construction industry. Performance warranties/guarantees provide the incentive or emphasis for contractors to look at life cycle costs as opposed to initial costs alone.

Collectively, effective use of these alternative QA/QC concepts would allow the FDOT to reduce the need for having a high level of in-house resources dedicated for materials and testing, and the need for construction engineering inspection on highway construction and maintenance projects.

The FDOT projected level of outsourcing, as outline in the current 5-Year Adopted Work Program, is likely to go up further.

E. FLORIDA DOT SAMPLE ASSET MANAGEMENT PERFORMANCE MEASURES

1. Maintenance Rating Program

The Contractor will conduct MRP ratings every four months. Beginning with the first four-month period, the Department will hold retainage equal to one percent (1%) of the cumulative amount of four months payments for each point below an overall maintenance rating of 80.

The Department will hold additional retainage equal to one half of one percent (.5%) of the cumulative amount of four months payments for each point below 75 on any element rating.

The Department will hold additional retainage equal to one quarter of one percent (.25%) of the cumulative amount of four months payments for each percentage point below 70 on any characteristic rating.

The Department will hold the retainage until the Contractor conducts the final four months Maintenance Rating and the annual maintenance rating is calculated. The percentages given (1% each point of MRP rating below 80, .5% each point of elements below 75 and .25% each percentage point of characteristics below 70, on the annual rating) will be applied to the entire annual contract amount. If the calculated amount is less than the retainage, the balance of the retainage will be paid to the Contractor. If the total reduction assessed exceeds the retainage amount, the balance will be deducted from the Contractor's payment.

Adjusted MRP ratings will be calculated as defined in section titled Maintenance Rating Program above.

2. Permits

Each month the Department may check permits entered into the Permits Information Tracking System. There will be 0.10% (.001) of the monthly lump sum deducted per day, per permit, for each day over 60 days used to process any permit to resolution. This reduction is not cumulative but will be calculated only for the number of days exceeding the 60 days processing time within the month being paid. The 60 days will begin when the Contractor receives a complete permit application. Resolution of the permit is considered complete when the permit is officially submitted to the Department with documentation and recommendation sufficient for approval or denial. The total of the permit reduction will be deducted from the Contractor's monthly lump sum payment.

3 Rest Areas

The Department will produce and provide to the Contractor a schedule of Rest Area inspections to be performed by the Contractor on a monthly basis. The Rest Area Inspection Schedule will identify the required inspection date and time for each Rest Area. The specified inspection will be performed by the contractor and reported to the Department on a monthly basis.

If the Contractor is not present at the Rest Area at the scheduled time to perform the Rest Area inspection, the Department will assign a score of zero.

The Department may inspect Rest Areas using the “Quality Assessment Review/Rest Area Inspection” checklist at any time. If the Department’s score is lower than 85, two points will be added to the Departments score, and that score shall be the official score. There will be a \$1,000.00 per point, per Rest Area reduction, for any month for scores less than the required rating of 85. The total of the Rest Area reductions will be deducted from the Contractor’s monthly lump sum payment. In addition, the Contractor will be assessed reductions, as defined in the Standard Maintenance Scope of Services, for Security Guard Services. The Contractor will be assessed reductions, as defined in the Standard Maintenance Scope of Services, for Rest Area Maintenance Services. There will be a \$1,000.00 per hour, per Rest Area, reduction for each Rest Area closure caused by Contractor negligence.

4. Motorist Aid Call Box System

The Department may perform an inspection of a minimum of ten motorist aid call box locations. If more than 10% of the motorist aid call boxes checked are not functional and properly maintained there will be a \$5,000.00 reduction per month, per cost center, deducted from the Contractor's monthly lump sum payment.

5. Structure Inspection

If the Contractor does not perform a structure inspection within the prescribed due date established in Pontis, to the day, of the prior inspection, there will be a reduction of \$1,000.00 per day, per delinquent inspection date , assessed and deducted from the monthly lump sum payment.

The completed, approved structure inspection reports are due within 60 days after completion of the inspection. There will be a \$1,000.00 per day, per delinquent report, reduction assessed for each day the reports are not received after the 60 day period. The reduction will be deducted from the monthly lump sum payment.

For every delinquent work order there will be a \$1,000.00 per day, per work order, reduction assessed. The total amount will be deducted from the monthly lump sum amount.

6. Highway Lighting and Navigational Lighting

The Department may perform highway lighting or navigational lighting outage surveys. If the highway lighting (overhead, underdeck and sign) outage exceeds 10%, there will be a \$5,000.00 reduction per cost center, per month, deducted from the Contractor's monthly lump sum payment.

Navigational lighting outages that cannot be repaired within one hour during the periods when navigational lights are to be in operation will require placement of temporary navigational lights.

There will be a \$100.00 per hour or portion thereof, per bridge, reduction of the Contractor's monthly lump sum payment for periods in excess of 2 hours when navigational lights (either permanent or temporary lights) are nonfunctional, during times when navigational lights should be in operation, following notification.

