JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION
OF THE VIRGINIA GENERAL ASSEMBLY

Review of Capital Outlay in Higher Education

Senate Document No. 3 (1996 Session)

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Preface

From 1988 to 1994, the General Assembly appropriated approximately $1.86 billion to fund capital outlay projects at Virginia's institutions of higher education. Senate Joint Resolution 135, approved by the 1989 General Assembly, directed JLARC to examine capital outlay and maintenance in higher education. This report examines planning for education capital outlay, the capital outlay process for higher education, and higher education maintenance needs. The report concludes a series of three studies on higher education; previous studies in this series included reviews of the Virginia Community College System and the State Council of Higher Education for Virginia (SCHEV).

Sound capital outlay planning for higher education should be based on five elements: institutional master plans, enrollment projections, utilization of existing space, SCHEV's fixed asset guidelines, and the State's six-year plan for capital outlay. The State needs to more effectively link these five planning elements to produce comprehensive capital planning. In addition, the report recommends improvements in master planning and the fixed asset guidelines.

The Commonwealth's capital outlay process for higher education involves numerous reviews by central agencies; a capital project may be reviewed by as many as ten central agencies. The report recommends streamlining reviews by central agencies to enhance cost effectiveness of projects and to reduce the time needed to design and construct capital projects.

Institutional maintenance needs are addressed through institutional operating budgets and through the maintenance reserve program, which funds large maintenance projects. The State faces a significant maintenance reserve backlog for higher education. This backlog is estimated to exceed $100 million.

This report was presented to the Commission on May 8, 1995. On behalf of the JLARC staff, I would like to thank the Department of General Services, the State Council of Higher Education for Virginia, and the Department of Planning and Budget for their cooperation and assistance during this review. I would also like to thank the institutions of higher education for their cooperation and assistance, with special thanks to the representatives of the six independent colleges who met with JLARC staff during this review.

Philip A. Leone
Director

June 27, 1995

JLARC Report Summary

REVIEW OF CAPITAL OUTLAY IN HIGHER EDUCATION

June 1995

Joint Legislative Audit and Review Commission

From 1988 to 1994, the General Assembly appropriated approximately $1.86 billion to fund capital outlay projects at Virginia's institutions of higher education (see Figure 1, page II). A capital project can take a decade or more from the initial request for funding to project completion. The capital outlay process involves reviews by as many as ten State agencies, as well as the Art and Architecture Review Board (AARB).

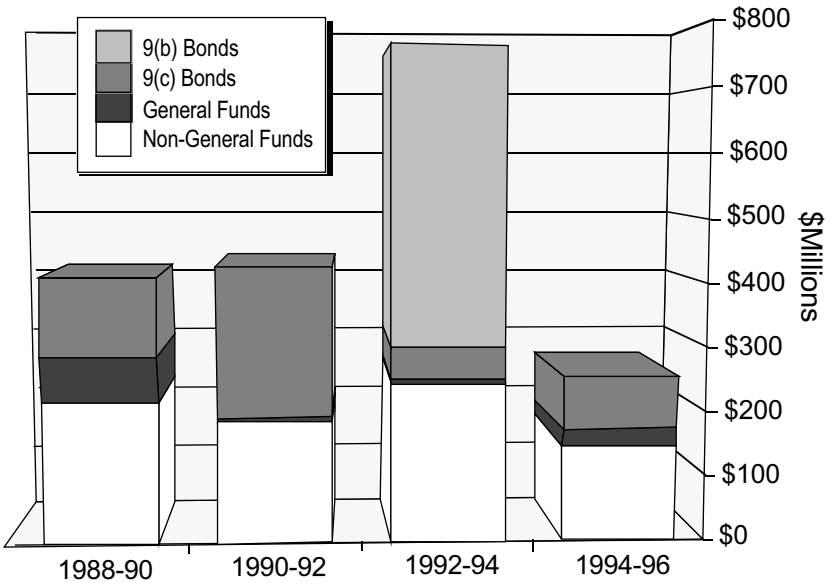
The Department of Planning and Budget (DPB) is responsible for developing the Governor's capital budget proposals, but the State Council of Higher Education for Virginia (SCHEV) is statutorily responsible for developing recommendations to the Governor and the General Assembly on higher education's capital outlay needs. The Department of General Services (DGS), through its Bureau of Capital Outlay Management (BCOM), reviews project plans and specifications for code compliance, suitability and adequacy, cost effectiveness, and compliance with the Procurement Act. The Department of Environmental Quality (DEQ) is responsible for coordinating reviews by environmental agencies of a project's environmental impact report.

JLARC's review of capital outlay in higher education was mandated by Senate Joint Resolution 135, approved by the 1989 General Assembly. JLARC last reviewed the State's capital outlay process in 1978. Major conclusions of the current study are:

- The capital outlay process for higher education is generally adequate;
- Future higher education capital outlay requests need to be more thoroughly evaluated by effectively linking master planning, enrollment projections, utilization data, SCHEV's fixed asset guidelines, and DPB's six-year plan for capital outlay;
- The State should decentralize significant tasks of capital outlay management to institutions of higher education; and

Figure 1

Higher Education Capital Funding by Source: 1988-1996



Notes: Does not include museum projects in the 1992 higher education General Obligation Bond or maintenance reserve projects; includes SWVA Higher Education Center. Totals for non-general funds include 9(d) bonds where applicable.

Source: JLARC staff analysis of 1989-1995 Appropriation Acts.

- The State faces a significant maintenance reserve backlog.

The report contains 25 recommendations to make the higher education capital outlay process more efficient and effective.

