

**JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION  
OF THE VIRGINIA GENERAL ASSEMBLY**

**Review of the Use  
of Consultants by the  
Virginia Department  
of Transportation**

**House document No. 12**

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## Preface

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House Joint Resolution No. 263 (1998) directed the Joint Legislative Audit and Review Commission (JLARC) to review the use of consultants by the Virginia Department of Transportation (VDOT). This report focuses on VDOT's use of engineering consultants in the development of road and bridge projects in the State.

While VDOT has always used consultants, its level of consultant use has increased substantially in recent years. As of August 31, 1998, VDOT had 675 consultant contracts for engineering-related services outstanding, with a total dollar value of \$840.9 million. This amount is eight times the dollar value of outstanding consultant contracts in 1987.

The review found that VDOT's procurement and management of consultant projects is generally good. However, with the rapid growth in outsourcing, VDOT is not well positioned to adequately monitor its overall use of consultants and consultant processes. VDOT needs to put in place management tools to better track its level of consultant use and the quality and cost-effectiveness of consultant work.

In particular, the department has not been proactive in identifying what is the most appropriate level of consultant use, particularly from the perspective of what is most cost-effective. While consultants generally provide a valuable service to VDOT, this review found reason for concern that VDOT's current level of consultant use may not be optimal in some instances. In addition, VDOT needs to address significant staffing and workload issues concerning the oversight of consultants. Further, it needs to implement a system to ensure coordination of overlapping projects. Recommendations addressing these concerns are included in this report.

On behalf of the Commission staff, I would like to express our appreciation for the cooperation and assistance provided during this review by the Virginia Department of Transportation staff.

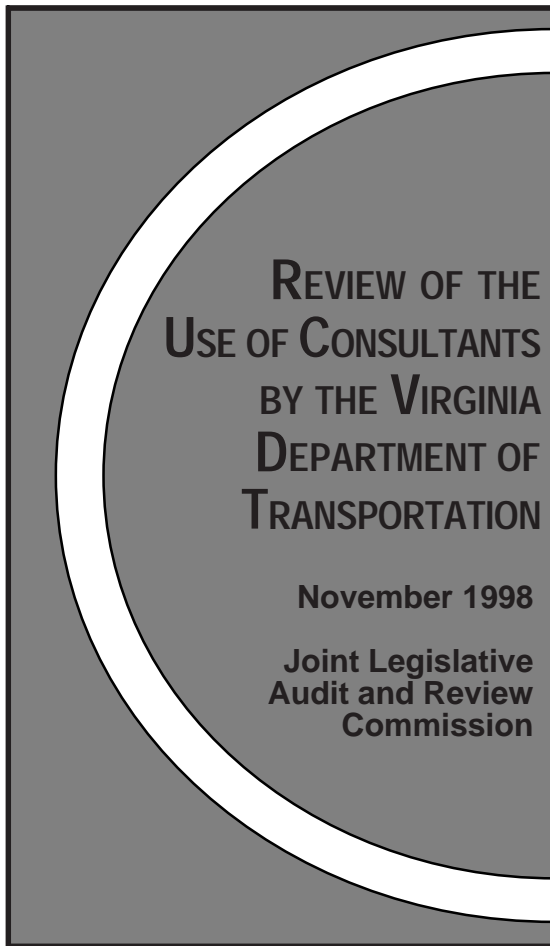


Philip A. Leone  
Director

November 22, 1998



# JLARC Report Summary



**H**ouse Joint Resolution (HJR) 263, passed by the 1998 General Assembly, directed the Joint Legislative Audit and Review Commission (JLARC) to review the use of consultants by the Virginia Department of Transportation (VDOT). VDOT regularly hires consultants to assist in the completion of its mission. In fact, the value of consultant contracts at the department is currently 800 percent of the consultant contract value in 1987. The majority of consultants are hired by VDOT to perform engineering-related work in the construction of roads and bridges. Of the \$192.2 million in VDOT's consultant-related expenditures for FY

1998, \$150.1 million (78 percent) was spent on engineering consultants.

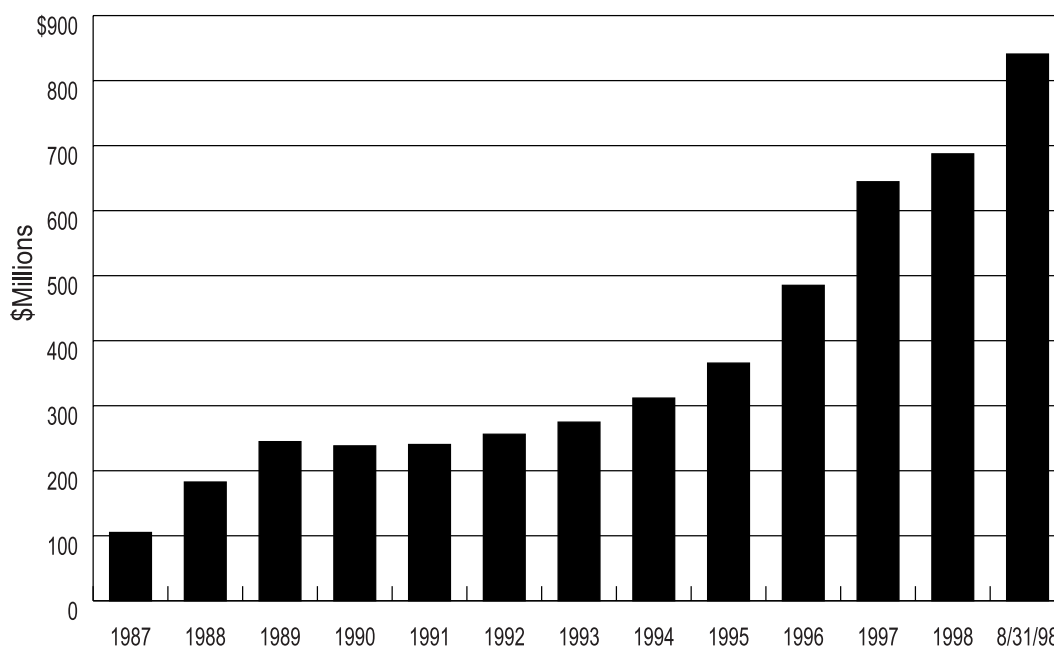
The JLARC staff review found that VDOT's procurement and management of consultants is generally good, although some specific problems were found. A key concern is that VDOT is not well positioned to adequately monitor its overall use of consultants and consultant processes. Moreover, the department's use of consultants is not guided by any analysis of the relative cost-effectiveness of in-house staff and consultants. So, while VDOT has implemented some good processes for managing and coordinating the individual consultant contracts, it still needs to develop an overall management process for its use of consultants.

## **VDOT Has Increased Substantially Its Use of Consultants**

While VDOT has always used consultants, the level of use has increased substantially in recent years. As of August 31, 1998, VDOT had 675 consultant contracts for engineering-related services outstanding, with a total dollar value of \$840.9 million. This amount is eight times the dollar value of outstanding consultant contracts in 1987. As a result of this trend, more of VDOT's preliminary engineering costs are now due to consultant expenses than in-house expenses.

This increased use of consultants can largely be attributed to an increased workload and decreased staff size. In particular, federal transportation legislation from the early 1990s resulted in additional funding for transportation projects at a time when State government implemented two major downsizings – one in 1991 and another in 1995 — which significantly impacted VDOT's staff size. This gap between

### Dollar Value of VDOT Consultant Contracts Outstanding (1987 to 1998, as of January 1 of Each Year)



Source: JLARC staff graphic based on data from VDOT.

workload and staffing levels is expected to grow increasingly pronounced in the next few years due to the recent passage of the federal Transportation Equity Act for the Twenty-First Century (TEA-21). TEA-21 is expected to increase Virginia's annual federal transportation funding level by approximately \$250 million, which will likely result in a substantial increase in VDOT's use of consultants.

#### **VDOT Lacks Adequate Processes for Monitoring Consultant Use**

Despite the fact that consultants are an increasingly significant mechanism through which VDOT accomplishes its work, the department does not adequately maintain and track meaningful consultant data to enable it to make sound decisions on consultant use. For example, VDOT does not accurately track the amount of work outsourced compared to the amount of work

conducted in-house. Therefore, it is not in a position to determine when it has reached its goal vis-a-vis the proper level of outsourcing.

In addition, the department does not routinely track data on the cost-effectiveness of outsourcing various work. This data could help determine whether the outsourcing goal VDOT has identified is, in fact, an appropriate level of outsourcing. Finally, VDOT does not track various performance data which are needed to adequately monitor consultants and ensure VDOT management has sufficient information to make informed decisions about its use of consultants. A major factor in this lack of data is the absence of adequate computer databases at VDOT.

It is important that VDOT address these issues given the increasing reliance on engineering consultants to meet the department's mission. The department needs to begin tracking levels of consultant

use department-wide on a consistent basis and ensure that its new automated financial management system contains the necessary consultant information to adequately monitor consultant activities.

### **Current Level of Consultant Use May Not Be Optimal In Some Instances**

Evidence from this review appears to show that consultants have made a substantial contribution to Virginia's transportation program. The mandate for this study questioned whether consultants are "hired repeatedly to study the same or substantially similar issues." To examine this issue, and more broadly, to assess whether VDOT hires consultants to perform unnecessary work, JLARC staff reviewed a sample of files from recent consultant studies; interviewed consultants, VDOT staff, and local officials; and examined projects placed in the VDOT Six Year Improvement Program. This assessment found that, generally, the studies and projects conducted by consultants appear necessary and appropriate. Further, this review found that work performed by consultants generally appeared to be good, and was comparable to work conducted by in-house staff.

Although consultants generally provide a valuable service to VDOT, concerns have been raised that VDOT's level of consultant use may not be optimal in some areas. VDOT management has voiced concerns that the current overall level of consultant use has not enabled the department to maintain adequate in-house expertise because more complex projects are routinely outsourced. VDOT management stated that it is important for some of these more complex projects to be completed in-house, so that staff have opportunities to hone their skills and maintain their ability to properly oversee consultants.

Questions were also raised concerning the level of consultant use related to two

specific activities – bridge safety inspections and design work for secondary roads – because of concerns related to their cost-effectiveness. VDOT staff estimate that the use of consultant bridge safety inspectors during the past three fiscal years has resulted in additional costs of approximately \$4.7 million. In addition, VDOT engineering staff uniformly believe that secondary road design projects can be completed more cost-effectively in-house, yet the department has begun to use consultants for this type of work in the past few years. VDOT has not conducted a formal cost-effectiveness analysis concerning this type of work.

More broadly, since VDOT does not typically review the cost-effectiveness of outsourcing its activities, it is not in a position to know if it is outsourcing the range of work activities which are most appropriate to outsource from a cost perspective. Identification of the two functions raises the possibility that there may be other functions which are inappropriately outsourced, and conversely, that there may be some activities which would more appropriately be outsourced. VDOT needs to conduct formal analyses of its work to determine which activities are cost-effective to outsource and base future staffing decisions and requests, in part, on these analyses.

### **VDOT's Current Consultant Procurement Process Is Generally Sound, But Can Be Further Improved**

In response to internal reviews which found problems with its procurement procedures, VDOT has implemented a number of new policies designed to ensure staff practices are fair, consistent, and efficient. JLARC staff found that these revised policies and procedures result in a generally sound process of consultant procurement.

However, there are some additional changes which are warranted to further streamline the process and provide some consistency in procurement procedures

across the department. Specifically, elimination of the requirement for Commonwealth Transportation Board approval of consultant contracts would reduce the time involved in procuring consultants. Also, to ensure that VDOT obtains services at a reasonable cost, VDOT needs to develop project work hour standards to be used by staff in negotiating contracts with consulting firms and provide contract negotiation training to staff. Further, the department needs to address inconsistencies which were found in the way different divisions use and monitor limited services contracts by developing department-wide policies governing their use. Finally, VDOT needs to stop the practice of allowing consultants to start projects prior to the finalization of a written contract.

### **Oversight of Consultant Projects May Be Adversely Affected by Inadequate Staffing**

VDOT oversight of consultant projects appears to be generally sound, although some reasons for concern were identified. VDOT's consultant workload has increased in recent years, and as a result, concerns have been raised by staff and some local officials that the quality of consultant oversight may be declining due to excessive workloads. This review did not find conclusive evidence that the quality of the product being overseen has declined. However, there is some work which is not being performed in a timely manner. For example, projects to be outsourced are backlogged. Also, VDOT staff are not consistently completing consultant evaluations. Because VDOT plans to use these evaluations in the selection process, it needs to ensure that the evaluations are always completed in a thorough and timely manner.

VDOT management has indicated that steps are being taken to address staffing issues through a redistribution of its available staff and the development of a more

competitive compensation system. VDOT needs to monitor these changes to determine whether they enable the department to provide effective oversight of consultants. In addition, the department should compile a standardized training manual, including guidelines for project management, for use by its staff.

### **Formal Mechanisms Are Needed to Ensure Coordination of Consultant Projects**

HJR 263 specifically requests a review of the coordination of consultants. Based on a project file review and interviews with VDOT staff and consultants, it appears that VDOT project managers generally keep consultants informed of potentially relevant or overlapping studies and take steps to coordinate their efforts. However, the ability of VDOT to continue to do so may be threatened by the department's loss of institutional knowledge, its lack of a system or process for preserving and sharing that information, and the absence of a formal model for coordination efforts.

Although JLARC staff identified several examples of cases in which VDOT took steps to coordinate neighboring projects, these efforts were not indicative of a department-wide strategy. Rather, they were largely *ad hoc* undertakings that resulted from the initiative of individual VDOT staff. Allowing coordination efforts to continue to develop on an *ad hoc* basis is problematic given the loss of experienced staff and the subsequent addition of new staff who may not recognize the need for coordination or understand how to go about coordinating projects.

To ensure that necessary coordination takes place, VDOT needs to develop guidelines and identify appropriate models for project coordination, which should be incorporated into the previously recommended project management training manual. Further, VDOT needs to develop a system or



process for preserving and accessing information on past projects.

**VDOT’s Approach to the Management of Consultants Lacks Consistency Across Divisions**

Although VDOT’s management of individual consultant projects generally appears to be appropriate, the department’s approach to the management of consultants lacks consistency across divisions. Because “best practices” are not typically shared across the department, divisions often waste efforts reinventing or refining processes that have been well developed in other divisions.

The department does have a Consultant Coordinating Committee, which serves as a central source of information concerning the use of consultants; however, it does not have the authority to ensure that its recommendations and guidelines are followed. VDOT needs an improved mechanism for ensuring consistency in the management and oversight of consultant use across divisions. Among the options which VDOT should consider are an assistant to the Chief Engineer or a strengthened Consultant Coordinating Committee, with authority to enforce standards across the department.

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## I. Introduction

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House Joint Resolution 263, passed by the 1998 General Assembly, directed the Joint Legislative Audit and Review Commission to “study the use of consultants by the Virginia Department of Transportation” (Appendix A). This resolution expressed the sentiment that the use of consultants should be governed by the principles of “economy, efficiency, prudent management, and responsible stewardship of public revenues.” The mandate directed that this review consider how best to ensure that consultants are not hired to duplicate previous work, that they demonstrate knowledge of relevant past studies which have been conducted, and that specific reasons are cited for conclusions and recommendations made by a consultant which may differ from a previous study’s findings. The mandate directed JLARC to report its findings to the 1999 Session of the General Assembly.

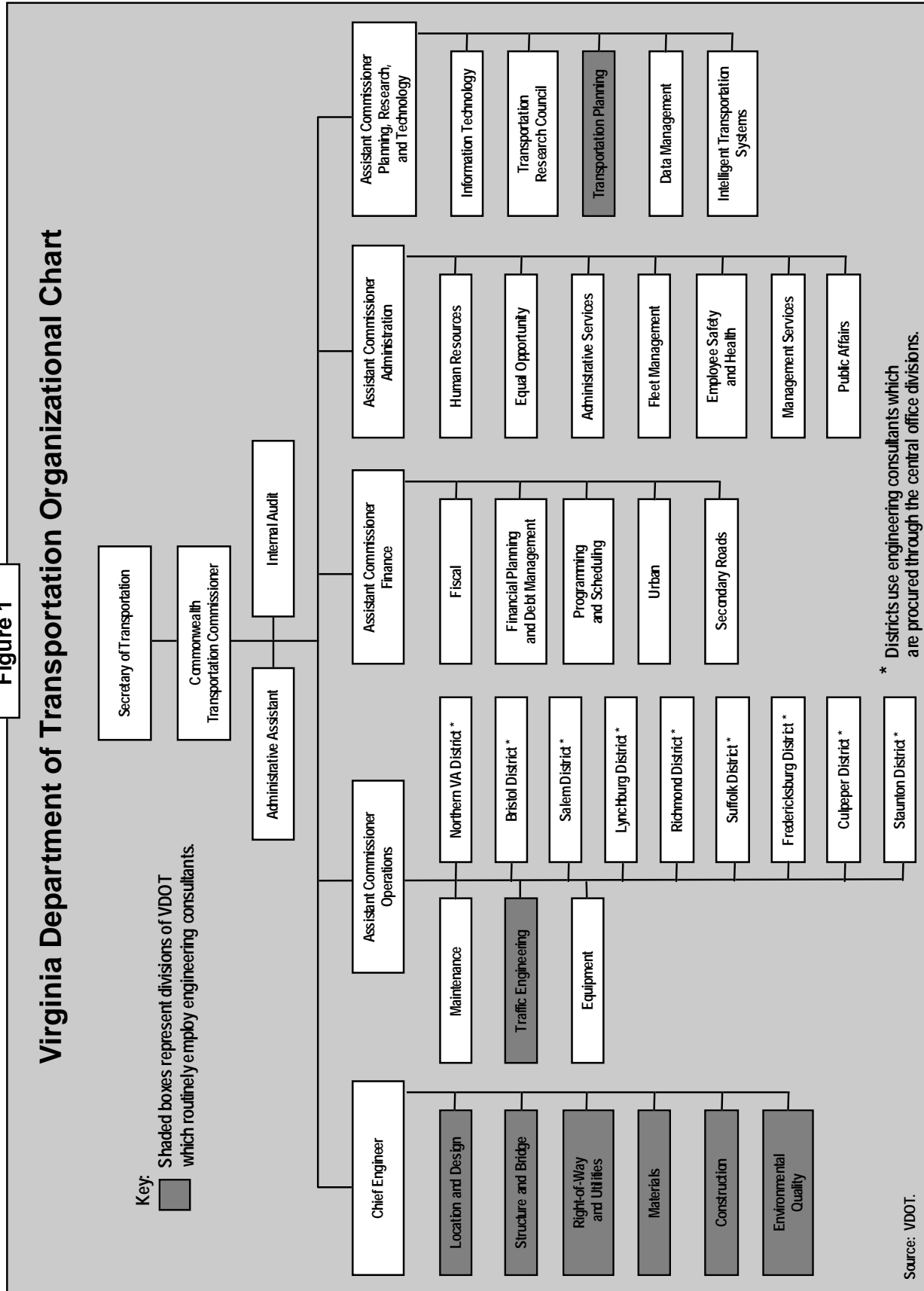
### VDOT’S USE OF CONSULTANTS

The primary mission of the Virginia Department of Transportation (VDOT) is to construct and maintain the State’s roads, bridges, and tunnels. VDOT regularly hires consultants to assist in the completion of its mission. In FY 1998, VDOT’s consultant-related expenditures totaled \$192.2 million. Of this amount, \$150.1 million was related to engineering consultants. Figure 1 shows the organizational structure of VDOT. The divisions which are shaded in gray are those which employ engineering-related consultants in their work.