7. Routine Movable Bridge Operation

Failure to operate the movable bridges in accordance within established bridge opening procedures and/or schedules will result in a \$500 per occurrence reduction from the Contractor's monthly lump sum payment.

8. Attenuator Inspection

If the Contractor does not perform attenuator inspections by the last day of the month they are due, there will be a reduction of \$1,000.00 per day, per delinquent inspection, assessed and deducted from the monthly lump sum payment.

The completed Attenuator Inspection Reports and the Attenuator Inventory Update Form (#850-055-04) are due by the fifteenth (15th) day of the month following the inspections. There will be a \$1,000.00 per day, per delinquent Attenuator Inspection Report or Attenuator Inventory Update Form, reduction assessed for reports or forms not received within the specified time period. The total amount will be deducted from the monthly lump sum payment.

9. Guardrail and Sign Inspection

If the Contractor does not perform guardrail and sign inspections within 24 months, to the day, of the prior inspection, there will be a reduction of \$1,000.00 per day, per cost center, assessed and deducted from the monthly lump sum payment.

The completed guardrail and sign inspection reports are due within fifteen (15) days after completion of the inspection. There will be a reduction of \$1,000.00 per day, per cost center, assessed for reports not received within the specified time period. The total amount will be deducted from the monthly lump sum payment.

10. Customer Service Resolution

If the Contractor does not contact the customer within one day, there will be \$500.00 per day assessed and deducted from the contractor's monthly lump sum payment, for each day greater than one day that it took the contractor to contact the customer.

If the customer request is not resolved to the Department's satisfaction within two weeks, \$1,000.00 per day, per customer request, will be assessed and deducted from the contractors monthly lump sum payment for each day over two weeks that it took for the contractor to resolve the customer complaint.

11. Incident Response

If the Contractor does not arrive on-site, prepared to take necessary action within 60 minutes from initial notification of an incident, \$1,000.00 per hour or portion thereof, per incident, will be deducted from the contractor's monthly lump sum payment for each hour past the allowed response time it took the contractor to be on site.

FLORIDA DOT MAINTENANCE RATING PROGRAM STANDARDS

ROADWAY FLEXIBLE PAVEMENT

FLEXIBLE POTHOLE: No defect is greater than 1/2 square foot in area and 1-1/2 inches deep. No pervious base is exposed in any hole.

FLEXIBLE EDGE RAVELING: 90% of the total roadway edge is free of raveling. No continuous section of edge raveling 4 inches or wider exceeds 25 feet in length.

FLEXIBLE SHOIVING: The shoved area does not exceed a cumulative 25 square feet

FLEXIBLE DEPRESSION/BUMP: No deviation exceeds more than 1/2 inch for any area greater than 1 square foot. within the initial 10 foot increment or plus 3/8 inch for each additional 10 foot increment. No single measurement shall exceed 2 inches

FLEXIBLE PAVED SHOULDER/TURNOUT: Rate flexible paved shoulder for pothole, edge raveling and depression/bump. Rate flexible turnout for pothole only.

ROADWAY RIGID PAVEMENT

RIGID POTHOLE: No defect is greater than 1/2 square feet in area and 1-1/2 inches deep. No pervious base is exposed in any hole.

RIGID DEPRESSION/BUMP: No deviation exceeds more than 1/2 inch for any area greater than 1 square foot within the initial 10 foot increment or plus 3/8 inch. For each additional 10 foot increment. No single measurement shall exceed 2 inches

RIGID JOINT/CRACKING: 85% of the length of transverse and longitudinal joint material appears to function as intended and 90% of the roadway slabs have no unsealed cracks wider than 1/8 inch

ROADSIDE

UNPAVED SHOULDER: No deviation exists across the shoulder width greater than 5 inches above or below the design template. No shoulder build-up exceeds 2 inches across the design template for a continuous 25 feet No shoulder drop-off exceeds 3 inches deep within 1 foot of

the pavement edge for a continuous 25 feet. No washboard areas exist having a total differential greater than 5 inches from the low spot to the high spot.

FRONT SLOPE: No ruts or washouts exist greater than 6 inches in depth.

SLOPE PAVEMENT: No single area of missing, settled or misaligned areas exist greater than 10 square feet

SIDEWALK: 99.5% of sidewalk area is free of vertical misalignments or horizontal cracks greater than 3/4 inches

FENCE: No unrestrained entry is allowed.

TRAFFIC SERVICES

RAISED PAVEMENT MARKERS: 70% of the required markers are functional (reflective). No more than 120 ft. of continuous centerline or laneline is without a reflective marker.

STRIPING: 90% of the length of each line functions as intended.

PAVEMENT SYMBOLS: 70% of existing symbols function as intended.

GUARDRAIL: Each single run functions as intended.

ATTENUATOR: Each device functions as intended.