Improved Capital Planning and Space Utilization Could Affect New Construction Needs

The State's capital outlay process could benefit from improved planning. The General Assembly should consider five significant planning instruments in assessing capital outlay needs of institutions of higher education: master plans, enrollment forecasts, utilization data, SCHEV's fixed asset guidelines, and DPB's six-year plan. Through better planning, the need for expensive capital projects could be reduced.

Master plans are prepared by institutions of higher education, but many plans have not been approved at the State level. The State does not have a clear definition of what a master plan should be and has not clearly established responsibility for the review of master plans. The General Assembly should consider delegating approval of master plans to the boards of visitors at senior institutions of higher education and to the State Board for Community Colleges, provided the plans follow appropriate guidelines.

"The most recent enrollment projections . . . do not indicate a compelling need for new construction throughout the system of higher education."

Enrollment forecasts made by institutions of higher education and approved by

SCHEV project significant increases in student enrollment. However, these increases are concentrated in a few selected institutions primarily in urbanized areas. The most recent enrollment projections, released in April 1995, do not indicate a compelling need for new construction throughout the system of higher education. There are, however, substantial renovation and maintenance needs. The enrollment forecasts should be used in combination with other planning instruments to thoroughly assess the need for capital projects.

"The General Assembly should consider decentralizing capital outlay management for institutions of higher education, which could result in a less cumbersome and time consuming process."

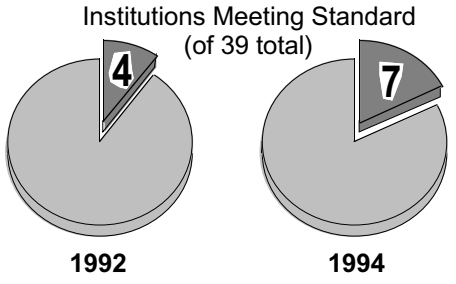
Another factor which could lessen the future need for expensive capital projects is better use of existing classrooms and laboratories. Most institutions of higher education are not utilizing their existing space in accordance with SCHEV guidelines for space utilization (Figure 2). Institutions of higher education have prepared restructuring plans that address, among other issues, increasing utilization of existing space. SCHEV should monitor the implementation of these restructuring plans.

SCHEV's fixed asset guidelines are also important in determining capital outlay needs. These revised guidelines are a significant improvement over the previous guidelines, but could be enhanced by including criteria for evaluating proposed renovation projects and new campuses, based on use of existing space and estimates of enrollment growth.

The six-year plan for capital outlay needs was developed at the direction of the Secretary of Finance in 1990. This process has significantly improved long-term capital planning. However, an effective six-year planning process requires consistent funding.

Figure 2

Institutions Meeting the SCHEV Classroom Utilization Standard



Source: JLARC staff analysis of SCHEV data.

Capital Outlay Management Should Be Decentralized for Institutions of Higher Education

The General Assembly should consider decentralizing capital outlay management for institutions of higher education, which could result in a less cumbersome and time consuming process. The Department of General Services would continue to provide an analysis of the appropriate overall project budget. Building code compliance review could be conducted using Assistant State Building Officials, local building officials, and private firms as recently recommended by the Governor's Commission on Government Reform.

In addition, the administrative thresholds for approval of change orders should be raised, the number of agencies involved in environmental reviews should be streamlined, and the review by the AARB should be strictly advisory to institutions of higher education. Institutions of higher education should also be permitted to more routinely use alternative construction approaches such as design-build and construction management. However, institutions of higher education should more consistently document the performance of general contractors and architectural and engineering firms.

The State Invests Significantly in Maintenance but Faces a Backlog of Maintenance Reserve Projects

The State has invested significant resources in the maintenance reserve program. However, the State has a backlog of validated maintenance reserve projects in excess of $100 million. This maintenance reserve backlog has a significant, negative impact on the condition of higher education facilities.

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I. Introduction

Senate Joint Resolution (SJR) 18, approved by the 1988 General Assembly, directed JLARC to review and evaluate the area of higher education as part of the Commission's responsibility for examining functional areas of government under the Legislative Program Review and Evaluation Act (§ 39-65 *et seq.*). The 1989 General Assembly subsequently approved SJR 135, which directed JLARC to review four areas in the functional area of higher education: the Virginia Community College System; the State Council of Higher Education for Virginia (SCHEV); capital outlay, land, and maintenance; and links between secondary schools and higher education.

This review is the last in a series on higher education in Virginia, and it addresses the capital outlay and maintenance review issue of SJR 135. The issue of land in higher education was addressed by JLARC's 1994 *Review of State-Owned Real Property*. Previous reviews in this series have covered the Virginia Community College System and the State Council of Higher Education for Virginia.

PREVIOUS REVIEWS OF THE CAPITAL OUTLAY PROCESS

The State's capital outlay process has been reviewed, in varying levels of detail, several times during the past 20 years. These reviews, which have been performed by both the executive and legislative branches, identified deficiencies and weaknesses in the process and made numerous recommendations for improvement. Four of these previous reviews are discussed below. In addition, two more recent studies have also devoted a significant amount of attention to the capital outlay process. These studies were completed by the Governor's Commission on Government Reform and the Department of Planning and Budget (DPB).

1978 JLARC Study

The 1978 JLARC report, *Operational Review: Capital Outlay Process*, was not limited to higher education. A number of findings concerning general administration, planning and budgeting, and project implementation within the capital outlay process resulted from the review. JLARC found the following:

- the lack of a clear definition of a capital outlay project,
- no systematic process for identifying long-term capital needs,
- construction of unauthorized facilities,
- lack of a standard cost management policy, and
- frequent delays in project completion.

Some of these deficiencies have been addressed. The *Capital Outlay Manual* and DPB's capital budget instructions define various types of capital projects. In

addition, the State has established a six-year capital outlay plan to identify long-term capital needs.