Most of the engineering consultant expenditures relate to pre-construction activities, such as the design of a road or bridge. Much of this work is managed by the Location and Design Division or the Structure and Bridge Division. However, these and other VDOT engineering divisions are also involved in overseeing consultants for a variety of other activities, including:

- road location studies;
- corridor studies;
- bridge inspections;
- wetlands delineations;
- preparation of federally required environmental documents;
- development of traffic management systems, such as automatic toll collection systems; and
- construction inspections.

**Figure 1**  
**Virginia Department of Transportation Organizational Chart**



Consultant work conducted through the non-engineering VDOT divisions generally relates to the administration of the agency. For example, VDOT has hired a consultant to review its human resources functions. Consultants are less routinely used in these divisions. Chapter II provides a more in-depth examination of the level of consultant use by VDOT and how that level has changed over time.

## JLARC REVIEW

This JLARC review provides an assessment of VDOT's use of consultants in assisting the agency to carry out its mission. The review examines VDOT's procurement and management of consultants as well as how the agency determines the need for consultants. This section describes the consultant services included in this review, the specific issues addressed by the study, and the research activities undertaken to address the issues.

### Consultant Services Reviewed for this Study

Section 11-37 of the *Code of Virginia* allows for an agency to obtain services from outside of the agency but does not define the nature of consultant services. Rather, the *Code* outlines the legal requirements that must be met depending on the type of service sought. Services are divided into two categories: professional services and non-professional services. The *Code* defines professional services as:

work performed by an independent contractor within the scope of the practice of accounting, actuarial services, architecture, land surveying, landscape architecture, law, dentistry, medicine, optometry, pharmacy or professional engineering. 'Professional services' shall also include the services of an economist procured by the State Corporation Commission.

All other consultants are classified as non-professional services.

Because the study mandate references consultants used in location studies, which are engineering firms, and engineering-related consultants account for the majority of consultants hired by VDOT, this review focused on VDOT's use of engineering consultants. And, since engineering consultants fall within the definition of professional services, this review in effect focused on VDOT's processes for procuring and managing professional services.

### Study Issues

JLARC staff identified five major issues for evaluation of VDOT's use of consultants:

- Does VDOT's use of consultants make the best use of resources?
- Are consultants hired to perform needed work?
- Is VDOT's consultant selection process adequate?
- Is there adequate oversight of the consultants and their products? Are consultants held accountable for their work?
- Does VDOT have an adequate process for identifying and managing overlapping consultant projects?

## Research Activities

Several research activities were undertaken to address the study issues. These activities included structured interviews, document reviews, file reviews, and reviews of financial and performance data.

**Structured Interviews.** One of the major components of this study was structured interviews. Interviewees included:

- VDOT staff,
- representatives of local governments and metropolitan planning organizations, and
- representatives of consulting firms and industry associations.

VDOT staff contacted included the Commissioner, assistant commissioners, division administrators, district administrators, consultant services section managers, project managers, Management Services Division staff, and Administrative Services Division procurement staff. Nine representatives of localities and metropolitan planning organizations were also contacted. Ten representatives of consulting firms, including firm principals, project managers, and task managers, were also interviewed. In addition, JLARC staff interviewed representatives of the Virginia Road and Transportation Builders' Association, the Consultant Engineers Council of Virginia, the Consulting Engineers of Metropolitan Washington, and the Old Dominion Chapter of the American Society of Highway Engineers. Finally, eight national associations and the Federal Highway Administration were interviewed regarding industry standards for consultant use.

**JLARC File Reviews.** JLARC staff conducted two targeted reviews of VDOT project files and a review of files from recent professional services procurements. The first file review focused on consultant studies conducted during the past three years. The primary purpose of this file review was to determine if any consultant studies appeared unnecessary. JLARC staff reviewed the files from 21 studies.

The second file review focused on determining how well projects were coordinated with each other. JLARC staff examined files for projects conducted within four selected localities – Fairfax County, Chesterfield County, Norfolk, and Roanoke City – during the past five years. Localities were selected based on the number of projects conducted in each locality during the time period and to ensure regional diversity. It was assumed that areas with a greater number of projects would be at a higher risk for having overlapping projects; therefore, localities with the highest number of projects in each geographic area of the State were selected. Within each locality, one project was randomly selected for review. Projects conducted within a two-mile radius of that project were also selected for review. In addition, the files for projects identified through other means as problematic were reviewed. Based on this method, a total of 23 projects were examined. A more detailed discussion of the methods used to select the two samples of projects is included in Appendix B.

In addition to determining the necessity of the studies and the adequacy of project coordination efforts, both of these file reviews also examined the quality of VDOT oversight, the appropriateness of the consultant selection process, and the quality of consultant work. Criteria used in assessing the study issues included: whether data in the files support that a problem exists; whether there is local government support for the project or study; whether the study duplicates a prior or concurrent project; if completed, whether the results were used; whether concerns were raised by the project manager about the quality of the consultant's work, and if so, how those concerns were addressed; whether VDOT staff and consultants responsible for overlapping studies had periodic meetings to ensure coordination of efforts; whether status reports were prepared and shared across the parties examining overlapping issues; and whether additional work was required (necessitating supplemental contracts) to alter projects based on the work of other projects.

For both project file reviews, numerous documents were reviewed, and in many cases JLARC staff conducted follow-up interviews with the relevant VDOT project managers. Documents reviewed included the memorandum of agreement between VDOT and the consultant, consultant procurement documentation, minutes from project coordination meetings, monthly consultant progress reports, correspondence between VDOT staff and consultant managers, correspondence with local officials and citizens, draft and final reports prepared by the consultant, and VDOT consultant evaluations pertaining to the project.

In addition to the project file reviews, JLARC staff also reviewed 21 files for the procurement of professional services. These files covered the period from June 1997 to the present to ensure that all of these procurements were conducted under the most recent VDOT procurement policies. JLARC staff selected every third file, organized by route number, to obtain the sample.

JLARC staff supplemented the file reviews by observing VDOT processes in action. This included attending meetings of the Commonwealth Transportation Board, observing consultant selection committee meetings, and attending consultant presen-



tations for one project selection. The convergence of information from these and the other research activities discussed was the basis for the study findings.

**Document Reviews.** As part of the research process, JLARC staff reviewed several VDOT internal reports and planning documents, studies conducted by other entities, and the *Code of Virginia*. In addition, Commonwealth Transportation Board meeting minutes, agency regulations, and databases maintained by VDOT were reviewed.

**Review of Financial and Performance Data.** In addition to the activities outlined previously, JLARC staff evaluated financial and performance data. These data were used to evaluate the cost-effectiveness and quality of work prepared by consultants in comparison to work prepared by VDOT staff. The types of data analyzed included: performance measures developed by VDOT, consultant performance reports, construction work orders, construction advertisement dates missed, and consultant expenditures.

## REPORT ORGANIZATION

The remainder of this report is organized into two chapters. Chapter II discusses VDOT's level of consultant use as well as factors affecting VDOT's decisions to outsource work to consultants. Chapter III discusses VDOT's consultant processes, including the selection, oversight, and coordination of consultants, and opportunities for improvement of these processes. The third chapter also includes recommendations to improve the overall consistency of consultant management.

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## II. VDOT's Use of Consultants

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The Virginia Department of Transportation's (VDOT) use of consultants has increased substantially in recent years. VDOT now accomplishes a significant portion of its work, particularly preliminary engineering work, through the use of consultants. Decisions to outsource this work have largely been in reaction to decreases in staffing levels, most recently due to the 1995 Workforce Transition Act, and increases in workload. Consultants, in turn, have provided a valuable service to VDOT.

As will be discussed in Chapter III, VDOT's management of consultant projects is generally good. However, with this rapid growth in outsourcing, VDOT is not well positioned to adequately monitor its overall use of consultants and consultant processes. VDOT needs to put in place management tools to better track its level of consultant use and the quality and cost-effectiveness of consultant work.

In particular, the department has not been proactive in identifying what is the most appropriate level of consultant use, particularly from the perspective of what is most cost-effective. This review found reason for concern that VDOT's current level of consultant use may not be optimal and needs to be addressed. Through improved monitoring, VDOT can better assess what is the most appropriate level of consultant use and can determine when that level has been reached.

### **VDOT's Use of Consultants Has Increased Substantially in Recent Years**

While VDOT has always used consultants, it has substantially increased its use of consultants in recent years. This increased use of consultants can largely be attributed to an increased workload and decreased staff size. Consultants are now a major mechanism through which VDOT accomplishes its workload, particularly its preliminary engineering work.

***Trends in VDOT's Level of Consultant Use.*** As of August 31, 1998, VDOT had 675 consultant contracts for engineering-related services outstanding, with a total dollar value of \$840,900,356. Table 1 shows the number of projects according to the contract dollar value. About 50 percent of the contracts account for 87 percent of the contract value outstanding. These larger contracts are typically used by the Location and Design, Structure and Bridge, and Traffic Engineering Divisions.

Figure 2 identifies the dollar amount of consultant contracts outstanding at the beginning of each of the last several years. The current amount of consultant contracts outstanding is 800 percent of the amount outstanding in 1987.

Actual yearly expenditures for consultant services show a similar upward trend (Figure 3). Most recently, VDOT spent more than \$100 million for consultant engineering services in each of the past three fiscal years.

Table 1

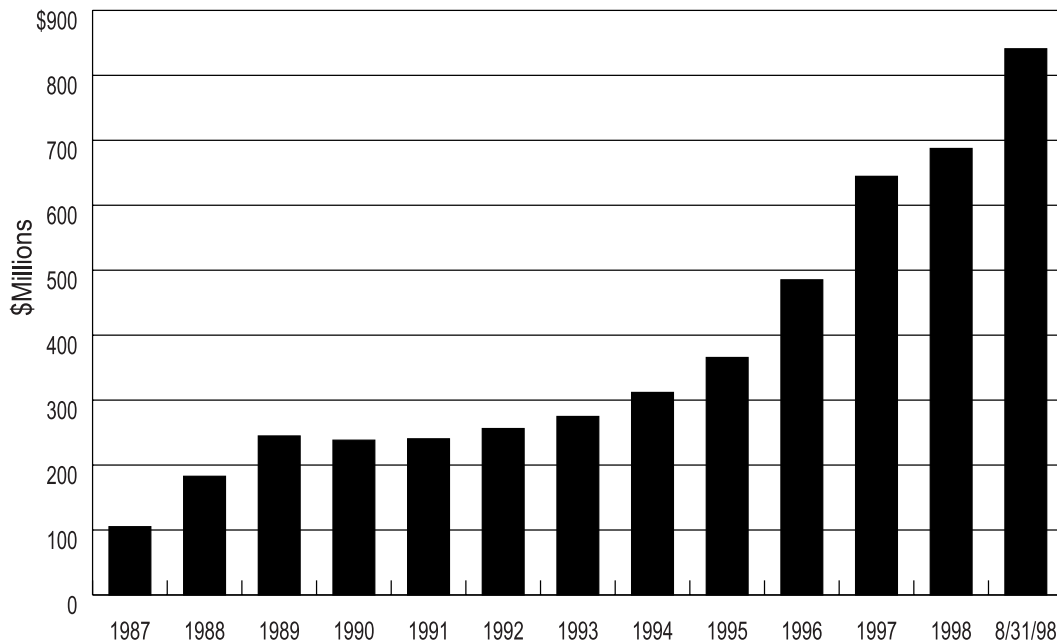
**Consultant Contracts Outstanding as of August 31, 1998**

Number of Contracts	Contract Value	Total Contractual Obligations
230	Less than \$150,000	\$15,276,468
110	Between \$150,000 and \$300,000	\$96,615,838
335	Over \$300,000	\$729,008,050

Source: VDOT Consultant Tracking Information System data as of August 31, 1998.

Figure 2

**Dollar Value of VDOT Consultant Contracts Outstanding (1987 to 1998, as of January 1 of Each Year)**



Source: JLARC staff graphic based on data from VDOT.

As a result of this trend, more of VDOT's preliminary engineering costs are now due to consultant expenses than to in-house expenses. Figure 4 shows the proportion of in-house to outsourced preliminary engineering expenditures for the past five fiscal years. For each year since FY 1995, more than 50 percent of preliminary engineering expenditures were attributable to consultant charges.

**Reasons for Increased Use of Consultants.** It appears that the increased use of engineering consultants is due primarily to two factors: an increased VDOT

Figure 3

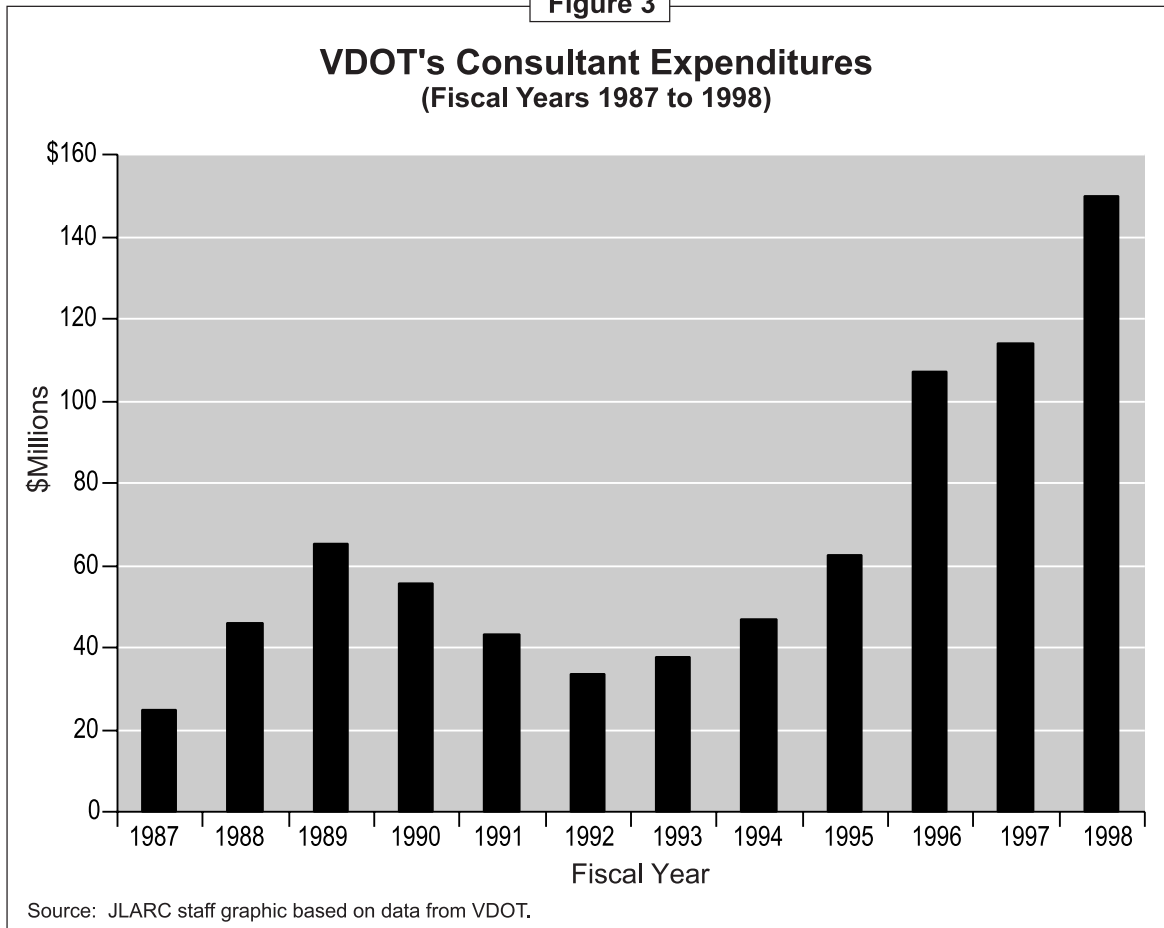
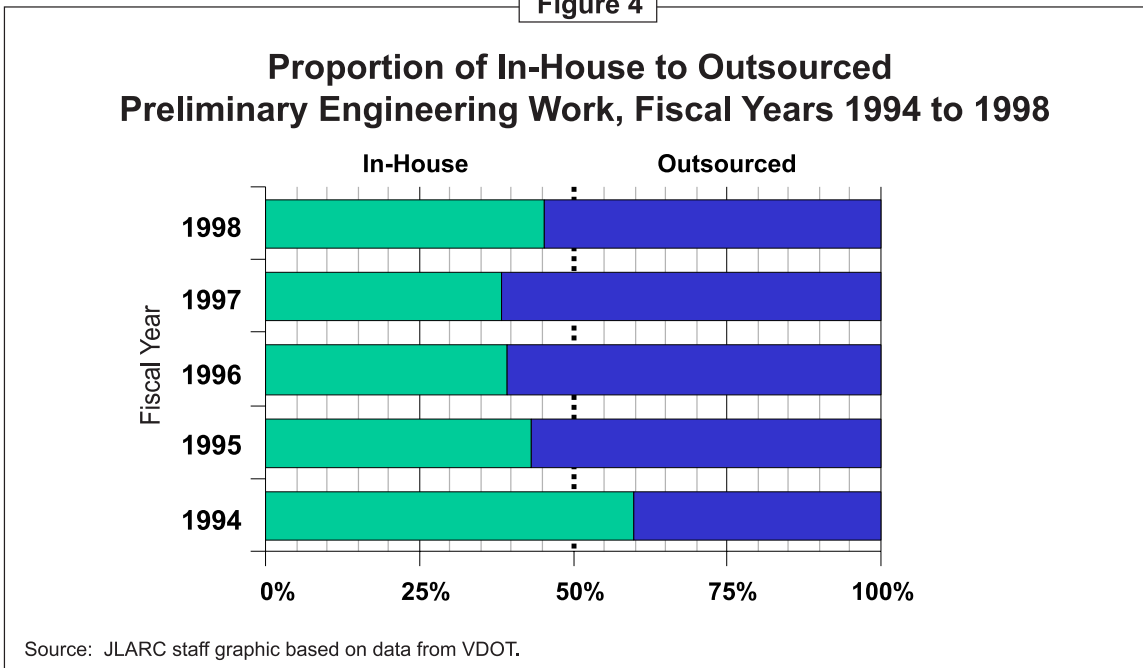


Figure 4



workload and decreased staff size. In particular, legislation passed by the General Assembly in 1986 and federal transportation legislation from the early 1990s resulted in additional funding for transportation projects. The federal Intermodal Surface Transportation Efficiency Act (ISTEA) provided increased federal funding at a time when State government was going through two major downsizings – one in 1991 and another in 1995 – which significantly impacted VDOT's staff size. In addition, there was a hiring freeze in effect at VDOT until July of this year. As a result, VDOT has been operating well below its authorized maximum employment level (MEL). As of July 1, 1998, VDOT's staffing level was 550 less than its MEL of 10,262 positions.