SIGNS LESS THAN OR EQUAL TO 30 SQ. FT.: 95% of the signs are functioning as intended.

SIGNS GREATER THAN 30 SQ. FT.: 85% of the signs are functioning as intended.

OBJECT MARKERS AND DELINEATORS: 80% of the markers are functioning as intended.

LIGHTING: 90% of the total luminaries of the combined sign and highway lighting are functioning as intended.

DRAINAGE

SIDE/CROSS DRAIN: 60% of the cross-sectional area of each pipe is not obstructed and functions as intended.

ROADSIDE/MEDIAN DITCH: The ditch bottom elevation shall not vary from the ditch design elevation more than 1/4 of the difference between the edge of pavement elevation and the ditch design elevation.

CHAPTER 4. CONCLUSIONS

4.1 CONCLUSIONS

As documented in a separate current NCHRP study, outsourcing is a growing practice and can be found in virtually all state DOTs in one form or another. Capital program delivery outsourcing, on the other hand, is much less common, and is found in less than half the states. That being said, it appears to be quite successful in the states where it has been tried. The motivations for experimenting with this form of outsourcing seem to be as follows:

- The rather sudden arrival, usually through the political process, of an accelerated transportation development program with specifically designated or newly available resources and a large new workload backlog. In circumstances like this, public expectations may be high, leading to intense public interest and impatience with delays in implementation.
- A deliberate strategy for handling normal program growth with a level or even mandatory reduced permanent state DOT staff.
- Some combination of these two.

The principal types of outsourced capital program delivery projects found through the survey and in telephone and personal visits with a sample of the state DOTs were as follows:

- Asset management-based large scale maintenance programs, utilizing performance measures as a key basis of program control.
- One or more of several variants of the design build approach project design and construction (and sometimes initial operations), usually with some form of warranty.
- The use of general engineering consultants for design, construction contract letting, and contractor supervision, almost another variant of design-build. In South Carolina, the term “Construction Resource Manager” was used to describe this type of service.

Outsourcing major capital program delivery functions, like the broad, “asset-management” performance measure maintenance agreements as found in Florida, Virginia and DC, or major design-build projects or large general engineering programs like those found in South Carolina, Louisiana, Virginia, Maryland, Utah and elsewhere, involves some delegation of authority and concomitant decision-making, which the leadership of some state DOTs may find somewhat discomfiting. On the other hand, techniques such as performance bonds, a “best buy” approach to team selection, the use of well thought out and objectively measurable performance methods or standards, a stress on clear and open communications, and other steps seem to have offset those potential risks and have led to generally satisfactory results.

Most of the states visited, particularly those utilizing some form of design-build, saw steady continued use of the approach for major, complex projects, but expected total expenditures assignable to this method to remain similar to its current proportion of the total. In other words, the design-build is expected to grow, but not much faster than the program as a whole. Reasons given for this included a belief that the combined engineering consultant and construction contractor community would not tolerate more growth in this area compared to conventional approaches. In addition, at least one state thought that these projects required more experienced

OUTFALL DITCH: The ditch bottom elevation shall not vary from the ditch design elevation more than 1/3 of the difference between natural ground and the ditch design flow line.

INLETS: 85% of the opening is not obstructed.

MISC. DRAINAGE STRUCTURE: 90% of each structure functions as intended.

ROADWAY SWEEPING: Material accumulation is not greater than 3/4 inches deep for more than a continuous 1 foot in the traveled way or shall not exceed 2-1/4 inches in depth for more than a continuous 1 foot in any gutter.

VEGETATION AND AESTHETICS

ROADSIDE MOWING: Not more than 1% of vegetation exceeds (varies) inches high. This excludes allowable seed stalks and decorative flowers allowed to remain for aesthetics.

RURAL LIMITED ACCESS - 18 inches

RURAL ARTERIAL - 12 inches

URBAN LIMITED ACCESS - 12 inches

URBAN ARTERIAL - 9 inches

SLOPE MOWING: Not more than 2% of vegetation exceeds 24 inches high. This excludes allowable seed stalks and decorative flowers allowed to remain for aesthetics. The area shall be evaluated in accordance with the mowing guide as a minimum.

LANDSCAPING: Vegetation is maintained in a healthy, attractive condition.

TREE TRIMMING: There is no encroachment of trees, tree limbs or vegetation in or over travelway or clear zone, lower than 14-1/2 feet or lower than 10 feet over sidewalks. There shall be no vegetation that violates the horizontal clearance as defined by this standard.

CURB/SIDEWALK EDGE: There is no encroachment of vegetation or debris for more than 6 inches onto the curb or sidewalk for more than 10 feet continuous feet or no deviation of soil of more than 4 inches above or 2 inches below the top of curb or sidewalk for more than 10 continuous feet.

LITTER REMOVAL: The volume of litter does not exceed 3 cubic feet per 1 acre excluding all travelway pavements.

TURF CONDITION: Turf in the mowing area is 75% free of undesired vegetation.