1985 Joint Subcommittee on the Capital Outlay Process

This joint subcommittee solicited testimony from participants in the capital outlay process, including private sector engineers and contractors, concerning the strengths and weaknesses of that process. The study developed a number of findings concerning capital outlay preplanning, planning, and construction. These included:

- preplanning objectives should be reviewed, and the preplanning process and requirements need streamlining;
- the Department of General Services (DGS) should consider delegating plan review authority to State institutions of higher education;
- DGS should streamline bid authorization and contract award procedures;
- State agencies should be authorized to approve change orders up to a limit of $10,000; and
- DGS, in conjunction with the Attorney General, should develop procedures to ensure contractors are fully qualified to perform State work, and that they comply with time schedules.

Some of these recommendations have been implemented. For example, institutions can now approve their own change orders up to a maximum of $15,000. In addition, DGS has established regulations under which the authority to review plans may be delegated to an institution through the Assistant State Building Official designation. Furthermore, DPB has implemented a new program that will reduce the number of preplanning studies.

1990 Commission on Alternative Methods of Finance

The purpose of this legislative commission was to study alternative means of financing certain facilities at State-supported colleges and universities. The commission recommended that:

- institutions be authorized to pledge general operating revenues, including tuition and fees, to provide debt service and security for 9(d) bonds;
- institutions be permitted to lease State property to university-related foundations or private entities without having to go through normal review and approval processes;

- the Secretary of Finance create a resource guide for the development of alternative financing proposals by institutions;

- institutions be permitted to retain the unexpended general fund balance from satisfactorily-completed projects, to be appropriated for use in future projects; and

- SCHEV review and consider revising space planning guidelines for research space.

Several of these recommendations appear to have been implemented in some form. For example, the Secretary of Finance issued alternative construction and financing guidelines in 1992. In addition, in 1995, SCHEV completed its revision of the space planning guidelines with the assistance of private architects and engineers, and representatives of the institutions. Furthermore, the institutions are currently authorized to issue 9(d) debt based on their own credit through a pledge of their general revenues.

1991 Secretary of Administration's Capital Outlay Task Force

In 1991, the Secretary of Administration created a task force to review the capital outlay process for all State agencies and institutions. The task force was charged with examining the perception that the Commonwealth takes too long to bring projects to completion and that the process itself wastes resources.

The task force found that capital outlay is a centralized process that historically has not recognized resource limits until after a great deal of money has been spent on justifying projects. Furthermore, projects may be planned, reviewed, and analyzed repeatedly for several years before they are approved for funding. The task force also found that few agencies perform adequate master planning.

Several recommendations were offered to address some of the findings. The task force believed that the new six-year capital outlay plan would help resolve some of the funding issues. In addition, the task force concluded that to expedite projects, more authority must be delegated to agencies sponsoring projects. A recommendation was made to provide more responsibility for project development and review to agencies who have demonstrated their ability. The task force also recommended that central review agencies shift from a regulatory to a service orientation. Furthermore, central review agencies should expand their role in training, technical assistance, and post-audit review.

1994 Governor's Commission on Government Reform

The Governor's Commission on Government Reform was charged with reviewing all the functions of State government. With regard to the capital outlay process, the commission identified four major problems:

- the efficiency and effectiveness of the capital outlay process is time-consuming, outdated, costly, and overly cumbersome;

- there is extensive duplication in defining responsibility and programmatic purpose;

- there are no competitive forces currently at work to improve the process; and

- the capital outlay process is not customer-service-oriented.

The commission offered a number of recommendations to address these problems. The recommendations were directed at the role of the Department of General Services in the capital outlay process, capital planning, and capital budgeting. Some recommendations require *Code of Virginia* revisions. In addition, some recommendations advised all parties involved in the process to make timely preparations and decisions, use a team approach, and establish mutual professional trust.

The recommendations directed at DGS included revising the *Capital Outlay Manual*; setting design, construction, and cost standards; reviewing submissions within DGS' stated turnaround time; and examining the fairness of the current architecture and engineering fee schedule. In the area of planning, the commission advised that all agencies prepare comprehensive master plans to determine capital budget requirements and that capital outlay requests be based on master plans, the six-year plan, and the Governor's priorities. Under budgeting, two recommendations were suggested. One was a change in budgeting that would create a central fund as a "design pool" to fund project design, with construction funds appropriated at the completion of design. The second was to replace preplanning studies with an architectural and engineering program scope.

Regarding the general capital outlay process, the Governor's Commission on Government Reform recommended that additional alternative construction and finance methods be used, that reviews by the Art and Architecture Review Board be performed prior to construction fund appropriation, and that an internal service fund be established to allow DGS to compete with other sources of code compliance reviews and construction inspections. Other capital outlay process changes recommended by the Commission might require revisions to the *Code of Virginia* or to the *Capital Outlay Manual*. These include removing current administrative approval restrictions on change orders to contracts, raising limits for open-end architectural and engineering contracts, and redefining the role of DGS' capital outlay section to include developing post-audit reviews, sharing cost data, conducting training, and providing technical expertise.

Department of Planning and Budget's *Study of the Capital Outlay Process in Virginia*

In December 1994, DPB released its evaluation of the capital outlay process. The report concluded that Virginia's capital outlay process is fundamentally sound:

> Virginia's existing capital outlay process incorporates practices of good capital budgeting such as long-term planning, defined decision-making criteria, legislative involvement, and mandated funding of maintenance. In addition, the design and review structure provides control over project planning and execution. Finally, agency management of capital projects ensures that program experts are intimately involved in facility development. The fundamentals of the process are sound, although significant improvements should be made.

The Department of Planning and Budget offered several recommendations to maximize cost-effective construction and reduce the amount of time from initial project proposal to construction completion. There were three groups of recommendations: long-term planning, capital budgeting, and design review.