Figure 5 identifies the change in staffing levels for VDOT's engineering divisions over the past five fiscal years. Also shown is the concomitant increase in workload, as reflected in the dollar value of projects advertised in each fiscal year. (The dollar value of projects advertised is considered an appropriate measure of workload since it generally takes into account project size and complexity.)

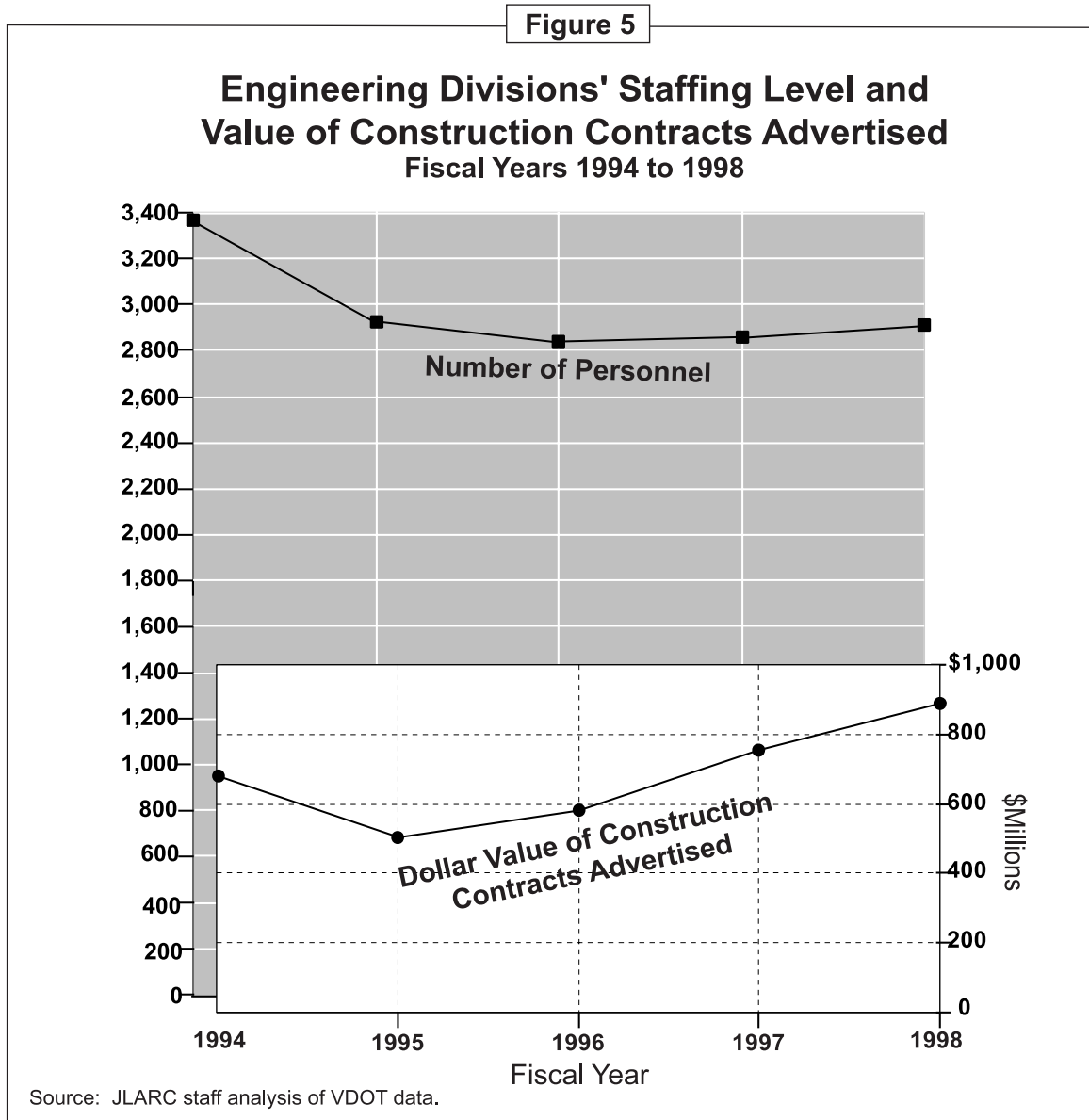
The gap between workload and staffing level is expected to grow increasingly pronounced in the next few years due to the recent passage of new federal transportation legislation – Transportation Equity Act for the Twenty-First Century (TEA-21). While Virginia received an average annual allocation under ISTEA of \$415 million, TEA-21 is expected to result in an average annual allocation of \$671.7 million.

This increased funding will likely result in a substantial increase in VDOT's use of consultants. According to VDOT management, the ability of VDOT to now hire additional positions up to its MEL will not significantly enhance its ability to perform the additional work in-house in the next few years for two reasons. First, VDOT management believes it will be difficult to hire staff due to lower salaries offered by VDOT compared to private sector firms. Second, staff that are hired will require training and experience before they will be fully productive.

Historically, VDOT has simply reacted to these conditions by using consultants to fill the gap between workload and available staffing. Only recently has it begun to develop a strategy to identify the department's staffing needs. However, as discussed later in this chapter, it does not appear that VDOT is considering what is the most cost-effective level of consultant use in making its staffing determinations.

### **Consultants Appear to Provide a Valuable Service to VDOT**

VDOT's use of consultants has enabled it to accomplish a greater workload with less staff in recent years. This review examined whether the work provided to consultants was meaningful and needed, and whether consultants, in turn, have provided useful, quality products to VDOT. Evidence suggests that consultants have made a valuable contribution to Virginia's transportation program. The projects they are hired to perform generally appear necessary. Further, the quality of the work provided by consultants appears good.



***Studies and Projects Conducted by Consultants Generally Appear Necessary and Appropriate.*** The mandate for this JLARC study questioned whether consultants are “hired repeatedly to study the same or substantially similar issues.” To examine this issue, and more broadly, to assess whether VDOT hires consultants to perform unnecessary work, JLARC staff reviewed a sample of files from recent consultant studies; interviewed consultants, VDOT staff, and local officials; and examined projects placed in the VDOT Six Year Improvement Program. Studies were considered necessary and appropriate if: data contained in the files, such as traffic and accident data, supported that a problem exists; there was local support for the study; the study did not duplicate a prior or concurrent study; and if the study was completed, the results were used. This assessment found that, generally, the studies and projects con-

ducted by consultants appear necessary and appropriate. (Since the focus of the JLARC review was on VDOT's use of consultants, the review did not consider whether studies and projects conducted in-house were necessary.)

JLARC staff reviewed the files from 21 studies conducted by consultants during the past three years. Based on this review and discussions with the VDOT project managers, in all but one case the need for each study could be identified. Further, in most cases local government support for the study was apparent. No evidence was found that any of the reviewed studies duplicated prior studies.

The one study which appeared questionable was conducted by a consultant for the Structure and Bridge Division, as described in the following case example.

*In 1995, a feasibility study was conducted "to determine the most economical method to provide four lanes of traffic across the Rappahannock River at Grey's Point." Options included widening the existing Robert O. Norris Bridge or building a new parallel structure. The cost of this study was approximately \$250,000. There were no data to suggest that the traffic level warranted a four-lane bridge. In fact, a 1988 in-house corridor study of the road leading to the bridge did not identify a need for widening the road to four lanes because the traffic flow did not warrant it. The 1988 study did recommend an engineering study of the bridge to determine deficiencies and rehabilitation costs. This study was subsequently conducted and major repairs to the bridge had just been completed prior to the feasibility study.*

Despite the apparent lack of need for expansion, there was strong local support for this study. According to VDOT staff, the local board of supervisors as well as local citizens requested the study. VDOT staff reported that they conducted the study in an effort to be responsive to the local citizenry, in keeping with their agency mission and goals statements.

While duplicative studies were not found, VDOT does initiate consultant studies which build on previous work conducted. Specifically, VDOT may conduct a feasibility study to determine if further, more in-depth analysis is warranted. For example:

*In 1992, an in-house feasibility study was conducted which subsequently led to a 1995 consultant rail realignment study. In Manassas, there were several locations where a rail line intersected city streets, causing significant traffic back-ups. The 1992 study examined whether there were other possible solutions to the traffic problem besides constructing grade separations at the rail crossings, specifically whether relocating the rail line was possible. The study suggested that there were some potentially feasible alternative rail locations, and therefore, further study was recommended. As a result, a more in-depth rail relocation study was conducted by a consultant in 1995. Accord-*

*ing to the consultant, the 1992 study was used as a starting point for the consultant study, but as expected, additional alternatives were considered as well.*

The use of small feasibility studies appears to be a prudent practice to identify the need for a study prior to engaging a consultant in a more costly, detailed study.

In some cases, the need for major investment studies and for examining certain alternatives in location studies was questioned by VDOT staff and local officials. Local officials and VDOT staff reported that sometimes alternative road locations are examined, which in the view of some, appear impractical and, therefore, unnecessary to study. For example:

*One county official said that there are cases where VDOT "refuses" to do something that the county asks them to do, particularly concerning major investment studies. For example, the county will tell them not to study certain alternates because the county knows they are not feasible, but "they just don't listen." At a later date those contested alternates will be declared unfeasible and removed from consideration. In the meantime, VDOT has expended time and money on the study of those alternates.*

However, VDOT is limited in its ability to eliminate study options in many cases. Federal regulations mandate the review of all possible locations to determine their environmental impacts. If VDOT did not consider certain alternatives, they would risk not obtaining federal approval for the final location. In the case of major investment studies, VDOT staff reported that the federal government is currently reexamining the need for the process, and changes to streamline the process are likely.

To examine further whether consultants are providing needed work, JLARC staff reviewed consultant design projects to determine if there are clear plans for their use within a reasonable amount of time. Specifically, JLARC staff examined the projects in the 1997-1998 Six Year Improvement Plan for which consultants are currently being procured by the Location and Design Division to determine if construction funds have been allocated for these projects. This analysis is based on the assumption that projects without construction funds have a lower likelihood of being built in the next six years, questioning the need to perform the design work now. VDOT staff stated that they try to avoid hiring consultants for design projects without construction money.

Based on the review, 40 percent of the projects currently in the division's procurement process do not have construction money allocated to them. Despite the relatively large percentage of projects without construction funds, it appears that priority is given to procuring projects which have construction money. The request for proposals of twice as many of the projects with construction money have been advertised as those without construction money. Further, one-quarter of the projects without construction funds in the 1997-1998 Six Year Improvement Plan were subsequently allocated construction funds in the next year's plan. The Location and Design Division



administrator said that they are ultimately required to pursue all of the projects listed in the Six Year Improvement Plan.

According to the Location and Design Division administrator, the division does not currently have any completed consultant design plans for which no action has been taken. This suggests that the consultant design projects that have been conducted have been or are currently being used. Based on these analyses, it appears that consultants are being provided work which is both needed and subsequently used by VDOT.

***Consultant Work Appears to Be of Relatively Good Quality.*** Because of the large amount of money that VDOT spends on consultant projects, it is important to ensure that the department receives quality products. To determine if the quality of consultant work meets VDOT standards, JLARC staff reviewed data from VDOT's six-month consultant evaluations and Design Quality Index, and interviewed department project managers and local officials. This review indicated that consultant work appears to be of relatively good quality.

Data reviewed by JLARC staff included scores from VDOT's six-month consultant evaluations and the department's Design Quality Index. Although the relative newness of these measures limited the amount of information available for analysis, the data appear to indicate that consultant work is of comparable quality to that completed in-house. Consultants generally received high marks on their evaluations, and the overall Design Quality Index of consultant projects is comparable to the scores of in-house projects.

Consultant evaluations are to be completed by VDOT project managers every six months. Project managers rate the consultants' work on a total of 18 items using a scale of one to five; a score of three indicates that the consultant's work "met expectations." These 18 items represent the following major areas of emphasis:

- attitude and cooperation;
- organization and management;
- utilization of Disadvantaged Business Enterprises (DBE) / Women's Business Enterprises (WBE) / subconsultants; and
- work performance.

Table 2 shows eight examples of the most important criteria against which consultants are evaluated, and the average of consultants' scores for each category. This evaluation process has been in place for approximately 21 months, and as of August 14, 1998, there were 440 completed evaluations. As discussed later, this is about 24 percent of the approximately 1,800 evaluations that should have been completed but were not.

Table 2

**Representative Criteria for VDOT  
Evaluation of Consultants and Average Scores  
(N=440)**

<b>Attitude and Cooperation</b>	<b>Organization and Management</b>	<b>Utilization of DBE/WBE/Subconsultants</b>	<b>Work Performance</b>
Cooperation with VDOT <b>(4.18)</b>	Quality/ability of personnel <b>(3.94)</b>	Assignment of tasks as agreed <b>(3.55)</b>	Completion of work on time and within budget <b>(3.79)</b>
Scope of work and terms of agreement followed <b>(3.8)</b>	Adequacy of supervision and management <b>(3.9)</b>	Coordination with Prime/Subconsultant <b>(3.69)</b>	Overall quality of interim/final submissions <b>(3.86)</b>

**Key To Scores**

1=Poor

2=Needs Improvement

3=Met Expectations

4=Exceeds Expectations

5=Exceptional

Source: VDOT Consultant Performance Reports as of August 14, 1998.

The average of the 18 individual scores determines the firm's overall score. JLARC review of this data indicated that the average consultant received a score of 3.91 out of five. Since a score of three indicates that the work "met expectations," the average consultant's work would appear to exceed somewhat VDOT's expectations.

JLARC staff also examined data gathered for VDOT's Design Quality Index process. The Design Quality Index was developed as a part of the department's strategic plan and implemented as a means of measuring project design quality. According to department documentation, "The Design Quality Index form (LD-433) evaluates the completeness, accuracy, clarity, and constructability of the design." All regularly-advertised projects are to be reviewed following their completion and rated by the project inspector in conjunction with the project engineer. Each project is scored on seven factors based on a scale of one to four, with one being "Major Design Problems" and four being "No Design Problems." If desired, the inspector may also provide design comments in addition to the numerical scores. This review is then to be shared with the designer of the plans.

This index has only been computed for construction projects completed since October 1997, and of the 36 projects contained in the dataset, only six had been designed by consultants. Therefore, this review of the Design Quality Index was limited by the small size of the dataset.

Despite this limitation, JLARC staff review of the Design Quality Index data appears to indicate that VDOT projects are of relatively high quality. For projects evaluated from October 1997 to June 1998, the average Design Quality score was 3.5 out of four. JLARC staff next compared the scores of projects designed by consultants to projects designed by VDOT staff. Because of the interrelated nature of tasks contributing to the quality of design, comparisons of these data were somewhat problematic. For example, a consultant may have been responsible for a flawed design which was caused by improper survey work conducted by VDOT staff. Because it would be difficult to disentangle the effects of one from the other, it would be difficult to determine which entity was responsible for the error. Despite this limitation, Design Quality scores of consultant-designed projects were generally comparable to those designed by VDOT staff. The average Design Quality Index for in-house projects was 3.56, compared to 3.45 for consultant designs. VDOT should continue to track the Design Quality Index and use it to ensure that the quality of consultant design is comparable to in-house design.

Interviews with VDOT staff and local officials support the conclusion that consultants' work is of relatively good quality. Generally, VDOT project managers and local officials reported that projects completed by consultants are of comparable quality to those completed in-house. VDOT staff stated that consultants are professionals who want to perform quality work. Consultants also reported a desire to perform good work and noted that substandard work would jeopardize their ability to secure future work with the department. This notion was also raised by VDOT staff.

*VDOT's Chief Engineer said that consultants are careful to do good jobs, because "the grapevine is a wonderful thing." He said that word of poor work gets around, risking firms' chances to work for VDOT in the future.*

As a result, the evidence suggests that consultants provide good quality work, meeting VDOT standards.

### **VDOT Lacks Adequate Processes for Monitoring Consultant Use**

Despite the fact that consultants are an increasingly significant mechanism through which VDOT accomplishes its work, the department does not adequately maintain and track meaningful consultant data to enable it to make sound decisions on consultant use. VDOT does not accurately track the amount of work outsourced compared to the amount of work conducted in-house. As such, it is not in a position to determine when it has reached its goal vis-à-vis the proper level of outsourcing.

In addition, the department does not routinely track data on the cost-effectiveness of outsourcing various work. This data could help determine whether the outsourcing goal VDOT has identified is, in fact, an appropriate level of outsourcing. Finally, VDOT does not track various performance data which are needed to adequately monitor consultants and ensure VDOT management has sufficient information to make

informed decisions about its use of consultants. A major factor in the lack of data available to track consultant work is the lack of adequate computer databases at VDOT. It is important that VDOT address these issues given the increasing reliance on engineering consultants to meet the department's mission.

***VDOT Does Not Adequately Monitor Its Level of Consultant Use.*** VDOT has identified a level of consultant use for design work which it considers appropriate to enable it to retain adequate in-house expertise for oversight purposes. The Chief Engineer stated that he would like for the interstate, primary, and urban road design work to be divided equally between in-house staff and consultants, with each having a similar level of complexity of projects. He believes that, except for large secondary road projects in urban areas, all other secondary road projects should be designed in-house. Further, he would like between 40 and 50 percent of the bridge design work to be completed in-house, with the remaining work to be outsourced. Based on these goals, VDOT reported that it currently outsources more engineering design work than desirable.

Despite these goals, VDOT does not have a mechanism in place to periodically track the current level of workload outsourced or its progress toward these goals. As part of this review, JLARC staff requested information concerning the level of consultant use for VDOT's engineering divisions. It was determined that the most appropriate measure of consultant use for design work is the construction dollar value of the projects being designed. Since more complex projects typically cost more to construct, this measure appropriately takes into account the complexity of the work in assessing workload levels for consultants compared to in-house staff.

However, JLARC staff found that VDOT does not routinely track workload using this measure. There is no database which can readily identify the total value of projects outsourced compared to those designed in-house. Currently, it is up to individual divisions to track the level of consultant use and to determine how it is measured. As a result, some divisions could not identify their level of workload outsourced, while others did so based largely on informal analyses. For example:

*The Location and Design Division administrator reported that the division currently outsources about 65 percent of its workload, based on the value of the projects. However, he reported that this information was derived from an informal analysis conducted a couple of years ago. This information is not routinely tracked.*

The only division to routinely track workload conducted in-house and outsourced, based on project value, is the Structure and Bridge Division.

VDOT does separately track expenditures incurred from outsourced and in-house preliminary engineering work. However, there are problems with using expenditures to measure workload. Expenditures do not accurately measure the amount of workload conducted in-house and by consultants because a portion of the in-house expenditures are actually for in-house oversight of outsourced work. Therefore, if VDOT

were to report, for example, that 45 percent of preliminary engineering expenditures are for in-house work, the actual percentage of workload conducted in-house is likely significantly smaller. Further, any differences in the cost of work outsourced and conducted in-house would impact the proportions. If the same project costs more for in-house staff to design than a consultant, it would improperly appear as if the in-house staff have a greater workload than the consultant.

VDOT has recently developed a workload planning system to identify the level of in-house staffing and equivalent consultant staffing necessary to achieve VDOT's current workload. According to staff responsible for the system, recommended staffing levels were initially derived based on identification of a desired level of outsourcing. However, from interviews with division administrators and other staff it is clear that the assumptions used in identifying recommended staffing levels varied across divisions. Therefore, the data do not consistently measure the in-house staffing needs necessary to achieve a desired level of outsourcing.

VDOT needs to develop an accurate, consistent mechanism for tracking the level of consultant use in each division and ensure that divisions track the necessary information. In developing such a process, VDOT may find it appropriate to develop different measures for different outsourced functions. The information collected should then be used by management in comparing the current use levels to desired levels of use. With such data, sound decisions about any changes necessary to reach desired goals can be made by VDOT managers.

***Recommendation (1).*** The Virginia Department of Transportation should begin tracking levels of consultant use department-wide on a consistent basis. In developing a tracking process, the department should consider the most appropriate measures of consultant use for each type of function outsourced. For design-related work, for example, the department might consider the cost of projects as a workload measure.

***Recent Decisions Concerning Outsourcing Have Not Considered Cost-Effectiveness of Consultant Use.*** In considering how work should be accomplished by VDOT, it is important to consider, among other factors, what is the most cost-effective approach to take. By not considering the cost-effectiveness of different approaches, the potential exists for excessive spending of tax dollars to accomplish VDOT's mission.

Traditionally, VDOT has used consultants to carry out work for which it does not have the expertise in-house or to meet peak workload demands. For many years VDOT has chosen to contract out projects or tasks requiring personnel whose specialized knowledge would be expensive, and whose services would be underutilized if maintained in-house. Such projects include, for example, underwater inspection of some bridges and studies of endangered species. In addition, since the size of VDOT's construction program historically has fluctuated from year to year, VDOT has used consultants to meet workloads during peak demand years. This avoids the situation of VDOT maintaining staff on the payroll during years in which the level of work does not

require such staff. Such decisions to outsource based on needed expertise or to handle unusually high workloads implicitly consider the issue of cost-effectiveness.

However, in recent years VDOT has increasingly used consultants to help it accomplish its normal engineering workload. This increase in consultant use has not been based on any analyses of the cost-effectiveness of using consultants. Rather, the increased use of consultants has been a reaction to significant reductions in its staffing level, most recently occurring as a result of the 1995 Workforce Transition Act. JLARC staff found only one work activity in which the use of consultants was being monitored for cost-effectiveness – that of bridge inspection services. As will be discussed in detail later in the chapter, that analysis found that it was not cost-effective to use consultants for inspection services. Given that the one analysis conducted found that the service was being provided in a more costly manner through consultants, it clearly raises the question of whether there are other VDOT functions which are not being performed cost-effectively.

Further, VDOT's goal for consultant use considers only the level of outsourcing which will allow VDOT to maintain adequate in-house expertise to oversee consultant work. Its goal does not consider what is the most cost-effective level of consultant use to have, either for specific activities or for the construction program as a whole. VDOT needs to incorporate in its decisions regarding outsourcing, consideration of the costs associated with outsourcing work compared to performing the work in-house.

***VDOT Does Not Adequately Track Management Information Concerning the Use of Consultants.*** To make effective management decisions concerning consultant use and VDOT processes for overseeing consultants, VDOT needs to maintain a variety of information concerning consultant activity. Currently, it does not appear that much of this information is available. As a result, decisions are made based on anecdotal information which may or may not accurately reflect current conditions. If consultant-related data were routinely collected and monitored, this information could then be used in decision-making concerning the proper level of consultant use and, if problems are identified, could be used to identify policies and procedures needed to avoid future problems.

For example, data such as the number and magnitude of design errors and whether a project meets its deadline are not collected and monitored as part of an effort to ensure that consultants are meeting the terms of their contracts. In addition, information is not readily available to management on the number of projects (and dollar value of projects) assigned to each project manager. This information would be useful in assessing whether workload is appropriately allocated among staff. Further, the extent to which consultant performance evaluations are completed by staff is not tracked. As will be discussed later, despite their importance, it appears that many evaluations are not being completed as required.

VDOT has taken a number of steps in recent years aimed at improving its consultant processes; however, mechanisms are not in place to track the extent to which

the changes were implemented or whether the changes made an improvement. For example:

*In 1996 VDOT reviewed its consultant procurement and management policies and procedures and identified a number of changes which were to take effect in December 1996. These changes included:*

- giving consultants a better opportunity to resolve plan errors, but also obtaining reimbursement from consultants, where appropriate;*
- making greater use of lump sum contracts; and*
- including a contingency of ten percent on design contracts and 15 percent on construction inspection contracts to help reduce the number of supplemental agreements used.*

*Despite these goals, VDOT does not have any mechanisms in place to track if it is properly seeking reimbursement, if there has been an increase in the use of lump sum contracts, if the number of supplemental agreements has decreased, and the extent to which the contingency amounts have had to be used. Tracking of these items would enable VDOT to determine if its efforts have been successful or if additional actions need to be taken.*

The only VDOT database which maintains information specifically on consultant projects is the Consultant Tracking Information System (CTIS). The system is largely used to track consultants' workloads and payments to consultants. However, VDOT staff consistently reported, and JLARC staff confirmed, that the CTIS data are flawed. Therefore, the system provides unreliable data on consultant activities. In particular, the extent to which staff enter data into the system accurately and in a timely manner varies significantly. For example, it appears that some staff routinely enter data on limited services contracts incorrectly, which results in overstating the value of consultant work outstanding, while underreporting the number of projects under way.

In addition, the information maintained in the system is inadequate for managing consultant activities. One problem with CTIS is that it only provides information on current projects. Therefore, it is impossible to evaluate trends in consultant use with the data. Also, it is not possible to track consultants' use of disadvantaged business enterprises according to contract requirements. Further, there is no distinction made for identifying active projects and those which have been placed on hold.

A 1994 VDOT internal audit identified additional problems with CTIS, mostly due to inquiry and reporting limitations of the system. However, improvements to the system were never implemented. As a result, some divisions have developed their own databases to monitor projects under their control. Aside from the data required in

CTIS, each division that procures consultants decides to what extent such information is tracked, if at all.

VDOT has taken steps recently to improve its consultant data management; however, it is too early to tell whether this will be adequate to correct the data deficiencies noted. Specifically, the agency's new financial management system (FMS II), which became operational on September 1, provides fields for various data on consultant contracts, some of which are mandatory and some of which are optional. For example, data fields are provided for contract beginning and expiration dates, final report date, detailed information on consultant and subconsultant hours spent to date, contract status (for example, whether active or on hold), information on specific activities required within the contract, and contract type (for example, lump sum).

However, it will still be incumbent on staff to enter the data accurately and in a timely manner for the new database to be useful for consultant management purposes. In addition, the data currently on the CTIS system needs to be entered into the FMS II system as soon as possible to ensure VDOT has complete information about consultant contracts. VDOT needs to stress to all its staff the importance of maintaining this consultant information. Further, clear guidelines must be developed for what information should be included and how it should be recorded. Finally, quality checks should be periodically conducted to ensure that staff are entering data appropriately.

***Recommendation (2).* The Virginia Department of Transportation needs to review all the consultant-related fields in its new financial management system to ensure that all the information necessary for project managers and department management to adequately monitor consultants are included, and make adjustments to the fields as necessary. Included in this review should be consideration of whether the data entered for each field should be required or optional.**

**Contract data from the Consultant Tracking Information System should be entered into the new financial management system and the previous system discontinued. In addition, the department should conduct periodic quality checks of the data in the new financial management system to ensure the data are consistently and accurately recorded.**

### **Current Level of Consultant Use May Not Be Optimal in Some Instances**

Although consultants generally provide a valuable service to VDOT, concerns have been raised that VDOT's level of consultant use may not be optimal in some areas. VDOT management has voiced concerns that the current level of consultant use has not enabled the department to maintain adequate in-house design expertise because more complex projects are routinely outsourced. VDOT management stated that it is important for some of these more complex projects to be completed in-house, so that staff have opportunities to hone their skills and maintain their ability to properly oversee consultants.



Questions were also raised concerning the level of consultant use related to two specific activities – bridge safety inspections and design work for secondary roads – because of concerns related to their cost-effectiveness. Monitored costs appear to show that it is not cost-effective to outsource bridge safety inspections. In addition, the consistent view of VDOT staff is that it is not cost-effective to outsource secondary road design work, yet the department has begun to use consultants for this type of work in the past few years. VDOT needs to address concerns related to the appropriate level of staffing and consultant use by developing measures which demonstrate the relative cost-effectiveness of in-house staff and consultants.

The Structure and Bridge Division has tracked the costs associated with using consultants in its bridge safety inspection program since 1995, when the use of consultants for this program expanded significantly. This federally-required program is responsible for periodically inspecting all the bridges in the State to ensure their safety. Currently, the program is responsible for inspecting 18,986 bridges, with a total area of 76.5 million square feet, of which approximately half are inspected each year. In 1994, there were 77 VDOT bridge inspectors. Due to the Workforce Transition Act in 1995, 14 positions (18 percent) were eliminated from this program. As a result of the decrease in staffing, VDOT now outsources approximately 28 percent of the inspection work (in terms of deck area).

The division maintains information on the cost charged by consultants for each bridge inspected since 1995. For each consultant-inspected bridge, the division also develops an estimated cost of using VDOT staff to inspect the bridge. In calculating the estimated State cost, division staff include the department's standard overhead rate to ensure comparability of costs. In addition, they use the step 15 salary for each relevant State position, which is somewhat higher than the average salary for VDOT employees in each of those positions. This calculation, therefore, should represent a fairly generous estimate of the State's inspection cost.

While the quality of the program has reportedly not changed since the use of consultants, the cost of the program has increased substantially. Exhibit 1 shows the difference in inspection costs between the consultants and in-house staff. Division staff estimate that the added cost associated with using consultants for bridge safety inspections during the past three fiscal years has been approximately \$4.7 million. The average cost per bridge is 74 percent more for consultant-inspected bridges than the estimated State cost for those bridges. This cost differential does not include the added cost of VDOT staff time required to oversee the consultants' work. Staff attribute this difference in cost to five main factors associated with consultants: higher salaries and types of personnel inspecting structures, higher overhead rates, profit, more hours required for inspections, and higher equipment costs. This analysis clearly calls into question the appropriateness of outsourcing bridge safety inspection work at the current level.

Another area warranting further scrutiny is the use of consultants for secondary road design work. No formal analyses have been conducted on the costs and benefits of outsourcing secondary road design work. However, VDOT engineering staff

**Exhibit 1**

**Comparison of Consultant and In-house Costs  
Associated with Bridge Safety Inspections  
Fiscal Years 1996 through 1998**

Total of Consultant Costs	\$10,996,619
Total Estimated State Costs	\$6,302,654
Cost Differential	\$4,693,965
Number of Bridges Inspected	4,615
Consultant Average Cost Per Bridge	\$2,383
State Average Cost Per Bridge	\$1,366

Source: VDOT Structure and Bridge Division.

consistently reported that it was not cost-effective to outsource this type of work because, except in highly urbanized areas such as Northern Virginia, these tend to be relatively small, less complex design projects. Despite this assertion, interviews with VDOT staff indicate that secondary design work is increasingly being outsourced, as the following case studies show.

*One district administrator said that more of the secondary projects in his district are going to consultants. He said that consultants who work on the secondary system request information and guidance from the district staff, anyway, so the district spends a lot of time on those projects. The district staff end up "being a liaison," and working on the projects even though they are not responsible for the design.*

\* \* \*

*Another district administrator said that VDOT staff are efficient when it comes to "typical" secondary projects, such as road widening. However, that work is now being outsourced at VDOT, even though the district administrator said it sometimes takes more staff time to review the consultants' work than it would take to do the design in-house.*

\* \* \*

*Another district administrator said that his staff had conducted an informal analysis of the cost-effectiveness of outsourced secondary design projects. His staff estimated that in-house secondary projects cost one-third to 45 percent less than outsourced projects. He said that for this reason, secondary design work had not previously been outsourced, although it was happening now due to staffing deficiencies.*

JLARC staff identified 24 secondary road design projects outside of Northern Virginia and Hampton Roads which were conducted by consultants during the past three years. The cost of these projects was approximately \$3 million. Most of these projects are from the Staunton and Bristol districts. Additional consultant contracts for secondary road design work are currently being prepared.

Given the uniform belief that secondary road design work is not cost-effective to outsource, VDOT needs to look closely at this issue. VDOT should conduct a formal analysis to determine whether it is, in fact, cost-effective to outsource these projects. If the department finds that it is not cost-effective, then steps should be taken to ensure that adequate staff are available to conduct this work in-house. Shifting work to in-house staff can be accomplished by either replacing outsourced secondary road design work with other work that could be outsourced more cost-effectively or by adding district staff.

More broadly, since VDOT has reviewed the cost-effectiveness of outsourcing only one of its activities, the department is not in a position to know if it is, in fact, outsourcing the range of work activities which are most appropriate to outsource, from a cost-effectiveness perspective. Identification of the two functions discussed raises the possibility that there may be other functions that are inappropriately outsourced, and conversely, that there may be some activities which would more appropriately be outsourced. VDOT needs to incorporate cost-effectiveness analyses in its decision-making process for outsourcing. This information should then be included in budget deliberations as to the appropriate staffing level for VDOT.

***Recommendation (3).* The Virginia Department of Transportation should conduct formal analyses of its work to determine which activities are cost-effective to outsource. Staffing decisions and requests should be based on these analyses, as well as the manpower requirements necessary to retain adequate in-house expertise. The department should report to the House Appropriations and Senate Finance Committees with its findings by September 1, 1999. In the future, a cost-effectiveness analysis should be completed before outsourcing any additional work and should be performed periodically on currently outsourced functions.**

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### **III. Procurement and Management of Consultants by VDOT**

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The Virginia Department of Transportation's (VDOT) processes for selecting and managing consultants generally appear to be sound. The department has taken steps to ensure that procurement practices are consistent with the Virginia Public Procurement Act, to improve the accountability of those practices, and to streamline the procurement process. Although the process for procuring consultants has been improved in recent years, JLARC staff identified opportunities for further streamlining the procurement process and increasing consistency across divisions.

VDOT efforts in the areas of consultant project oversight and coordination are also generally sound. This review found that project managers maintain frequent contact with consultants and appear to coordinate potentially overlapping projects. In addition, available information on relevant current and past studies and projects is generally provided to consultants by VDOT in a timely manner. However, VDOT needs to address significant staffing and workload issues in this area. In addition, it needs to implement a system to preserve historical information and ensure coordination of overlapping projects. Finally, VDOT must address concerns regarding its overall management and use of consultants across divisions.

#### **VDOT'S CONSULTANT PROCUREMENT PROCESS**

VDOT's consultant procurement process is guided by provisions of the Virginia Public Procurement Act. While the Act identifies the general approach which must be taken, VDOT has developed specific procedures which staff are to follow. In response to internal reviews which found problems with the procedures, VDOT has implemented a number of new procurement policies designed to ensure staff practices are fair, consistent, and efficient. JLARC staff found that these revised policies and procedures result in a generally sound process of consultant procurement. However, there are some additional changes which are warranted to streamline further the process and provide some consistency in procurement procedures across the department.

#### **Process for Procuring Professional Services**

The process State agencies must follow to procure professional services is outlined in the Virginia Public Procurement Act, sections 11-35 through 11-80 of the *Code of Virginia*. Professional services are procured through a competitive negotiation process. With this process, an agency first issues a written Request for Proposal (RFP) indicating in general terms the nature of the project and what will be required of the consultant. In response to the RFP, a firm submits to the agency an "Expression of Interest" which identifies the firm's qualifications, past experience with similar types of work, and any other items required in the RFP. The agency then reviews all the

expressions of interest and develops a “short list” of firms most qualified, from which it will engage in further discussions.

The Act requires that at least two suitable firms be selected for additional deliberations. For VDOT, these deliberations take the form of presentations made by each short-listed firm to demonstrate how that firm’s qualifications are best suited for the project. After the presentations, the firms are ranked and the agency enters into negotiations with the first ranked firm. If a contract can be negotiated at a price considered fair and reasonable, an award is made to that firm. Otherwise, the agency begins negotiations with the second ranked firm and so on until a reasonable contract can be negotiated. Though not set in statute, VDOT has developed a policy whereby the Commonwealth Transportation Board has final authority to approve all contracts over \$300,000. The Commissioner of VDOT approves all contracts between \$150,000 and \$300,000, and the Chief Engineer approves contracts less than \$150,000.