The first recommendations dealt with long-term planning. DPB suggested that agencies integrate strategic planning, existing space utilization analysis, and capital planning. DPB also recommended that agencies prepare or update master plans regularly.

The second group of recommendations proposed improvements in capital budgeting. One recommendation suggested modifying the capital budgeting process to eliminate preplanning studies and to budget funds initially only to complete preliminary designs. Under these modifications, agencies would plan projects through the preliminary design stage, upon which DPB and BCOM would recommend realistic construction costs for appropriation by the General Assembly.

Improving the design review process was the subject of the last group of recommendations. Within this group, DPB recommended greater cooperation between agencies, architectural and engineering firms, BCOM, and DPB. In addition, DPB recommended that BCOM contract with a technical writer to rewrite the *Capital Outlay Manual*. Furthermore, DPB suggested that BCOM expand its technical assistance to agencies, expand their training programs, and set standards for value engineering studies.

Other recommendations made by DPB included allotting maintenance reserve funds to agencies as soon as possible, developing cost effective alternatives to the current design review process such as privatizing technical and code compliance reviews, and delegating assistant State building official authority to qualified agencies. Finally, DPB recommended that BCOM take a lead role in developing a capital outlay project status database.

JLARC REVIEW

This report assesses the capital outlay process within the functional area of higher education. The research for this review was conducted between November 1994

and March 1995. The report examines capital planning and financing, the role of central agencies, and institutional maintenance.

Study Issues

Five major research issues were developed to address the study mandate. These issues include:

- Is the master planning process for the State's institutions of higher education adequate to accurately identify long-term capital needs?
- Does the State capital budget process for higher education promote efficiency, effectiveness, and adequate planning in the appropriation of State funds for capital projects?
- Are institutions of higher education utilizing their existing facilities in accordance with State guidelines for utilization?
- Does the State's capital outlay process promote timely and efficient execution of capital projects?
- Are the State's institutions of higher education appropriately maintaining their facilities and is the State adequately funding maintenance of these facilities?

Research Activities

Several research activities were undertaken to address the study issues. Staff at numerous educational institutions and agencies were contacted to obtain quantitative data and qualitative explanations and perspectives on this process. The types of research activities are summarized below.

Site Visits. JLARC staff visited all State-supported institutions of higher education. This included the 15 four-year higher education institutions, 23 community colleges, as well as Richard Bland College. Site visits were primarily used to conduct structured interviews, but some visits also included tours of the institution's campus and selected buildings. In addition, site visits were also used to verify the accuracy of SCHEV's room-by-room inventory. A sample of buildings at eight colleges and universities was selected for this activity.

Several independent colleges within the State were also visited during this review. Six colleges were selected based on student population and the presence of an active capital outlay program. A separate set of structured questions was administered to chief business officers during these visits. The independent colleges visited were:

University of Richmond, Mary Baldwin College, Washington and Lee University, Roanoke College, Randolph-Macon College, and Hampden-Sydney College.

Structured Interviews. Structured interviews were held with the staff of several State agencies and institutions. Interviews were conducted at each State university and college. In addition, interviews were conducted with staff of several central agencies including the Department of General Services, Department of Planning and Budget, and State Council of Higher Education for Virginia.

Furthermore, interviews were arranged with staff of several other State entities with a peripheral involvement in the capital outlay process. These entities included the Art and Architecture Review Board, Department of Environmental Quality, Department of Housing and Community Development, Department of Historic Resources, Department of Conservation and Recreation, Virginia Department of Health, and the Chesapeake Bay Local Assistance Department. Finally, structured interviews were administered at other State agencies with large capital outlay programs that were not specifically the focus of the study mandate but were interviewed for comparative purposes. These agencies included the Department of Transportation; the Department of Mental Health, Mental Retardation, and Substance Abuse Services; and the Department of Corrections.

Other structured interviews were administered over the telephone. One set of questions was asked to chief facilities officers at major state universities in other southern states, and a different set of questions was asked to representatives of private architectural design and engineering firms. The interviews with staff of other state universities discussed other states' higher education capital outlay processes. Interviews were conducted with staff at the University of Kentucky, Florida State University, the University of Tennessee, the University of North Carolina, the University of Maryland, and the University of Georgia.

The capital outlay process in Virginia was also discussed with representatives from several private architectural and engineering firms who have performed capital outlay services for the State. Four firms were randomly selected from firms identified during DGS file reviews. Representatives of firms were asked a number of questions about the State's capital outlay process and the firms' experiences in performing State work.

Document Reviews. Several types of documents were reviewed for this report. Literature in the field of capital outlay and facilities management was examined. In addition, the *Capital Outlay Manual* was analyzed to determine the capital outlay requirements. Budget and finance instructions, guidelines, and reports were also reviewed to assess financial guidelines in the capital outlay process. These reports included DPB instructions and SCHEV guidelines, as well as various reports made by legislative subcommittees, the Secretary of Finance, and other executive branch departments.

Financial decisions and decisionmaking processes were evaluated by reviewing past capital budget requests, Appropriation Acts, six-year plans, and other supporting

documentation. Documents included the capital budget requests and Appropriation Acts for FY 1982 through FY 1996, the 1992-1998 and 1994-2000 six-year plans, SCHEV's *Capital Outlay Recommendations for the 1990s*, *The 1993 Virginia Plan for Higher Education*, and institutions' ten-year capital outlay plans submitted to SCHEV as directed by the 1994 Appropriation Act.

Data Analyses. Several sources of data were used to analyze various aspects of the capital outlay process. First, data from DPB's Program Budgeting System were used to identify expenditures each educational institution made on maintenance activities. Expenditure data for the 1988-1990, 1990-1992, and 1992-1994 biennia were obtained using this method.