### **Past Reviews Found Significant Problems with VDOT’s Professional Services Procurement Process**

VDOT’s professional services procurement process has been reviewed in recent years by its internal auditor as well as its Value Engineering Section. In these reviews, numerous problems were found with the process as it pertains to obtaining engineering and design services by the agency. Problems ranged from a lack of compliance with State law to inefficient practices leading to increased costs associated with procuring consultants.

The most recent internal audit, conducted in 1996, noted significant problems with a lack of adequate documentation for selection decisions, unexplained changes in selection scores, and unreliable data from VDOT’s Consultant Tracking Information System (CTIS). As stated in the audit report:

[W]e found numerous score changes, which were unexplained by the documentation, and unexplained irregularities in some projects. There was one situation where there was an intentional alteration of the selection records in order to shortlist a particular consultant. We were told that the changing of scores was a normal practice in some work groups.

Because of the substantial problems found by the audit, VDOT revised its procurement guidelines and placed the Administrative Services Division in an oversight role with regard to the process.

In addition to the internal audit, a value engineering study was conducted which focused on identifying ways to reduce the cost and time involved in the consultant selection process for VDOT and consultants without adversely affecting quality and performance. The study concluded that VDOT spent more money than necessary through excessive advertising of RFPs. Further, it found that savings would accrue to

both VDOT and consultants if VDOT better identified the scope of the project in the RFP and limited the amount of information firms were expected to provide in their expressions of interest. These changes would save review time for VDOT staff and would reduce the firms' cost of compiling the expressions of interest. The study also found that administrative savings would result from an increased use of "lump sum" contracts as opposed to the "cost plus net fee" contracts normally employed. These and other recommendations were presented to VDOT management through a March 1995 report.

### **VDOT Has Made Improvements to Its Professional Services Procurement Process**

In part as a response to the internal audit and value engineering study, VDOT has taken numerous steps to improve its procurement process. These changes have helped ensure that VDOT practices are consistent with the Virginia Public Procurement Act, and have resulted in improved accountability and a more streamlined process.

The process was significantly revised in early 1997 to have the Administrative Services Division monitor and oversee the selection process. This division now attests that each selection process has been completed fairly and according to agency policies and State statutes before negotiations can begin with a firm. To do so, staff from this division attend meetings held to rank firms' expressions of interest and develop the short lists. Further, they attend the presentations of the short-listed firms and approve the final documentation selecting the first ranked firm. This division also now maintains the official file for each professional services procurement.

The department has also instituted a number of cost containment measures designed to ensure it receives the requested service at a reasonable cost. For example, the department has limited the fixed fee (profit) allowed on a contract to no more than ten percent. (Previously, the typical range was ten to 15 percent). It also no longer allows principals to charge time to a project at the principal's pay rate. Now, if performing technical work, the principal may bill his or her time at a rate not to exceed that charged for other employees performing similar technical work. Further, VDOT has limited the rate that can be billed for computer costs. These measures were instituted in late 1996 when federal law was changed to prohibit States from capping overhead rates in determining the cost for transportation design projects.

Other changes instituted by VDOT include:

- standardizing the memorandum of agreement (contract) used by divisions in procuring consultant services;
- reducing the amount of information required in the expressions of interest and, in general, streamlining the RFP and expressions of interest; and

- making an effort to better define the scope of work prior to issuing the RFP, in part to reduce the number of supplemental agreements needed on a project.

These changes have served to improve the process by increasing consistency across divisions and reducing the time it takes to procure a consultant.

### **VDOT's Current Professional Services Procurement Process Is Generally Sound**

In addition to examining the changes made to VDOT's procurement process, other analyses were conducted to assess the department's process. JLARC staff compared VDOT's revised procurement process to guidelines developed by the American Association of State Highway and Transportation Officials (AASHTO) and found that VDOT's process was consistent with these national standards. Further, consultants were asked for their perceptions of the selection process, including whether they thought the department's process was fair. Of the ten consultants and four in-state transportation consultant-related associations interviewed, all felt that the process was fair.

To assess whether VDOT staff were following the new procurement policies, a sample of 21 files for procurements conducted since the new procedures were instituted was reviewed. In addition, JLARC staff attended three meetings at which VDOT staff "short-listed" consultants and one meeting during which presentations were made by short-listed firms and a final selection was made. Based on the file review and attendance at selection meetings, JLARC staff found that the new process was generally being followed. There were, however, some relatively minor inconsistencies in documentation requirements which warrant continued monitoring by VDOT.

JLARC staff also examined the types of factors VDOT considers in making selection decisions. One concern cited by the mandate for this JLARC study was whether, "prior to their entering into a contract with the Department, consultants demonstrate a knowledge of studies that have already been done on the same or substantially similar issues." Through the procurement and other file reviews conducted for this study, it was evident that VDOT staff do consider a consultant's knowledge of the project at hand, including conditions and past projects which impact the current project. For example:

*Knowledge of the Route 29 Phase I corridor study results was a major consideration in which consultant was selected to perform the Route 29 Phases II and III corridor study since the methods in the first study were to be replicated in the second study.*

As a result of these analyses, the JLARC review found VDOT's procurement process to be generally sound. However, there are some additional changes that could be made to further improve VDOT's procurement process, as will be discussed in the next section.

### **Additional Changes Would Further Improve the Process**

According to a recent study of VDOT's business processes, the process of selecting and hiring a consultant takes an average of seven months and 22 days. Based on the JLARC review of project files, there can be a substantial range in the amount of time required to procure consultants, from approximately four months to more than a year. One step in the process – obtaining contract approval from the Commonwealth Transportation Board – appears unnecessary. Elimination of this requirement would result in reducing the time involved in procuring consultants.

There are additional steps as well that VDOT should take to improve consultant procurement practices. First, this review found that additional attention needs to be given to the process of negotiating contracts with consulting firms to ensure that VDOT is obtaining the needed service at a reasonable cost. Second, the department needs to address inconsistencies which were found in the way different divisions use and monitor limited services contracts. And third, VDOT needs to stop the practice of allowing consultants to start projects prior to having a written contract finalized.

***Commonwealth Transportation Board Approval of Professional Services Contracts Should Be Eliminated.*** As previously noted, the Commonwealth Transportation Board (CTB) approves all memoranda of agreement (MOAs) with consultants for projects over \$300,000. This accounts for 87 percent of the value of all engineering consultant contracts currently outstanding, including almost all of the consultant services procured by the Location and Design Division. Of the 456 MOAs brought to the Board in the past six and one-half years, only two have not been approved by the Board. Thus, it appears there has been little value added by having the CTB approve consultant MOAs.

However, CTB approval adds significant time to the process of procuring consultants. All requests for CTB approval must be submitted at least 17 days prior to the monthly Board meetings. Based on a recent study of VDOT's business processes, including procurement, and discussions with VDOT staff, the CTB approval generally takes between three to five weeks, depending on the Board's meeting schedule. Given that the large majority of MOAs are approved, this added time does not appear warranted.

Further, much time and expense by both VDOT staff and consultants have occurred by the time the MOA reaches the Board. The time and expense are wasted if the Board denies approval of the MOA, as the following case example shows.

*The most recent MOA to be denied by the CTB occurred at its June 1998 Board meeting. The proposed MOA was a \$1 million contract on the initial phase of an \$18 million project to install new lighting on Interstate 66 in Northern Virginia. According to VDOT staff and newspaper articles at that time, the contract was denied because some board members felt that there were other, higher priority roadway needs in*



*that area besides lighting. However, the Board had previously voted to include this project in the Six Year Improvement Program. VDOT staff had spent approximately six months' time selecting the proposed consultant and developing the draft MOA. This does not include the time and expense involved for the consultant.*

As the case example points out, the Board already has an opportunity to provide input into what projects VDOT conducts since it approves the projects to be included in the Six Year Improvement Program, which is revised annually. This avenue allows for significant CTB input in project development without resulting in unnecessary staff and consultant time being spent. In addition, the CTB currently receives quarterly reports concerning VDOT's level of consultant use and the status of consultant contracts.

Given these factors, it appears that VDOT's procurement process could be streamlined by eliminating the CTB approval of consultant contracts. Instead, approval of consultant contracts should be vested in the VDOT Commissioner and Chief Engineer. However, the CTB should continue to receive periodic updates concerning the department's use of consultants and policies used in procuring consultants to use in setting broad policies for VDOT's use of consultants.

***Recommendation (4). The Commonwealth Transportation Board and Virginia Department of Transportation should modify their procurement policies to eliminate the Commonwealth Transportation Board responsibility for approval of consultant contracts over \$300,000.***

***More Attention Needs to Be Given to the Negotiation Stage.*** Because consultant services are not procured through a low-bid process, costs are controlled in part by ensuring that the work hours allowed to be charged to a project are appropriate. VDOT staff with responsibility for negotiating these work hours must have familiarity with a range of VDOT projects and be able to determine the reasonable amount of hours needed to complete different types of projects. For example:

*One VDOT division administrator discussed the first consultant contract for which he was responsible. The firm that had been selected proposed a limiting fee of \$5 million for the project, while the department wanted to spend \$500,000. VDOT negotiated with the firm to reduce the level of work hours, resulting in an agreement under \$1 million. According to the division administrator, that was when he learned that firms "want to sell you a Rolls Royce," when you can often "get by with a Pinto." The division administrator said that firms that have more experience dealing with VDOT tend to submit proposals that need "less whittling."*

This division administrator's experience demonstrates how critical the negotiation process is in ensuring that VDOT obtains a quality product at a reasonable cost.

VDOT's negotiation process has five major steps. Once a firm is selected for negotiation, the department and the firm meet to discuss the scope of the project in detail and what will be expected of the consultant. The consultant then develops a detailed scope of work and fee proposal which includes the number of hours expected to be needed to complete the work. At the same time, the VDOT project manager is supposed to develop an estimate of how many hours he or she expects the project to require. Once the department receives the proposal, the project manager then compares the VDOT estimate and expectations of work to be performed with the consultant's proposal and adjusts the consultant's estimated hours accordingly. The project manager and consultant then work together to develop a final estimate of hours needed and the scope of work that both feel is reasonable.

During the project file reviews, JLARC staff found little evidence that work hour estimates were being prepared by VDOT staff in advance of receiving the fee proposals from consultants. Rather, project managers usually first reviewed the consultant proposals and then made modifications as they saw appropriate. Further, in some cases there was not any clear indication that work hours were fully negotiated. For example:

*For one project reviewed, the manhours identified in the firm's fee proposal were accepted without any changes. When asked how the project manager determined what was a reasonable number of work hours for the project, the manager reported that the hours proposed by the consultant appeared reasonable based upon past experience. The project manager did not prepare an independent estimate of work hours prior to obtaining the consultant's proposal, as required by VDOT policy and federal law (for federally funded projects).*

The use of a consultant's proposal as a starting point, although saving time for the project manager, presents problems for VDOT. Consultants have a financial incentive to maximize the total work hours of a project because it increases their net fee. Negotiating a mutually acceptable number of work hours is the most direct means for VDOT to control these costs. It is, therefore, essential that the department develop its own independent view of the necessary project hours.

For some divisions there does not appear to be reliable data for use in estimating how long various tasks take to complete for different types of projects. Project managers from some divisions reported basing their estimates of hours needed for a project on their past experience or by talking informally with other staff. In other divisions, work hour standards may exist, but they are outdated, and therefore, their usefulness is limited. In contrast, other divisions have detailed data for use in identifying work hours needed. For example:

*The Structure and Bridge Division has three methods by which staff can estimate the number of work hours required to design a bridge. First, they have written guidelines which identify the hours needed for*

*the basic design work of different types of bridges, to which a capacity factor is applied for certain conditions. The data are based on in-house work hours required for the designs. Second, they have a database of work hours used for projects designed by consultants. Third, they have standards for the number of work hours needed per sheet of plan drawings.*

Several VDOT staff reported a need for more reliable, up-to-date data to use in negotiating work hours. In fact, the need for this type of information was identified in the Location and Design Division's Consultant Services Strategic Plan prepared in 1997. This division has begun requiring consultants to provide monthly reports which detail work hours expended on various tasks. The Consultant Services Section manager reported that these data would be included in the department's new financial management system and would be used in the future in estimating work hours for proposed projects. However, at this point, data have not been collected and/or compiled to enable the division to develop up-to-date work hour standards.

In addition to work hour standards for use in negotiations, a need has been identified for contract negotiation training. Such training has been an identified need for at least two years, but none has been provided. In fact, VDOT reported in a letter to consultants in December 1996 that the department planned to "improve our negotiating skills" effective immediately. However, no training was initiated to effect such a change. Given that VDOT has substantially increased its use of consultants, and as a result, has had to use VDOT staff from outside the divisions' consultant services sections to serve as project managers, it is critical that negotiation training be offered to staff.

***Recommendation (5).*** The Virginia Department of Transportation should clarify with staff the importance of preparing work hour estimates in advance of receiving consultants' fee proposals. Managers of the divisions' consultant services sections should periodically monitor the negotiations for projects to ensure work hour estimates are being prepared appropriately.

***Recommendation (6).*** The Virginia Department of Transportation should ensure that all divisions which procure consultant services develop standards for the length of time required for different types of project activities. These standards should then be periodically reviewed to ensure accuracy. Project managers should be provided with these standards and should use them in negotiating work hours with consultants.

***Recommendation (7).*** The Virginia Department of Transportation should make it a priority to institute contract negotiation training as soon as possible.

***Policy Needs to Be Developed on the Use of Limited Services Contracts.*** All of VDOT's engineering divisions now use limited services contracts in accomplishing their workload. A limited services contract is a contract for one or more services to

be performed during a specified period of time, with a cap on the total dollar amount of work that can be accomplished under the contract. For example, the Location and Design Division currently has four limited services contracts for design services, each of which covers a different portion of the State. The contracts last three years, for amounts up to a total of \$3 million each. There is no guarantee that work will be assigned to the contract. However, the consultant for each limited services contract agrees to provide the resources necessary during the contract period to provide whatever services are requested. Use of this type of contract is an integral way in which VDOT is able to accomplish its workload.

There are no VDOT guidelines for the use of limited services contracts. However, staff report that the purpose of these contracts is to provide a method of contracting out small projects and tasks that would not be cost-effective to procure as separate projects. For example, Location and Design Division staff reported that generally they try to use the design limited services contracts for jobs costing no more than \$100,000 to \$200,000 each.

While the majority of tasks assigned to the contracts are for relatively small costs, JLARC staff identified 32 pre-construction projects performed under limited services contracts during the past three years which cost more than \$300,000 each. One job procured on a Location and Design Division limited services contract cost almost \$1 million. In addition, in at least one district, large construction inspection projects are routinely placed on limited services contracts.

Use of these contracts for large jobs results in by-passing the normal VDOT procurement approval process. As previously noted, currently CTB approval is required for any contract over \$300,000, and the VDOT Commissioner's approval is required for contracts between \$150,000 and \$300,000. Final approval authority required for specific projects on a limited services contract varies by division, from a section manager in one division to a division administrator in another division.

The type of projects being assigned to the limited services contracts also needs to be scrutinized. The JLARC review found that districts are increasingly using limited services contracts to employ consultants to design secondary road projects. While use of these contracts may be the most cost-effective way to obtain consultant services for secondary road projects, it raises a fundamental question as to whether it is cost-effective to use consultants at all for these types of projects. District administrators reported to JLARC staff that they were contracting out secondary road projects due to a lack of staff, but that it was not a cost-effective practice. As discussed in Chapter II, VDOT needs to examine the outsourcing of secondary road projects and determine whether this practice should be allowed to continue.

Another concern with the use of limited services contracts pertains to the tracking of specific projects assigned to each limited services contract. Tracking of assigned projects is important to ensure that contract dollar limits are not exceeded. Problems have been encountered from improper tracking of job assignments, as the following case examples illustrate.

*In early 1998, two districts assigned work on the same Location and Design Division limited services contract, which resulted in the maximum contract amount being exceeded. VDOT had to enter into a supplemental agreement with the consultant to alleviate the problem. As a result of this problem, procedures were changed in this division so that staff must now obtain approval from an assistant division administrator before assigning a specific project to a limited services contract. A spreadsheet was also developed to better track activity on each contract.*

\* \* \*

*Traffic Engineering Division staff reported having difficulty keeping track of how much money had been spent on their first limited services contract (which ended in early 1998). In fact, based on a review of all the projects assigned to the contract, the division would have exceeded the \$500,000 contract limit by \$1,400 if the consultant had used the full amount authorized for each specific project. Division staff report that they are now tracking better the individual assignments on their current limited services contracts.*

Tracking of specific projects by districts appears to be particularly lacking. In fact, to provide data to JLARC staff concerning the projects assigned to limited services contracts, districts had to obtain this information from each consultant for which they had a limited services contract. They did not have this information readily available in-house.

In addition, sound management requires that a written agreement, such as a “letter of agreement,” be prepared for every task or project assigned to a limited services contract. However, it does not appear that this practice is routinely followed by all VDOT divisions. Specifically, not all districts develop written agreements for the tasks they assign to limited services contracts. For example, one district reported that when additional consultant construction inspection staff are needed, the district construction engineer calls the consultant to let them know how many inspection staff will be needed that month. A written agreement is not developed.

VDOT management needs to develop a formal policy on the use of limited services contracts by its divisions. The policy should identify the types of projects and tasks that are appropriate to obtain through the contracts and the maximum dollar amounts allowed for individual projects. Further, standard practices should be developed to ensure that all divisions are adequately tracking the projects assigned to each contract.

***Recommendation (8).*** **The Virginia Department of Transportation should develop a formal policy for the use of limited services contracts by its divisions. This policy should identify the conditions under which use of a limited services contract is allowed. Further, a standard mechanism for track-**

**ing individual projects assigned to a limited services contract should be developed for use by all divisions.**

***Occasional Practice of Providing Consultants the Notice to Proceed on Projects Prior to Formal Contract Approval Should Be Stopped.*** VDOT contracts with consultants take the form of a “memorandum of agreement.” As stated in the standard consultant memorandum of agreement, consultants may not be reimbursed for work performed on a project prior to VDOT formally notifying them that they can proceed with the project. This notification is supposed to take place after the memorandum is signed by all parties.

During the course of this review, JLARC staff found evidence that VDOT occasionally gives consultants the notice to proceed on a project prior to having an approved contract. For example:

*The Transportation Planning Division issued a notice to proceed in December 1997 for a project in the Hampton Roads area that was to be placed on a limited services contract. However, the limited services contract was not approved by the CTB until February 19, 1998. Further, the contract was not signed until May 1998 – after the work had already been completed for the project.*

\* \* \*

*During the period of the JLARC review, the Culpeper District was applying construction inspection work to a limited services contract that had not been executed. Documentation provided by VDOT stated that, “the contract has not been executed, but it is assumed that the Maximum Total Compensation for this work will be \$7,500,000. The Culpeper District was given permission to use these inspection services without an executed contract. [Consultant] started providing inspection services in March of 1998 and continues through this date (7/15/98) to operate without a contract.”*

In another case, in identifying the firm’s ability to meet schedules, a consultant wrote in an expression of interest submission that:

On recent engagements, [consultant], with VDOT notification, has proceeded on projects without benefit of a contract in order to meet accelerated advertisement schedules.

VDOT staff confirmed that this practice occurs occasionally in order to meet certain construction advertisement dates or to expedite a project.

These examples represent a poor business practice which should be stopped immediately. Failure to fully execute a contract prior to the beginning of a project means that VDOT lacks the legal basis for holding consultants responsible for their

performance. And technically, consultants are not supposed to be paid for work conducted prior to the contract. Further, this practice may unintentionally apply undue pressure on consultants during the consultant selection process. In some cases, consultants may feel compelled to start a project in advance of the contract since they may believe that if they do not, VDOT will hold it against them in future selection decisions. This practice, therefore, could negatively impact the integrity of the selection process.

***Recommendation (9).* The Virginia Department of Transportation should discontinue immediately the practice of issuing a notice to proceed on a project prior to having a signed memorandum of agreement. Prohibition of this practice should be clearly stated in VDOT policy.**

## MANAGEMENT OF CONSULTANT PROJECTS

The JLARC review found that VDOT project managers generally provide appropriate oversight of consultant work. In addition, VDOT appears to take necessary steps to coordinate potentially overlapping projects to ensure that work is not duplicated. However, VDOT's ability to continue to provide this oversight and coordination may be jeopardized by the expected growth of the State transportation program and the departure of experienced project management staff.

### **Oversight of Consultant Projects Is Generally Good, Although Staffing and Other Concerns Need to Be Addressed**

VDOT oversight of consultant projects appears to be generally sound, although some reasons for concern were raised. VDOT's consultant workload has increased in recent years, and as a result, concerns have been raised by staff and some local officials that the quality of consultant oversight may be declining due to excessive workloads. This review did not find conclusive evidence that the quality of the product being overseen has declined. However, the potential for this to occur exists. Given that design work can have a direct impact on the cost of construction, it is an area which needs continued monitoring. JLARC staff did identify one example of inadequate oversight – VDOT staff's failure to consistently complete consultant evaluations. Because VDOT plans to use these evaluations in the selection process, it is essential that the evaluations always be completed in a thorough and timely manner.

VDOT management has indicated that steps are being taken to address staffing issues through a redistribution of its available staff and the development of a more competitive compensation system. VDOT must address these needs to ensure its ability to continue to provide effective oversight of consultants. In addition, it should compile a standardized training manual, including guidelines for project management, for use by its staff.

***Oversight of Consultants Is Generally Sound.*** The JLARC review examined the adequacy of VDOT oversight, considering such factors as the frequency of consultant contact and whether problems resulting from poor oversight could be identified. The review indicated that VDOT's oversight of consultants is generally sound.

VDOT project managers monitor consultants through monthly project status reports, periodic plan reviews, and frequent telephone contact. Consultants interviewed for this study appeared to be satisfied with the oversight provided by VDOT project managers. They indicated that VDOT project managers maintain regular contact, often speaking with them on a daily basis.

*One consultant who had worked on several large studies said that VDOT oversight had been adequate on all projects. He felt that they had good project managers, and that oversight had been "well above average." As a result, he reported, everyone worked well together.*

The JLARC file review indicated that problems that did arise were generally resolved, and did not reveal problems that could be attributed to inadequate project oversight.

In addition to individual project managers, VDOT sometimes uses technical advisory committees to guide projects. These committees are occasionally used on complex projects to provide guidance to consultants and to make recommendations based upon the work of consultants, and may include State, local, and federal government staff. Consultants and VDOT project managers who had worked with technical advisory committees stated that these bodies are generally helpful in recommending courses of action based upon the information presented by the consultant.

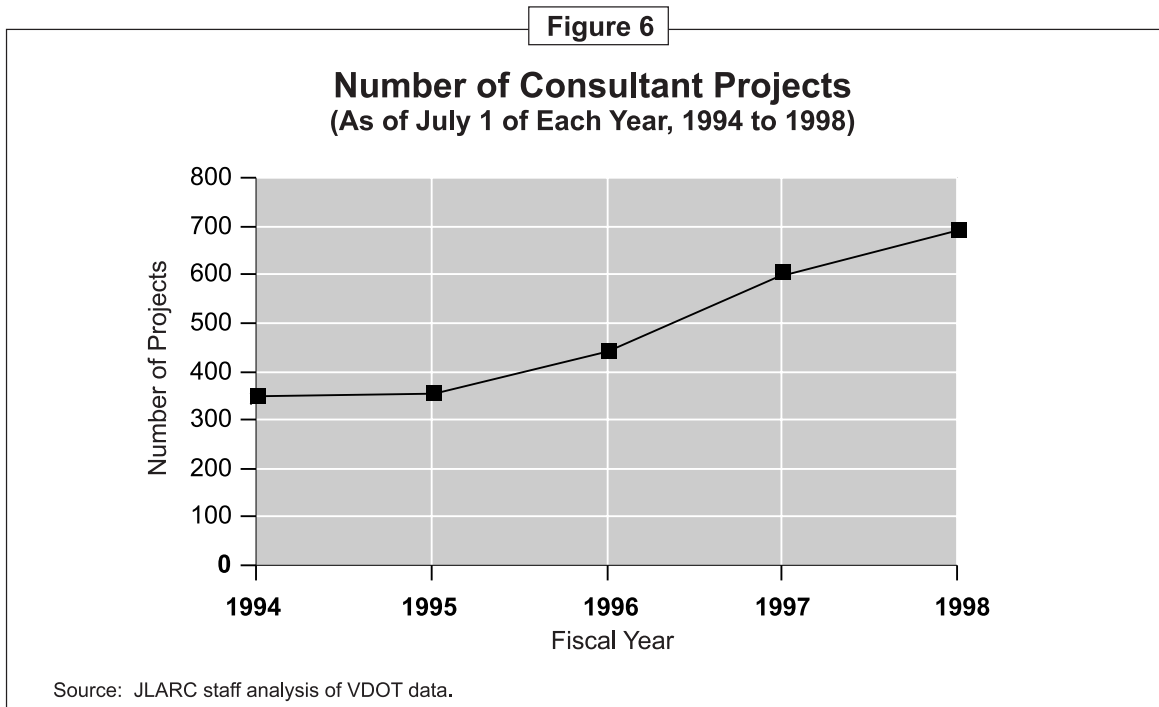
*A consultant managing a major investment study reported that the technical advisory committee for her study "worked well." She was particularly impressed by the involvement of the staff from the impacted counties.*

***Concerns Have Been Raised that Staffing for Consultant Project Management May Be Inadequate.*** As previously described, VDOT has increasingly turned to the private sector to complete its workload. Figure 6 shows the number of ongoing consultant projects as of July 1 of each year. Interviews with VDOT staff revealed concern that VDOT project managers are overseeing excessive numbers of projects as a result of this increased workload.

The Location and Design and Structure and Bridge Divisions, in particular, have seen rapid growth in the number of consultant projects for which they are responsible.

*One way that the Location and Design Division has responded to this increased workload is by spreading consultant project management work out among design staff (who are less familiar with the consult-*





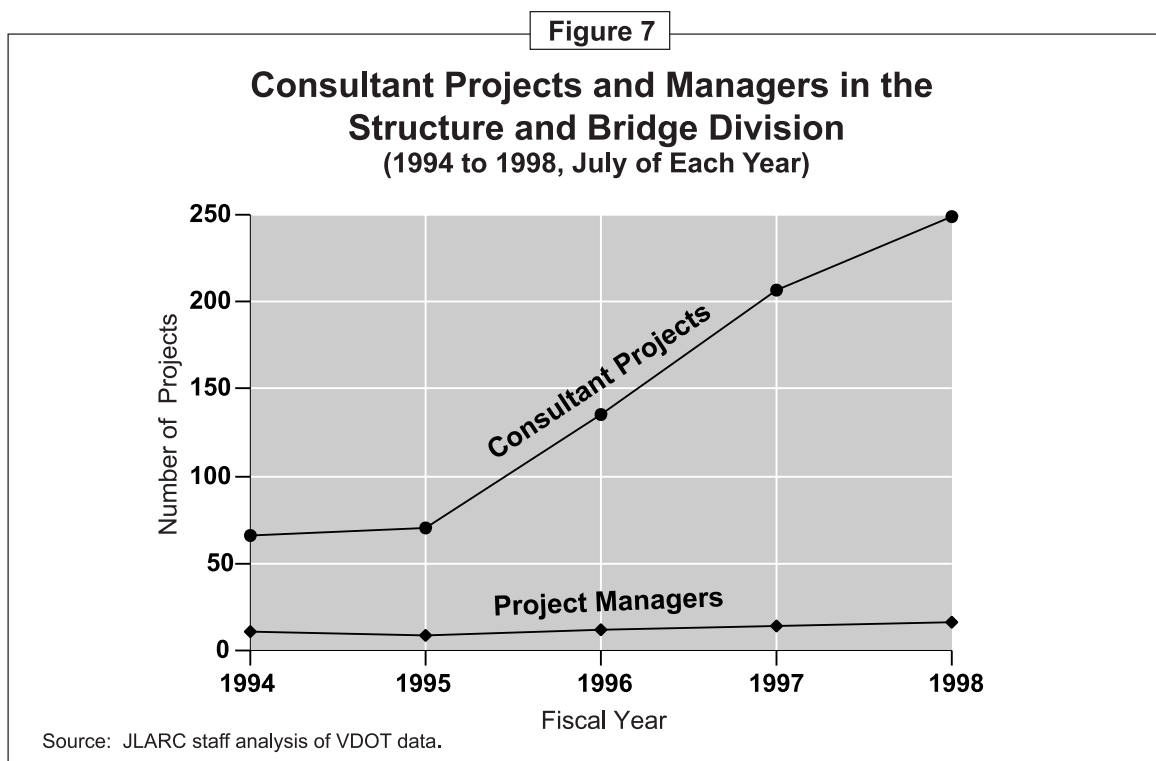
*ant management process). Despite this action, full-time consultant project managers are still overseeing an average of 18 projects valued at \$274 million. The Location and Design Division administrator said that the average number of projects assigned per project manager should be 12, based on the complexity of jobs outsourced.*

As shown in Figure 7, the Structure and Bridge Division has seen an increase in the number of projects in recent years. In contrast, the number of consultant project managers has remained relatively constant.

Staff indicate that they have generally been able to complete their work, but that they face capacity constraints. In 1997, JLARC staff surveyed Location and Design Division project managers as part of its review of the highway location process. Of the project managers who responded to the survey, 62 percent agreed that “I have more work assigned than I can handle.” Further, 75 percent disagreed with the statement “Expectations for the amount of work I perform are reasonable.”

Consultants interviewed for this study also stated that VDOT project managers appear to be overworked.

*A principal of one large consulting design firm indicated that his project managers oversee one large project or several smaller ones, but that he understood VDOT staff were generally overseeing ten to 20 projects. He said that was a level he “would not feel comfortable with.”*



*A representative of a consultants' association said that VDOT has "a staffing problem." He said that VDOT needs to increase its staffing to oversee design work. As a result of this staffing problem, he noted that project managers could be slow to respond to consultant queries.*

\* \* \*

*A consultant conducting a major investment study said that it seems that VDOT staff sometimes have too many projects. According to her, "They seem really overworked."*

***The Quality of Oversight May Be Declining as a Result of Project Management Workload.*** Although a pattern of problems could not be discerned from JLARC's review of VDOT project files, some VDOT staff indicate that excessive consultant workloads are resulting in errors and delays. Project managers reported that they are unable to perform quality checks as often as they would like to, or review consultant plans with the thoroughness that they feel they should. And, as the following case example shows, consultants' monthly vouchers are not always reviewed by all relevant divisions.

*Traffic Engineering Division staff reported that there are a number of tasks that they cannot complete because they do not have the time. This includes monitoring manhours on the traffic engineering components of Location and Design Division projects. According to Traffic*

*Engineering staff, they must show “blind trust” that the vouchers have been filled out honestly by the consultants.*

The 1997 JLARC survey of Location and Design Division project managers revealed similar concerns. The survey asked what the resulting consequences were from not having the time to adequately manage the projects assigned to them. Responses included:

I do not have the time to thoroughly field review projects which makes me dependent on the consultants’ evaluations of project conditions.

\* \* \*

Time available for quality control is limited. I do not have the time to check as much as I should – both in-house and consultant projects.

\* \* \*

The tremendous volume of assigned work results in untimely responses to consultant inquiries. This in turn can delay their progress and cause project delays.

To supplement this anecdotal evidence, JLARC examined VDOT data related to construction work orders and the Design Quality Index of projects to determine whether quality has declined as a result of improper project oversight. It was expected that if quality has declined, there would be a corresponding increase in the number of work orders issued. While no increase in the amount of work orders relative to construction workload was found, this review was largely inconclusive. Many factors limited this review, including the fact that problems resulting from inadequate consultant oversight may not become apparent for several years due to the length of time involved in the highway development process. VDOT staff indicated that because projects currently under construction were designed years ago, information related to their quality is not likely to be indicative of current oversight practices.

Similar concerns surrounded the use of Design Quality Index information to evaluate whether the quality of oversight has declined. The Design Quality Index, a measure of project quality, has only been calculated for certain projects since late 1997. As a result, VDOT has no real baseline for quality comparisons. In addition, it is difficult to determine whether “design comments” identified by the review process are truly indicative of errors. For example, construction may reveal a previously unknown situation, such as the presence of asbestos in a structure. In this case, although a construction work order would be needed, it does not necessarily indicate that an error was made or that oversight was inadequate.

Management Services Division staff indicate that VDOT plans to analyze the Design Quality Index data in the future to examine whether design comments are

indicative of true errors, or whether they result from situations beyond the control of the project staff. They have not yet begun this process, however.

Despite the limitations of the aggregate data, specific comments contained in the Design Quality Index reports indicate that there is reason for concern. Some of the design comments included:

General notes and plan sheets are in conflict. Plan sheets show planting trees in clear zone and underneath utilities. General notes state to avoid this.

\* \* \*

Pavement marking plan not included in project plans. Sign plans did not match up with roadway plans. Summary plan sheets for pay items were in error – especially for drainage structures.

These comments indicate that mistakes are possibly not being caught by project managers responsible for reviewing plans.

Another possible indicator of staffing problems is that required consultant performance evaluations are not being consistently completed by project managers. Although evaluations of consultants are to be completed by project managers every six months, the JLARC file review indicated that this does not always occur. In fact, VDOT staff managers were unsure how regularly evaluations are completed because that information is not monitored. Interviews with consultants indicate that evaluations are not being completed as they should be, as the following case examples show.

*One consultant project manager said that he had received one six-month evaluation in the three years he had been working on a VDOT study. Because VDOT policy requires an evaluation to be completed every six months, he should have received six.*

\* \* \*

*Another consultant for a large engineering firm said that he has only received two evaluations (on the same project) out of the seven projects he had worked on. According to the consultant, they may have been done, but he had not seen them to sign off on them, as VDOT requires.*

Examination of VDOT data confirmed that evaluations appear to have been neglected. A VDOT database of consultant evaluations contained approximately 440 entries since the current evaluation process began in late 1996. Considering that VDOT had at least 600 ongoing consultant projects at any one time during that period, and that three evaluation periods would have occurred within that time span, at least 1,800 evaluations should have been completed. Because VDOT plans to use past evaluations

in the consultant selection process, it is very important that VDOT staff always complete consultant evaluations and provide them to consultants in a timely manner.

***Recommendation (10).*** The Virginia Department of Transportation should ensure that staff in all relevant divisions review vouchers for consultant projects and complete consultant evaluations on all projects every six months. If the department has insufficient staffing for these oversight activities, it should submit an appropriate request for positions to the 1999 General Assembly.

***Recommendation (11).*** The Virginia Department of Transportation should implement its plan to evaluate design comments identified through the Design Quality Index review, identify causes of plan errors, and take appropriate corrective actions. Information from this review should be used in further examining staffing concerns.

***Projects to Be Outsourced Are Backlogged.*** Excessive VDOT staff workloads may also be resulting in a backlog of projects to be sent out to consultants. JLARC staff identified 35 design projects from last year's Six Year Improvement Plan for which a consultant contract had yet to be developed as of August 10, 1998. VDOT had not even advertised for a consultant for 22 of these projects. Local officials indicated that they understood that projects were often delayed because VDOT staff were overworked, as shown by the following case studies:

*A city official voiced his frustrations concerning an urban project that had been delayed. He said that it took VDOT approximately one year to secure a consultant following the completion of survey work. He said that VDOT staff told him that the early retirements had left them "gutted" and unable to procure consultants in a timely fashion.*

\* \* \*

*One city official said that an urban project had been delayed, despite its inclusion in the previous year's Six Year Plan. He said that there had been "extensive" delays in getting the RFP out. The pre-scoping meeting was held in January, and responses to the RFP were due in June. As of August, a consultant had not yet been selected. He understood that the delay resulted from VDOT being behind in its procurement work.*

\* \* \*

*A county official cited a project that went into the Six Year Plan in 1994 to improve a major North/South urban route. Although the county identified it as one of the most critical bottlenecks in the area, it was not treated as a priority, and the procurement process alone took approximately one year. In the meantime, a design project is un-*

*derway to reconstruct an Interstate that parallels the urban route. As a result of the delays, both roads will be under construction at the same time, even though they are designated as alternatives to one another. She said that the result will be tremendous congestion in the area. Her understanding was that the delays were due to VDOT outsourcing so much work that it could not get projects out quickly at its current staffing level.*

Although these delays are problematic, it is unlikely that the department's current project management staff could adequately oversee these projects if they were to be outsourced more quickly. This is a particular concern given the evidence that the quality of VDOT oversight may already be declining as a result of overextended project managers.

***VDOT's Consultant Workload Is Expected to Increase.*** Two factors indicate that VDOT project management workloads will grow in the future. The size of the transportation program is expected to increase dramatically as a result of the recently passed 1998 Transportation Equity Act for the 21st Century (TEA-21). At the same time, VDOT expects to continue to lose staff to retirement and the private sector.