Data obtained from SCHEV summarized the existing space of educational institutions, the utilization of that space, as well as the fixed asset guidelines for requesting additional space. SCHEV also provided the results of its deferred maintenance survey, which was requested from each institution of higher education. On this survey, each institution reported its own estimate of deferred maintenance on a building-by-building basis. These data were used to assess institutional maintenance needs.

Finally, two reports from databases maintained by DGS were also analyzed. One report listed the dates design submissions were received by DGS and the date when review of each submission was completed by DGS staff between July 1, 1990 and December 31, 1994. The second report listed each project change order approved during the same period. These reports were used to assess DGS' workload, time to complete reviews, and the frequency and amounts of project change orders.

File Reviews. JLARC staff also reviewed files at BCOM and SCHEV during the course of this review. DGS' files contained documentation on completed and ongoing capital projects. The documentation included approval forms, contracts, review comments, change orders, and correspondence for each project. SCHEV's files were used to examine master site plans and restructuring plans of institutions of higher education.

REPORT ORGANIZATION

This report is organized into five chapters. This chapter has provided a brief introduction to the previous reviews of capital outlay in higher education and the scope of this review. Chapter II presents a more detailed overview of the entire capital outlay process. Chapter III discusses the planning issues involved in the process. Chapter IV discusses the role of central agencies of State government in project design and execution. Chapter V concludes the report by discussing institutional maintenance.

II. The Capital Outlay Process in Virginia

Capital expenditures are typically made to construct new facilities, or to maintain and improve existing facilities. As of April 1995, Virginia's institutions of higher education were managing the design and execution of more than 300 capital projects worth more than $1.3 billion. In the 1994-96 budget, more than 70 percent of the State's capital appropriations were for projects at institutions of higher education; however, most of this funding was comprised of non-general funds.

The State's capital outlay process has been the subject of several legislative and executive branch reviews. Recent reviews have found that the capital outlay process for higher education is generally adequate. However, the study by the Governor's Commission on Government Reform found the process to be very time consuming and cumbersome. Subsequent chapters propose ways for making the process more efficient and effective. This chapter describes the current capital outlay process.

The capital outlay process for higher education projects is particularly complex and often highly technical in nature. Three central State agencies have significant roles in the process: the Department of General Services (DGS), the Department of Planning and Budget (DPB), and the State Council of Higher Education for Virginia (SCHEV). The role of these entities in the capital outlay process is defined primarily through the Appropriations Act and the Commonwealth of Virginia's *Capital Outlay Manual*, which is maintained by DGS.

The capital outlay process begins with planning. During planning, institutions of higher education develop master plans and six-year capital outlay plans. Next, institutions submit capital project proposals for inclusion in the Commonwealth's biennial capital budget. At this stage, a capital project proposal is subject to a series of reviews by central agencies. Projects are appropriated by the General Assembly and may be funded through general fund revenues, non-general funds, or several debt vehicles. Appropriated projects then advance to the design stage, where architects and engineers design the project. After more reviews by central agencies, the project reaches the execution phase in which the project is constructed. While maintenance is not a distinct part of the capital outlay process, the performance of maintenance has a significant impact on the need for capital outlay.

PLANNING

There are several components to capital planning for higher education. The first of these is a master plan, developed by an institution of higher education to depict planned growth of facilities. Enrollment forecasts, made by the university and approved by SCHEV, are another important component of higher education capital planning. The six-year capital outlay plan, developed by the Department of Planning and Budget,

attempts to identify long-term capital outlay needs and proposed funding sources for all of State government, including higher education.

Master Planning

The capital outlay program of Virginia's educational institutions begins with the development of a master plan. Each institution of higher education is required by the *Capital Outlay Manual* to prepare a comprehensive master plan. The master plan is intended to depict current and future land use and to guide future growth of the physical plant in an orderly fashion. The master plan is intended to address the institution's long-range needs over the next 20 years. An institution's master plan is required to comply with specific technical content and design requirements developed by DGS' Bureau of Capital Outlay Management (BCOM).

The institution's master plan is intended to be a flexible document. As the mission and programs of an institution change, revisions to the master plan may become necessary. Institutions are required to submit their master plans to the DGS Bureau of Real Property Management (BRPM). As part of the master plan review process, BCOM, SCHEV, DPB, and the Art and Architecture Review Board (AARB) provide comments to BRPM about the plan. DGS may also choose to obtain input from other appropriate State agencies.

Enrollment Forecasts and Utilization

Enrollment forecasts are another important component of capital planning for higher education. SCHEV is responsible for reviewing and approving individual institution enrollment forecasts. SCHEV staff do not generate their own enrollment forecasts for individual institutions. Instead, SCHEV staff develop an enrollment estimate for the entire higher education system by combining institutional enrollment forecasts.

Enrollment forecasts are made for the fall headcount, which is the number of students who register at a particular institution for the fall semester. Annual full-time equivalent students (annual FTEs) are then estimated based on the headcount projections. For capital outlay decisionmaking, institutional enrollment forecasts are an important indicator, more so than the system-wide estimate, because projects are allocated to individual institutions, not the entire system. Enrollment projections and an institution's existing space are translated into justified space needs through SCHEV's fixed asset guidelines.

Enrollment at a given institution is one factor that is used in determining whether a new construction project is justified according to SCHEV guidelines. The other component is each institution of higher education's existing inventory of space. Therefore, enrollment forecasts must be considered in the context of utilization of current space.

SCHEV's fixed asset guidelines also establish standards for classroom and laboratory utilization. These standards are 40 hours a week for classrooms and 24 hours a week for laboratories. The standard assumes that 60 percent of classroom stations, and 75 percent of laboratory stations, will be filled on average.