TEA-21 will provide approximately \$671.7 million for transportation improvement projects for each of the next six years – an average yearly increase of more than \$250 million from the previous six years. As a result of this increased level of funding, VDOT's program, and level of consultant use, will undoubtedly increase in coming years. If much of the additional workload is outsourced, additional staff will likely be needed to adequately oversee the consultants' work.

However, while VDOT's workload is increasing, VDOT will likely lose a number of its most experienced staff to retirement in the near future. Analysis of data provided by the Department of Personnel and Training indicates that 867 of VDOT's 2,954 engineers (30 percent) have 25 years or more experience with the State, and may be expected to retire within the next five years. Those staff in the "Transportation Engineer" class with 25 or more years experience currently account for 55 percent of the total years experience of the class. Staff with 25 or more years of experience in the "Transportation Engineer, Senior" class account for more than 65 percent of the total years experience of the class. "Transportation Engineering Program Supervisors" with 25 or more years experience account for 80 percent of the years experience of that job class. Because the staff who take over these positions will have less experience than the retirees, these conditions will serve to exacerbate workload concerns currently facing VDOT.

In addition to retirement, VDOT continues to lose experienced staff to consulting firms. The trend toward outsourcing is a national one. As states, including Virginia, have hired more consultant engineers, the private-sector firms have hired additional staff. They often turn to state departments of transportation for experienced staff who may be lured away by the higher salaries of the private sector.

*The head of traffic and transportation related projects for a large consultant engineering firm said that consultants are looking for the expertise that the VDOT staff offer. He said that this is especially true for some of the smaller consultants, who need that "edge."*

VDOT also faces increased competition in the labor market from localities. As the localities have grown and increased the size of their departments of public works and transportation, they have begun to compete with VDOT for staff.

*One district administrator said, "VDOT is becoming a revolving door." He said he had lost a "good, young L&D engineer" to a nearby city for a position that paid \$10,000 more a year. VDOT could not compete with that, and the department lost someone who "would have been a great long-term asset for VDOT."*

VDOT staff and consultants interviewed for this review expressed the belief that VDOT will continue to lose staff to other employers. A continued loss of experienced staff will likely result in a worsening of VDOT's workload situation.

***Although VDOT Has Taken Initial Steps to Address Staffing Issues, It Must Monitor Their Efficacy.*** VDOT management has taken steps which it believes will begin to address its staffing issues. These steps include a recent redistribution of positions to increase staffing levels in its pre-construction divisions and the development of a competency-based reward system for managing its human resources.

During the spring of 1998, VDOT management reexamined its agency priorities and compared them to its staffing levels across the agency. Based on this review, VDOT reallocated its current positions to divisions using the VDOT Mission and Strategic Outcome Areas as the driver of the process. The resulting redistribution placed the highest priority for increasing staff on five areas, including the Location and Design and Structure and Bridge Divisions. As of July 1, 1998, VDOT increased the number of positions in Location and Design from 601 to 646, including approximately 20 project manager positions; and the Structure and Bridge staffing level increased from 289 to 320, including approximately 20 project manager positions.

A tool that VDOT hopes will address the problem of staff retention is the Competency Based System (CBS) currently being developed. The CBS, which must be approved by the Department of Personnel and Training (DPT), will integrate human resources functions, such as performance planning, individual career management, and staff compensation and recognition.

One of the key features of the CBS is the use of employees' competency levels to determine compensation levels within broad pay bands, as opposed to the traditional State pay grade system. These pay bands have been developed based on market salary surveys, and allow the department to reward strong individual performance. The implementation of CBS will not function as a general regrade. Rather, compensa-

tion will be determined in part by an individual's performance. Therefore, the salaries of "high performers" likely would increase, up to a cap of ten percent of annual salary per cycle.

VDOT staff report that DPT's approval of the CBS is expected in the fall of this year, with implementation for the approximately 650 design engineers occurring during December 1998. The first changes in compensation levels resulting from the use of the CBS would occur in June 1999.

Although these steps appear to be appropriate, it is too early to determine whether they will fully address VDOT's staffing issues. For example, it is unclear if the CBS will improve VDOT's ability to retain staff. Several VDOT staff members recounted examples of VDOT engineers receiving job offers from consultants that increased their salaries by 15 or 20 percent. If VDOT salary increases are capped at ten percent, it is unclear whether adequate incentives will be provided for staff not to seek positions with consulting firms.

Following implementation of these initiatives, VDOT should review their effectiveness to determine whether they adequately address VDOT's staffing problems. This review is critical considering the increased amount of federal transportation funding that the State will receive as a result of TEA-21. This increased funding will result in an increased workload. Project oversight will likely worsen if VDOT faces this increased workload with less experienced staff.

***Recommendation (12).*** **The Virginia Department of Transportation should report to the House Appropriations and Senate Finance Committees prior to November 1, 1999, on the impact of the recent staffing changes and progress of the Competency Based System, and whether those changes adequately address its staffing and compensation problems.**

***VDOT Lacks a Detailed Training Plan and Policies Manual.*** Because of the growth in VDOT's workload and loss of experienced staff, it is essential that staff receive guidance in the form of training and a comprehensive policies manual. VDOT managers recognize the need for such a resource. For example, development of a training manual has been in the Location and Design Consultant Services Section's Strategic Plan for two years, but has not yet been completed because of time constraints. The Structure and Bridge Division has its own manual, but this manual is not used by other divisions.

VDOT is currently revising its draft "Guidelines for the Procurement and Management of Professional Services" manual issued in May 1997. However, the first draft appears still to lack necessary detail in its guidelines for project oversight. For example, the guidelines in the draft manual indicate that VDOT project managers should "maintain project files and satisfy the requirements for record keeping, filing, and reporting." However, the manual does not provide detailed information regarding what those requirements are. Similarly, the manual advises that project managers



should “provide liaison with consultants in preliminary stage, design stage and during construction” without providing guidelines for appropriate frequency or means of contact.

As a result, the JLARC review identified inconsistencies across divisions concerning consultant oversight. For example, some project managers remain unclear on guidelines for completing evaluations, as is shown by the following case study.

*A manager of a consultant design project said that she had not completed an evaluation because she had been told she did not have to complete evaluations for projects assigned to limited services contracts. She said that she wished she could have completed an evaluation because the consultant had done good work, and she wanted the consultant to be recognized. In fact, however, VDOT policy does require that six-month evaluations be completed for all consultants, including those used under limited services contracts.*

General guidance on issues such as this has typically been provided through email to staff as problems arise. Beyond that, individual divisions have addressed training needs and the development of written procedures on their own. The Environmental Division recently developed its own written guidelines which provide a detailed guide to the procurement of consultants. However, as with the draft agency manual, the division manual lacks detailed information concerning project management. VDOT needs to develop an agency-wide training plan and a comprehensive policies manual which identifies explicitly the expectations regarding project management. This is particularly important now given the level of staff turnover that has occurred and is expected and the plan to hire additional staff.

***Recommendation (13).* The Virginia Department of Transportation should develop a training plan and policies manual for staff consultant project managers to provide detailed guidelines for project oversight.**

### **Coordination of Projects Occurs, Although More Formal Mechanisms Are Needed to Ensure Coordination in the Future**

A key concern cited by the study mandate was whether VDOT was adequately coordinating consultant projects. Based on the project file review and interviews with VDOT staff and consultants, it appears that VDOT project managers generally keep consultants informed of potentially relevant or overlapping studies and take steps to coordinate their efforts. However, the ability of VDOT to continue to do so may be threatened by the department’s loss of institutional knowledge, its lack of a system or process for preserving and sharing that information, and the absence of formal models for coordination efforts.

***Overlapping Consultant Projects Have Been Adequately Coordinated.*** To examine the project coordination issue, JLARC staff reviewed the files for projects

in close proximity to each other, where the need for coordination might be expected. A sample of projects within four localities was selected. If projects or studies appeared to overlap, JLARC staff examined whether VDOT project managers held periodic meetings or shared status reports across projects to ensure coordination of efforts. In addition, JLARC staff interviewed representatives of local governments, VDOT staff, and consultants associated with some of those projects to determine the level of coordination needed and whether it was provided. This review indicates that VDOT has generally done a good job of ensuring that potentially overlapping projects and studies are coordinated.

Consultants and VDOT staff reported that information on relevant current and past studies and projects is generally provided to consultants prior to submission of an expression of interest and is made available by VDOT in a timely manner. VDOT also reviews this information with the consultant as part of the project scoping process which determines project limits and requirements. Consultants stated that although they conduct their own research to supplement the information provided by VDOT, they rely on the department's institutional knowledge of previous studies and projects to ensure that work is not duplicated.

Several cases were identified by JLARC staff that appear to confirm that studies and projects are coordinated:

*A large project to improve Route 58 was broken into six projects that were designed by different consultant firms. VDOT staff had to coordinate the efforts of these firms to ensure that designs were compatible and completed at the same time. As a result of these efforts, only one public hearing was needed for the entire project. According to those interviewed by JLARC staff, this coordination saved time and money, and made the public involvement process more customer-friendly. District staff and consultants involved in the process reported that the designs were well coordinated and will result in a better product.*

\* \* \*

*Plans are underway to improve the 325-mile section of Interstate 81 that extends from the Virginia-Tennessee border near Bristol to the Virginia-West Virginia state line. To complete this massive project, seven consulting firms are conducting ten separate studies. In addition, two previously designed construction projects are currently under way near Bristol and Christiansburg. All phases of this work are being coordinated by VDOT staff to ensure compatibility. A steering committee meets regularly to ensure that all projects are coordinated.*

\* \* \*

*One consultant reported working on a location study that was in the vicinity of several other VDOT studies. He said that they had participated in meetings and had follow-up discussions concerning planning forecasts for current projects to ensure that traffic forecasts for all projects were consistent.*

\* \* \*

*A consultant reported working on an urban feasibility study that had to be coordinated with another study in the area. The consultant said that the study teams shared information such as vehicle travel times and vehicle occupancy rates to avoid duplicating work and ensure that they worked from the same assumptions. The consultant conducting the feasibility study also had to incorporate interchanges into his study that had already been developed by the other study team and accepted by VDOT. He had to make sure that his recommendations did not conflict with those plans that had already been developed.*

These case studies demonstrate that VDOT staff and consultants generally appear to recognize the importance of coordinating studies.

***VDOT Lacks Formal Models for Project Coordination.*** Although JLARC staff identified several examples in which VDOT took steps to coordinate neighboring projects, these efforts were not indicative of a department-wide strategy. Rather, they were largely *ad hoc* undertakings that resulted from the initiative of individual VDOT staff. Allowing coordination efforts to continue to develop on an *ad hoc* basis is problematic given the loss of experienced staff and the subsequent addition of new staff who may not recognize the need for coordination or understand how to go about coordinating projects.

*One local official cited an effective coordination effort in his county, but questioned whether it could happen again. He explained that the coordination was largely the result of one person's efforts, and that person had since left VDOT to work for a consultant. The local official's perception was that VDOT project managers are currently too overworked to initiate such a large effort because of the additional work it may generate.*

To ensure that necessary coordination takes place, VDOT must develop guidelines and identify appropriate models for project coordination, which should be incorporated into the previously recommended project management training manual. One possible model for coordination, the Gainesville Area Studies and Projects (GASP), is described below. A more detailed description of GASP is included in Appendix C.

*In May 1997, VDOT established the Gainesville Area Studies and Projects (GASP) to share information among several studies ongoing*

*in the area. The main purpose was to ensure that study teams were aware of the corridors that were being examined by other studies, so that they could identify possibilities for cooperation. For example, two projects might be able to share right of way or overpasses. The GASP coordinator periodically collected updates from each project manager, organized them into a report, and sent the report to local officials, project managers, and other involved parties.*

*Although GASP was generally considered effective by VDOT staff and consultants, several citizens voiced concerns that coordination efforts were not apparent. These concerns may have been addressed through earlier implementation of the GASP and inclusion of an enforcement mechanism to ensure that information was shared. Despite these limitations, GASP still demonstrates an approach that VDOT should consider formally refining and adopting as a model for the coordination of overlapping studies and projects.*

Although the results of GASP were mixed, they indicate an effort by VDOT staff to coordinate potentially overlapping projects and studies. As demonstrated by the examples of project coordination that were identified in the previous section, VDOT staff have employed varied approaches to project management. VDOT should examine these approaches to develop formal models for coordinating potentially overlapping studies.

***Recommendation (14).*** **The Virginia Department of Transportation should develop formal models for coordinating potentially overlapping studies and projects. The models should include standards to allow for coordination efforts to begin at the earliest possible stage, allow for effective coordination of the public involvement process, and include a mechanism to ensure that conflicts are addressed. These models should be incorporated into the agency project management manual.**

***VDOT Continues to Lose Institutional Knowledge Because of Staff Departures.*** VDOT staff almost universally expressed concern regarding the departure of a significant number of employees and the resulting loss of institutional knowledge. This loss of experience is problematic, as consultants and local officials reported that much of their information concerning other studies and projects results from VDOT staff's institutional knowledge.

From FY 1995 to FY 1998, VDOT lost 797 staff, representing 10,426 years of service, due to employee separations. In particular, many of the most experienced VDOT staff left in 1995 as a result of the Workforce Transition Act. Other staff have since left VDOT to work for consultants. For example, the Structure and Bridge Division lost four of its 24 design staff to consultants during the course of this study.

***VDOT Lacks a System for Preserving and Sharing Information Concerning Previous Studies and Projects.*** As previously noted, VDOT staff and con-

sultants indicate that information concerning relevant past and current studies and projects is provided to consultants at the earliest stages of project development. However, VDOT staff indicated that they rely on the institutional knowledge of staff, not a system or process, for this information. As one district administrator said:

We don't have a system to provide that historical view. If staff walks out the door, we lose that institutional knowledge.

While information on current projects can be gleaned from VDOT's Six Year Plan, VDOT's information systems do not provide a means for identifying and sharing information related to previous studies and projects. Hence, information concerning relevant studies may not always be shared among VDOT divisions, as the following case example demonstrates.

*A VDOT central office staff member stated that one district had conducted a study to evaluate traffic sensors. The staff person said that this was valuable information with general application. However, the staff person just happened to hear about it at a meeting.*

If VDOT had a system in place which provided information on past studies and projects, staff would not have to rely on happenstance to learn about relevant projects.

It appears that VDOT staff recognize the importance of identifying previously completed work that has relevance to current studies or projects because it may allow VDOT to avoid duplicating work. For example:

*One district administrator said that project managers manually review the files from previous projects. Through such a review, district staff identified a previous environmental document that provided wetlands information for a current study.*

However, such review appears to be informal and time-consuming. Project managers more typically consult senior staff or review VDOT's Six Year Plan. As VDOT loses experienced staff, the potential for not properly identifying relevant studies and projects increases.

To alleviate this problem, VDOT needs to develop a system or process for preserving and accessing this information. For example, if project data were compiled in a geographic information system (GIS) or searchable database, a project manager could access all studies and projects completed in a specific area over a certain period of time. Such a system would ensure that all relevant past and current studies and projects are identified and evaluated for use in current projects. Further, it would save staff time spent researching the existence of relevant studies and projects.

***Recommendation (15). The Virginia Department of Transportation should develop and implement a system or process to preserve and identify***

**historical project information for use in coordinating department projects and avoiding duplication of efforts.****OVERALL MANAGEMENT OF CONSULTANT PROCESSES**

Although VDOT's management of consultant projects generally appears to be appropriate, the department's approach to the management of consultants lacks consistency across divisions. VDOT has taken steps to ensure consistency in its procurement process, implementing many changes in recent years. The same level of consistency needs to be applied to the management process once the consultants have been procured. At present, such a consistent approach appears to be absent.

**Divisions "Reinvent" Consultant Processes**

Because VDOT lacks consistent standards for overseeing consultants, divisions often waste efforts reinventing or refining processes that have been well developed in other divisions. Many of the practices of individual divisions appear to be transferable to other divisions. Yet, these "best practices" are not shared across the department. For example:

*As previously reported, several divisions have had trouble tracking assignments to limited services contracts. The Location and Design Consultant Services Section has since developed a spreadsheet which tracks relevant information concerning each assignment, as well as the extent to which the consultant is meeting its Disadvantaged Business Enterprises contractual obligations. Other divisions could benefit from the use of this spreadsheet. To date, most divisions had difficulty in managing their limited services contracts and have independently developed ways to address the problems.*

\* \* \*

*The Structure and Bridge Division uses a detailed checklist to identify project milestones and when they were completed. This system, however, has not been adopted by other divisions.*

Instead of staff spending time developing their own processes and procedures, staff could better spend their time on consultant oversight activities.

**VDOT Needs to Enforce Department-wide Consulting Standards and Practices**

The concerns mentioned in the previous sections, as well as in Chapter II, point out the need for VDOT to create a central authority to establish department-wide

standards for managing and tracking consultants. VDOT currently has a Consultant Coordinating Committee which is made up of representatives from each division that uses consultants. It is co-chaired by the consultant services section managers for the Location and Design and Structure and Bridge Divisions. The Consultant Coordinating Committee currently serves as a central source of information concerning consultant policies; however, one of the co-chairs of the committee indicated that the group did not have the authority to ensure that its recommendations and guidelines were followed. Further, it has tended to respond to issues as they arise, rather than being proactive in developing systematic policies and procedures for consultant use. One reason for this may be that serving on the committee is essentially secondary to the primary responsibilities within their own divisions. VDOT needs an improved mechanism for ensuring consistency in the management and oversight of consultant use.

There are different ways in which VDOT could address this need. It may wish to strengthen the Consultant Coordinating Committee, giving it the authority to set policies for the department's management of the consultant process. Or, it may wish to create a new position to act as an assistant to the Chief Engineer concerning consultant matters. Whichever alternative VDOT should choose, it must ensure that the entity has experience with engineering and management issues, and has the ability to develop policies for consulting department-wide. This central authority should track timeliness of consultant work, develop and conduct in-house management and negotiation training, and serve to disseminate information across divisions concerning "best management practices." This entity should also be responsible for maintaining an up-to-date manual of all consultant management policies.

***Recommendation (16).*** The Virginia Department of Transportation should develop a mechanism to ensure consistency in division management practices regarding consultant use. Among the options which VDOT may want to consider are an assistant to the Chief Engineer or a strengthened Consultant Coordinating Committee.