Six-Year Capital Outlay Plans

Another planning instrument used in the capital outlay process is the six-year capital outlay plan. This longer-range planning document is a fairly recent development initiated by the Secretary of Finance and first used during the 1992-1994 biennium. The six-year plan was developed to assist State decisionmakers in recognizing the extent of the State's overall capital outlay needs so that informed choices could be made within the context of the State's limited revenues and debt financing abilities. Requests for projects listed in the six-year plan are submitted to the Department of Planning and Budget during the preparation of the capital budget.

CAPITAL BUDGETING

The development of the State's capital budget begins with biennial capital budget instructions from DPB to State agencies (including institutions of higher education) to guide them in submitting capital project requests. In their requests, each institution attempts to justify its need for projects. Capital project requests, which are submitted to DPB, SCHEV, and the legislative budget committees, contain project information such as capacity and size, construction characteristics, and project costs. In addition, each institution must submit a maintenance reserve plan which identifies certain maintenance projects that maintain or prolong the useful life of a facility.

There are several central agencies with roles in reviewing the capital budget proposals of the institutions of higher education. Some of these agencies, such as DPB and SCHEV, perform a review of each project requested. Other agencies perform reviews of capital projects only when certain criteria are met. These agencies include DGS/ BCOM, the Department of Environmental Quality (DEQ), and the Department of the Treasury.

Department of Planning and Budget

The Department of Planning and Budget requires institutions to submit a capital budget proposal which includes a maintenance reserve plan, capital projects requests for the coming biennium, and capital project requests for the following two biennia. Upon receipt of the institutions' requests, DPB begins its process of review. DPB analyzes all capital project requests in terms of project costs, impacts on the operating budget, funding alternatives, and programmatic justifications. In order for a capital project to be included in the executive budget, DPB is required to make several

determinations including the relative urgency of need for the project and whether the project conforms to a site or master plan approved by the Governor for a program approved by the General Assembly. In conducting its analysis, DPB uses various sources of information including capital project recommendations made be SCHEV.

In the past, DPB might have required an institution of higher education to prepare a preplanning study. A preplanning study presented more detailed architectural, engineering, and technical information concerning the proposed project. The study also confirmed technical feasibility and refined cost data. Preplanning studies were generally required when the project involved new construction of more than 20,000 square feet or if the project cost exceeded $1 million.

DPB's capital budget instructions for the 1996-1998 biennium initiated a pilot program that changes the method of determining project scope and costs. This was done after several studies criticized the expense and usefulness of preplanning studies. DPB's new proposal is attempting to develop a less rigid and more communicative process to determine project scope and costs. DPB's instructions call for the institutionalization of project teams to establish initial agreements about design-to construction budgets, design-to gross area, and a project design budget. The project team will consist of institution staff, a DPB analyst, a BCOM reviewer, SCHEV staff, and legislative staff. DPB envisions a matrix management approach for this team, and that the team will work jointly throughout the life of the project, from establishing initial agreements about project design, to quickly resolving project execution problems.

Department of General Services

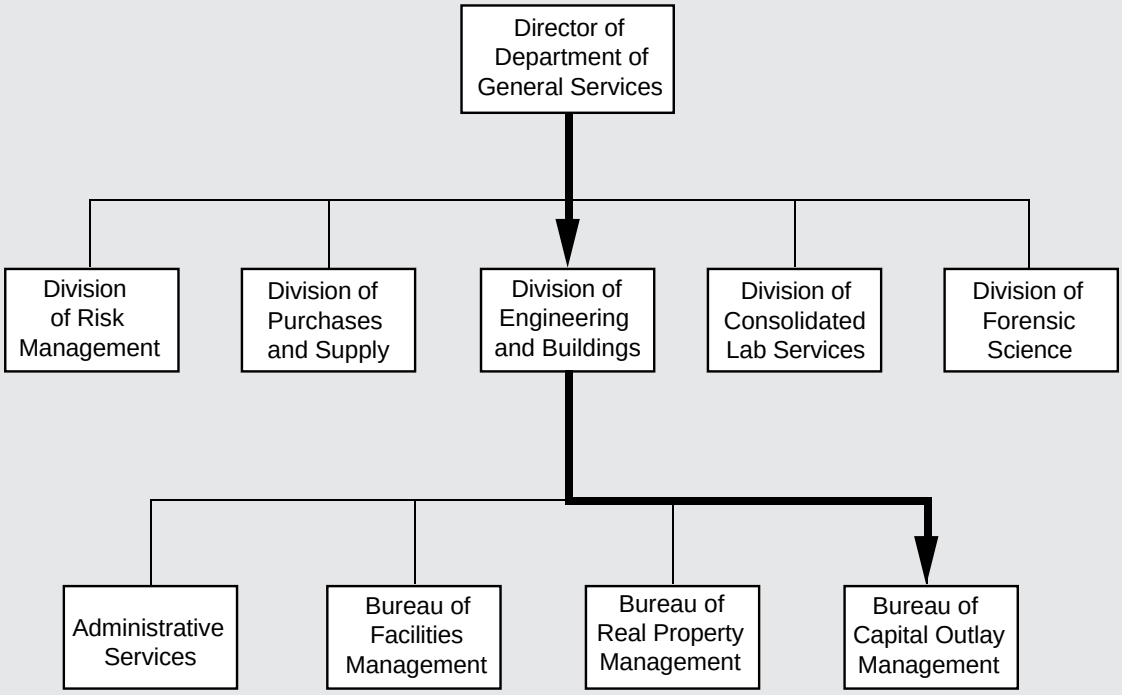
The Department of General Services' role in capital budgeting will be changing as a result of DPB's new program to determine project scope and costs. Since the program is new, DGS' role is not yet clear.

In the past, preplanning studies were reviewed by DGS with the assistance of SCHEV and legislative staff. The detailed review of preplanning studies was conducted by the Bureau of Capital Outlay Management, located within the Department of General Services. Figure 1 shows the relationship of these organizational units. BCOM reviewed the preplanning study to ensure that the project represented a reasonable technical solution to a capital need of the institution. In essence, the purpose of the review was to ensure that unnecessary expenses were avoided as well as to ensure the project's technical feasibility. Based on their review of the preplanning study, BCOM staff recommended a budget for the capital project.

In reviewing preplanning studies, BCOM developed its own set of cost estimates. Separate estimates were required for the costs of individual building systems, such as the foundation, roofing, interior walls, electrical, and plumbing. Additional cost estimates were required for site and utility work associated with the project. Preplanning cost estimates were also required to be escalated forward to the estimated project bid date, as determined by DPB.

Figure 1

Organization of the Department of General Services



Source: JLARC staff graphic.

State Council of Higher Education for Virginia

SCHEV also reviews the capital budget requests of each institution of higher education using its own guidelines and criteria. These include projected enrollment, utilization of existing space, and fixed asset guidelines. The fixed asset guidelines, first used in the 1972-74 biennium, provide a framework by which the mix and amounts of proposed space are evaluated. SCHEV recently approved a new set of fixed asset guidelines that condensed 15 categories of educational and general space at the institutions into six new categories. The guidelines emphasize the use of existing space and encourage technological access to instruction and information as an alternative to adding space.

Each institution is required to project its need for each type of space, using the guidelines and methodology developed by SCHEV, as part of its capital budget request. There are four steps involved in projecting space needs:

- application of space planning guides based on estimated enrollments and other data,

- quantitative and qualitative evaluation of space currently available,
- consideration of space which has been funded for construction or renovation, and
- estimation of additional space needs for specific future planning periods.

Based on its guidelines, criteria, and priorities, SCHEV issues recommendations to the Governor concerning the capital project requests of each institution of higher education. SCHEV also has financial review responsibilities for proposed higher education bond projects. SCHEV reviews all proposed revenue bond projects to identify their impact on the current and projected cost to students. The review of each project also identifies its impact on the institution's need for student financial assistance.

Department of Environmental Quality

On any capital project which costs $100,000 or more, an institution must prepare an environmental impact report prior to any funds being spent on the project. According to statute, the Department of Environmental Quality (DEQ) must review the environmental impact report within 60 days of receipt. DEQ works with a number of environmental and other agencies in preparing this review, including: the Department of Conservation and Recreation, the Department of Forestry, the Department of Game and Inland Fisheries, the Chesapeake Bay Local Assistance Department, local planning district commissions, and the Virginia Department of Health. DEQ issues a statement to the Governor's designee, the Secretary of Administration, commenting on the environmental impact of the proposed project. Based on the comments from DEQ, the Secretary of Administration can either approve or disapprove use of State funds for the project. Typically, the Secretary approves funds with the stipulation that the agency follow comments made by DEQ.

Department of the Treasury

Prior to the inclusion of any revenue bond-financed project in the executive budget, the State Treasurer is required to review the financial feasibility of the project. This review is completed during the same period when DPB is reviewing capital budget requests. In addition, if more than one year elapses between this review and the institution's request for project initiation, the State Treasurer must again review the project's financial feasibility.

The State Treasury Board serves as the issuing, sales, and paying agent for all general obligation and revenue bonds issued for higher education capital outlay. The Board reviews the terms and structures of these debt issuances with the goal of financing projects as efficiently and effectively as possible.

PROJECT FINANCING

Capital projects are funded from either an institution's operating budget or its capital budget. Operating budgets are used to fund certain capital expenditures, such as the purchase of instructional or research equipment. In addition, any new facility or improvement to an existing structure which costs less than $250,000 may be paid for out of the agency's operating budget. Capital projects funded from an operating budget are not subject to the State's capital outlay process requirements. However, the projects are required to meet building code, environmental impact, and handicapped accessibility standards. Furthermore, a capital project funded through the operating budget must normally be completed during the same fiscal year for which the operating appropriation is made.

Most of the capital expenditures of the State's colleges and universities are made out of each institution's capital budget. The 1994-96 biennial State budget appropriated more than $323 million in cash and bonded debt issuance authority for higher education capital expenditures. These expenditures included the costs of debt issuance and debt service, project planning and design charges, costs of construction, and central appropriations including maintenance reserve.

Within the capital budget for higher education, the State uses two primary methods of paying for capital construction, improvement, renovation, and maintenance reserve projects at its institutions of higher education. These methods are (1) direct appropriation of cash, and (2) issuance of bonded debt. Within each of these two broad areas, there are several variations and specific financing techniques available. For example, the State can issue debt that is both revenue supported and backed by the full faith and credit of the Commonwealth. Alternatively, the State, and the institutions of higher education themselves, can issue revenue supported debt which is not backed by the State's full faith and credit.

The Commonwealth has historically relied on a pay-as-you-go approach to financing capital projects over debt financing. However, general fund support for higher education projects is decreasing, and continued demand for capital projects has caused the Commonwealth to use debt more routinely. Throughout the last four biennia, the Appropriation Act has appropriated approximately $1.86 billion for higher education capital projects. Of this, approximately $1.08 billion has been financed with debt. This includes the 1992 General Obligation Bond (GOB) which is being used to finance nearly $461 million for higher education capital projects (this amount does not include funding provided in the higher education GOB intended for projects at museums).

General Fund Appropriations

This fund source uses cash from current revenues to pay for capital projects. The benefits associated with this type of funding include the avoidance of debt issuance and service expenses. In addition, the State's debt capacity is not affected. However, the

availability of this fund source for higher education capital outlay is increasingly limited. The State's institutions of higher education compete among themselves, and with all other State agencies, for general fund appropriations for capital outlay. The 1994-96 Appropriation Act contained nearly $68 million in general fund appropriations for higher education capital outlay. Of this, $32 million was for maintenance reserve projects and approximately $10 million was for handicapped accessibility and asbestos abatement.