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## Appendixes

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## Appendix A

### House Joint Resolution No. 263 1998 Session

#### **Requesting the Joint Legislative Audit and Review Commission to study the use of consultants by the Virginia Department of Transportation.**

WHEREAS, in considering possible locations for the construction of highways and related facilities, the department of Transportation (the Department) not infrequently contracts for the services of consultants; and

WHEREAS, the use of consultants in such a role is not, of itself, inappropriate or objectionable; and

WHEREAS, it is, however, highly desirable, in the interest of economy, efficiency, prudent management, and responsible stewardship of public revenues, that certain conditions and limitations be observed in the Department's contracting for the services of consultants in such matters; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Joint Legislative Audit and Review Commission (JLARC) be requested to study the use of consultants by the Virginia Department of Transportation. In conducting its study, JLARC shall consider how best to (i) ensure that consultants are not hired repeatedly to study the same or substantially similar issues; (ii) require that, prior to their entering into a contract with the Department, consultants demonstrate a knowledge of studies that have already been done on the same or substantially similar issues; and (iii) be certain that, if consultants make a recommendation contrary to that reached by an earlier study of the same or substantially similar issues, clear and cogent reasons are supplied for any such recommendation. JLARC shall submit other findings and recommendations related to the Department's use of consultants as JLARC deems appropriate.

The Joint Legislative and Audit Review Commission shall complete its work in time to submit its findings and recommendations to the Governor and the 1999 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

## **Appendix B**

### **Selection of Projects for Case Study File Reviews**

JLARC staff conducted case study file reviews for a range of VDOT consultant projects. There were multiple purposes for the file reviews, and as such, separate samples were selected to best address those varying purposes. In practice, all of the files were reviewed for relevance to all of the issues; however, each sample was predominately targeted toward addressing one or two issues or potential problem areas.

#### **Addressing the Necessity of Consultant Projects**

One of the selected samples targeted the issue of whether all the consultant studies are necessary. To select this sample of files for review, JLARC staff focused only on consultant studies, not actual engineering design projects. This decision was based on the assumption that it is unlikely that VDOT would actually build a road that did not need to be built, given all the road construction needs in the State. However, the assumption was that the department might agree to a less expensive study, for example to “show” a small group of concerned citizens that they were “taking action” on the citizens’ concerns.

The VDOT engineering divisions that conduct studies are: Transportation Planning, Location and Design, Environmental Quality, and Traffic Engineering. JLARC staff reviewed data from the Consultant Tracking Information System (CTIS) for the past three years and identified all the projects which appeared to be study-related. The sample was drawn from studies conducted during the past three fiscal years since the use of consultants by VDOT increased substantially during this time. Sixty-one contracts for consultant studies were identified.

Based on a target of reviewing 20 files, staff identified the number of files to be reviewed in each division largely based on the proportion of all studies conducted by each division. For the Location and Design and Environmental Quality Divisions, the studies could be classified into different types. For example, one type of study is a location study, which identifies and assesses possible alternative locations for a new road. To ensure that the range of studies was reviewed, JLARC staff selected the projects from these divisions based on type. The specific studies within each type were selected to provide diversity in roadways examined. In contrast to these divisions, all Transportation Planning Division studies were functionally similar. Since the type of project was not relevant, every third project was selected for review. Because there were only two Traffic Engineering studies during the time period, both of these projects were reviewed.

Figure 1 identifies the number of consultant studies overseen by each division during the past three years as well as the number of files reviewed. In addition to the studies identified in Figure 1, the most recent Structure and Bridge Division study (from 1995) was selected for review. In total, 21 studies were reviewed.

**Figure 1**

<b>Consultant Studies Reviewed FYs 1996 to 1998</b>		
<b>Division and Type of Study</b>	<b>Total Number of Studies (Percent of Total)</b>	<b>Number of Studies Reviewed</b>
<b>Location and Design</b>	28 (46%)	9
Location	16	4
Constructability	9	2
Feasibility	3	3
<b>Environmental Quality</b>	17 (28%)	5
Cultural Resources	6*	2
Wetlands	3*	1
Air Quality Conformity	2*	1
Miscellaneous	6	1
<b>Transportation Planning</b>	14 (23%)	4
<b>Traffic Engineering</b>	2 (3%)	2

\*Represents the number of limited services contracts.  
Source: JLARC staff analysis of VDOT Consultant Tracking Information System data.

### **Addressing Overlapping Projects**

Another file review was conducted to determine whether VDOT projects ever overlap, and if so, how well VDOT coordinates those projects and shares information. This review also examined how well VDOT oversees consultant work. Certain assumptions guided the team in generating the sample of files to be reviewed. First, it was assumed that the sample should be regionally diverse to represent the areas served by VDOT. Second, it was assumed that areas with a greater number of projects would be at a higher risk for having overlapping projects. Finally, it was assumed that the sample had to be of a manageable size, given the time limitations of the JLARC study.

To select the sample, VDOT provided JLARC staff with a dataset which included the following information for all preliminary engineering projects conducted during the past ten years:

- division code,
- project number,
- whether the work was done in-house or outsourced,
- the date of last charge, and
- the amount or cost charged during the past ten years.

To allow for sorting of projects by region, the project number (a fifteen-digit “smart” code), was broken into its components:

- county,
- route,
- location,
- section, and
- job number.

The mean project value was \$49,971.08. To focus on large projects, which should have a greater chance of overlapping with other projects, JLARC staff eliminated from consideration those projects with a value less than the mean. The resulting subset of projects was sorted by locality.

Certain assumptions about the data had to be made. The dataset represented projects that had charges within the past ten years, meaning that only projects incurring charges over \$49,971.08 in that ten-year window would be included in the sample to select the localities. For example, a large project that only incurred small charges at the end of the ten-year period might be eliminated from the sample. It was assumed that this was not a problem because those projects would have had only a small window of opportunity to overlap with other projects.

A similar situation could result from large recent projects that have not yet incurred charges over \$49,971.08. This situation was also not considered a problem. Although they could have the potential to overlap with other projects in the future, it is unlikely that the files on a recent project would yet document overlap or how well VDOT had managed it.

JLARC staff selected one locality from each of the top four VDOT districts (in terms of transportation expenditures) for further review. From each of the four districts, JLARC staff selected the city or county with the greatest number of higher cost projects (both in-house and outsourced) over the past ten years. The selected cities and counties are shown in Figure 2.

Next, JLARC staff took a subset of the data containing all active projects during the past five years (July 1, 1993 to present). The team then selected the project at the midpoint of the listing for each locality. (The project listing was sorted by project code.) Based on location data for all the projects, the other projects which were within

**Figure 2**

**Localities Selected for Review**

<b>City/County</b>	<b>District</b>	<b>Number of Higher Cost Projects</b>
Fairfax County	Northern Virginia	355
City of Norfolk	Suffolk	131
Chesterfield County	Richmond	145
Roanoke City	Salem	47

Source: JLARC staff analysis of data provided by VDOT for all localities.

a two-mile radius to the selected project were also reviewed. In addition to these files, the project team reviewed the files of projects that, during the course of the study, were identified as problem cases. Based on this selection process, files from 23 projects were reviewed.

## Appendix C

### Case Study: Gainesville Area Studies and Projects (GASP)

In 1997, VDOT established the Gainesville Area Studies and Projects (GASP) to coordinate the large number of transportation efforts ongoing in the area. GASP generally served as an effective means of coordinating among consultants, project staff, local officials, and citizens. Coordinating with citizens was essential because several of the studies, particularly the Manassas Rail Alignment Improvement Study, generated a great deal of controversy.

Although GASP was generally effective, opportunities for improving coordination efforts exist. GASP should have been implemented at an earlier stage, should have provided a mechanism to ensure coordination, and should have more effectively managed the public involvement process. However, GASP still demonstrates an approach that VDOT should consider formally refining and adopting as a model for the coordination of overlapping studies and projects.

**Coordination Was Needed in the Gainesville Area Because of the Level of Diverse Transportation Activity.** The GASP updates were necessitated by a unique situation involving a large number of transportation studies and projects in and around the town of Gainesville. From 1995 to the present, four major studies and one construction project were under way, utilizing staff from different consulting firms, VDOT, and the Virginia Department of Rail and Public Transportation (VDRPT). The need for coordination among the four studies was great, as each had a different purpose, was at a different stage in the transportation planning process, and faced different time horizons. A summary of the major efforts under way at the time is included in the table.

**GASP Generally Provided an Effective Means of Sharing Information Among Interested Parties.** GASP grew out of informal efforts that began in the spring of 1996. On March 12, 1996, the VDRPT project manager of the I-66 MIS organized a meeting with State and consultant personnel working on the Western Transportation Corridor Study, the Route 29 Corridor Study (which was later incorporated into the I-66 MIS), and the Manassas Rail Alignment Improvement Study. The agenda for this meeting of the “Gainesville Area Major Studies” indicated that the purpose of the meeting was “to assure coordination of four major studies in the Gainesville/Haymarket area.”

Each project manager presented a briefing, including maps showing alignments under consideration. In addition, time was allotted to “discuss major issues of concern to each study that related to the area.” The agenda also included time for a “moderated discussion to identify overlaps, conflicts, and coordination opportunities” among the studies. During this portion of the meeting, traffic models to be utilized by the studies were also discussed. A follow-up meeting was held, and information was shared informally throughout the following months.

<b>Study/Project</b>	<b>Type</b>	<b>Purpose</b>	<b>Timeline</b>	<b>Responsible Agency</b>
Western Transportation Corridor Study (WTCS)	Corridor Study	Identify transportation demands in the western portion of the Northern Virginia region in the 2020 timeframe and propose solutions to meet those needs	1995 - 1997	VDOT
Manassas Rail Alignment Improvement Study	Feasibility Study	Analyze various options to relieve highway congestion caused by Norfolk-Southern Railway operations in the City of Manassas; additionally consider the expansion of VRE commuter rail service to the northwest of Manassas	1995 - 1997	VDOT
Interstate 66 Major Investment Study (I-66 MIS)	Major Investment Study	Develop regional consensus on a transportation investment strategy for the I-66 corridor	1995 - Present	VDRPT
Route 29 Corridor Study	Corridor Study	Identify and evaluate Route 29 improvements and alignment options between Warrenton and Centreville	Folded into the I-66 MIS	VDOT
Interstate 66 HOV (I-66 HOV)	Construction Project/ Preliminary Engineering	Construction of HOV lanes from Route 234 to Gainesville; conduct preliminary engineering and develop engineered concept drawings for a new I-66 interchange with US 29 at Gainesville	Under Development	VDOT

During this time, conversations between local officials, the public, and VDOT staff concerning the studies in the area indicated that a more formal means of coordination was necessary. On May 13, 1997, the Northern Virginia District Administrator contacted supervisors and mayors in the areas affected by these studies to announce the formation of GASP.

The GASP did not function as a formal committee, but provided a periodic update to interested parties, including members of the General Assembly and the Commonwealth

Transportation Board, county supervisors and staff, mayors, and project staff. A Northern Virginia District staff person served as coordinator of GASP. He collected updates from the manager of each project, organized them into a report, and sent them to local officials, project managers, and other involved parties. He also helped to develop a consolidated mailing list of about 1,800 names from the individual lists maintained by each project manager. This consolidated mailing list allowed VDOT to ensure it communicated with citizens in a cohesive way.

According to the coordinator of GASP, its purpose was to provide information and share data. The main priority was to ensure that study teams were aware of the corridors that were being examined by other studies, so that they could be aware of possibilities for cooperation. For example, two projects might be able to share right of way or overpasses. Maps that showed all corridors being studied were developed, which allowed the public to better understand all of the studies. VDOT and consultant staff indicated that these updates were very helpful. Conflicts between the use of the I-66 corridor in the Rail Alignment study and the I-66 MIS were identified, as were possible conflicts at the I-66/Route 29 interchange. These updates continued until most of the studies were completed. The GASP is currently inactive.

**Coordination Was Essential Due to Unexpected Citizen Opposition to the Manassas Rail Alignment Improvement Study.** The Rail Alignment study in particular required effective coordination because of the unexpected amount of controversy that it generated in the area. Although VDOT and VDRPT staff did not expect it to be a controversial study, it generated a great deal of public outcry.

The purpose of the study was to evaluate alternatives for resolving traffic congestion that resulted from a curve in the existing railway within the City of Manassas. This sharp curve forced trains to slow to a maximum speed of ten miles-per-hour through the area. The situation was exacerbated by crew changes that the railway frequently made in this area and increased traffic from the area's booming industry. As a result, the trains would block Route 28, Route 29, and Wellington Road, among others, for extended periods of time. Traffic could be tied up for as long as 20 minutes while trains passed, raising concerns that emergency vehicles could not cross the tracks if a train were going through. VDOT and VDRPT reported numerous complaints from local citizens, officials, and staff.

The study attempted to evaluate a broad range of possible alternatives. Particularly controversial were those alternatives that would have relocated the existing railway entirely. Such alternatives led many citizens to speculate that the true beneficiary of the study would be Norfolk-Southern railroad, not citizens impacted by the traffic situations. VDOT and VDRPT officials agreed that a relocated railway would have benefited Norfolk-Southern railroad and citizens; however, such a strategy was considered desirable by VDOT and VDRPT staff because they believed it could allow the State to recover a greater share of the construction costs from Norfolk-Southern. In addition, relocation of the railway could have possibly allowed the expansion of Virginia Railway Express service to Gainesville.

Replacing at-grade crossings with grade-separated ones would have addressed the traffic problems; however, the federal government limits the percentage of construction costs



that may be recovered from railroads for such work. Since a relocated railway would bypass the troublesome curve in the City of Manassas, Norfolk-Southern would be able to move its trains through the area more quickly, resulting in reduced operating costs. Because of the savings it anticipated if such a strategy were followed, Norfolk-Southern had indicated its willingness to contribute a greater share of the construction costs.

As the study progressed throughout 1996, nearly every alternative examined by the study was opposed by some part of the citizenry. State staff were met with hostility at public information meetings, and groups disseminated newsletters and fliers in opposition to the study. Worsening this situation was the lack of a clear system for handling public comments. For example, the study newsletters did not include a contact name or telephone number. This omission was criticized by the District Public Affairs Manager in an inter-office memorandum:

This will be my last comment on this subject and I am going to be blunt. Making a conscious decision to not include a contact name and phone number in a VDOT publication because you don't want any more phone calls is incredibly arrogant. I don't care who said it's okay. We all work for a public agency and have a responsibility to be accessible to citizens.

The District Administrator said that events at a public information meeting that he attended indicated to him that the handling of public input could have been improved.

*At a crowded meeting, a citizen stood and asked for a phone number and contact name in case he wanted more information after the meeting. When the project manager and consultant did not respond, the district administrator stood, introduced himself, and provided his telephone number and contact information.*

On September 20, 1996, the study was placed on hold because of this public opposition. In order to resolve the situation, the Secretary of Transportation appointed a Policy Advisory Committee (PAC) consisting of local legislators, supervisors, and mayors, among others, to recommend a solution. It made the recommendation to the Secretary to implement grade-separations at several intersections. Desiring to coordinate with other work and avoid conflicts, the PAC recommended that the Route 29 railroad crossing be addressed as part of the design project to improve the I-66/Route 29 interchange.

**GASP Should Have Been Implemented Earlier.** It is possible that proactive implementation of the GASP at an earlier point in time may have abated some of this opposition to the Rail Alignment study. Although the study teams had met in March of 1996 and informally shared information throughout the following year, VDOT did not formally create the GASP until May of the following year. In the interim period, public opposition to the Rail Alignment study had peaked, driven in part by the appearance of a lack of coordination between studies.

The number of studies in the area created the appearance that coordination was lacking. Citizens saw, for example, that the I-66 MIS was examining East-West improvements to the I-66 corridor. At the same time, the Rail Alignment study was evaluating

the feasibility of new railway alignments in the same area. The Western Transportation Corridor Study was examining North-South corridors that would have intersected both the I-66 MIS and Rail Alignment study areas. In addition, upgrades were planned for the Route 29/I-66 interchange, and HOV lanes were being constructed. Despite their interdependence, each study had its own consultant, newsletter and public meetings. This made it appear that VDOT was not coordinating these studies.

Citizens and officials also identified specific cases where coordination was not necessarily apparent. For example, one of the alternatives brought forward by citizens in the area and considered by the Rail Alignment study team would have relocated the railway to utilize the existing right of way of the I-66 corridor. The Rail Alignment Project Manager indicated that this alternative was considered in an effort to be responsive to citizen concerns and to consider all reasonable alternatives. The I-66 MIS study team, however, was at the same time considering alternatives that would have utilized the same corridor. Although this conflict was identified by the GASP coordination, this coordination was not immediately apparent to the public.

Citizens also recognized conflict between the Rail Alignment study and the Western Transportation Corridor Study. The Rail Alignment study initially considered two alternatives that would have moved the Norfolk-Southern line to a point that would have crossed the western edge of Lake Manassas. The area impacted by these two alternates was also known as “Segment Four” of the Western Transportation Corridor Study. The Rail Alignment study eliminated the alternatives from consideration in response to concerns that such a route could potentially imperil the area’s drinking water supply. When Segment Four was not also immediately removed from consideration by the Western Transportation Corridor Study, it presented the appearance that information was not being shared across projects, a point made by many citizens who opposed the Rail Alignment Study and the Western Transportation Corridor Study. If VDOT had implemented a formal model for coordination such as the GASP at an earlier point in time, coordination efforts may have been more visible, mitigating some of the concerns of the public.

**GASP Lacked Authority to Ensure Cooperation.** Although GASP provided a forum for sharing information about these related studies and projects, it lacked the authority and means to ensure that action was taken. This was considered a limitation by consultants, local officials, and project staff involved in this study.

*One consultant said that to a great degree, the studies were coordinated. However, they had difficulty getting information from one of the other study teams. Even the VDOT project manager was having trouble getting information from that study team. GASP lacked the authority to take action to obtain the information it needed.*

\* \* \*

*The Assistant District Engineer involved in the formation of the GASP said that it was “very effective,” although its role was limited to that of “a broker” to point out problems. It pointed out potential conflicts to the project managers, but did not have a mechanism to ensure that*

*they were resolved. He advocated a central coordinator who would be responsible for making decisions about these conflicts to ensure that action was taken.*

Source: JLARC staff interviews with VDOT staff, local officials, and consultants, and file reviews.

## **Appendix D**

### **Agency Response**

As part of an extensive data validation process, State agencies involved in a JLARC assessment effort are given the opportunity to comment on an exposure draft of this report. Appropriate technical corrections resulting from the written comments have been made in this version of the report. Page references in the agency response relate to an earlier exposure draft and may not correspond to page numbers in this version. This appendix contains the response from the Virginia Department of Transportation.



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