Non-General Fund Appropriations

An appropriation of non-general funds authorizes an institution to use specified revenue sources, such as student tuition and fees, private donations, and federal funds, to pay for capital projects. The use of non-general fund appropriations for capital projects may, depending on the specific nature of the project, add substantially to student fee charges. The 1994-96 State budget contained more than $130 million in non-general fund appropriations for higher education capital outlay (including $19.6 million for maintenance reserve).

Debt Funding

The other means of paying for capital projects is through issuing bonds. The State has several vehicles for financing. These options are provided by Article X of the *Constitution of Virginia*. These include:

- 9(b) General Obligation Debt. This debt is backed by the State's full faith and credit and must be authorized by a majority of the General Assembly and the voters in a statewide referendum. Debt service is paid by general appropriations made directly to the Treasury Board.

- 9(c) General Obligation Debt. This debt is backed by the State's full faith and credit. These bonds are intended to be supported by revenue producing capital projects such as parking facilities, dormitories, and dining halls. This debt must be authorized by a two-thirds vote of the General Assembly. The Department of the Treasury pays this debt service with transfers made by the institutions.

- 9(d) Debt. This debt allows institutions of higher education to issue their own debt. Therefore, the State's full faith and credit is not pledged. Institutions can use these bonds to support a variety of projects. Debt service is paid directly by the institutions from project revenues or other institutional funds. This debt is authorized by in the Appropriation Act.

Under the provisions of 9(d) debt, the General Assembly has also established other financing vehicles for capital projects. These include:

- Virginia College Building Authority (VCBA). The VCBA was established to help Virginia's public and private institutions construct and equip capital projects. With the exception of equipment leasing, the VCBA has not been used historically to fund capital projects at public institutions of higher education.

- Virginia Public Building Authority (VPBA). The VPBA is used to construct and lease public buildings for State and political subdivisions. The VPBA owns the projects and leases them to the State. This type of financing has not generally been used by the institutions of higher education.

Another form of 9(d) debt is debt issued by institutions under the alternative financing guidelines. The Secretary of Finance issued alternative construction and financing guidelines in 1992. These guidelines were the result of the Commission on Alternative Finance (created by HJR 373 in 1989). The guidelines opened financing and construction channels in essentially two manners.

The first change clarified the revenue streams that institutions can use to pay off their bonds. This expanded the use of 9(d) debt beyond revenue projects. The guidelines cleared the way for institutions to use any unencumbered revenues, including indirect cost recoveries, for debt service. The second way in which the guidelines opened channels was to allow institutions to enter into long-term leasing arrangements with other entities. This made it possible for foundations to construct projects on institution property.

SCHEV and the Department of the Treasury analyze all capital budget proposals that will utilize 9(c) or 9(d) financing. SCHEV performs this analysis to determine the impact on student fees at the institution. Treasury performs its analysis to determine if projected net revenues will be sufficient to pay the debt service.

Funding Methods for Higher Education Capital Outlay

Funding for capital projects is based on the type of project, the funding mechanisms available, and institutional preferences. The State Council of Higher Education for Virginia has established guidelines to determine what projects should be funded from State revenues and general obligation bonds. If debt is used, the institutions prefer some debt methods over others.

SCHEV's Fund Source Guidelines. An institution's choice of project financing is based on SCHEV's fixed asset guidelines. The guidelines state that educational and general space which includes instructional, academic, and institutional support space should be funded with State revenues which include general funds and general obligation bonds. Research space should be funded with a mix of State revenues and non-general funds. The guidelines specify that this mix should be one-half from each source. Physical recreation facilities should not be supported with State revenues, according to these

guidelines. In addition, the guidelines dictate that community college site work outside of five feet from a building should be funded by non-general funds or institutional debt.

Debt Method Preferences. The institutions' preference to use the various means of debt are guided by some of the provisions of the each of the financing vehicles. Typically, 9(b) general obligation debt is preferred by institutions because the institution has no obligation to provide debt service. Debt service is paid by general fund appropriations, and the Department of the Treasury provides all the financing administration. The next most advantageous financing method for institutions is 9(c) debt. This method requires the institution to use specific project revenues to pay debt service. However, since the debt is backed by the Commonwealth's full credit, this debt uses the State's AAA bond rating and obtains the most favorable interest rate. Like 9(b) debt, the Department of the Treasury provides most of the administration associated with this debt.

Issuance of 9(d) debt is less attractive to institutions of higher education. Since this debt is issued by an individual institution, it is issued without the Commonwealth's full faith and credit pledge. Such debt is issued based on the institution's own credit, and therefore, the credit rating is lower and the interest rates are higher than 9(b) and 9(c) debt. In addition, the institution is responsible for making all debt service payments and administering the debt. Because of the cost of this source of financing in terms of debt service and issuance costs, and because of the staff support that is required to issue this debt, only institutions in a strong financial position with adequate staff can use 9(d) debt. Many institutions do not have the financial strength to use this debt option.

VCBA and VPBA debt have not historically been used by the institutions of higher education. The reason for this is that the provisions of this debt are similar to the provisions of regular 9(d) debt. Furthermore, under VPBA financing, there are legal issues dealing with permanency of project ownership, credit rating, and bond indenture terms that deter institutional interest is VPBA funding. Table 1 shows the amount of 9(c) and 9(d) debt issued for each institution as of June 30, 1994. Table 2 shows the amounts authorized by 1992 General Obligation Debt authorized for each institution of higher education, and the amount expended as of the end of March 1995.

PROJECT DESIGN AND EXECUTION

Once a project is appropriated by the General Assembly, it moves to the design and execution stage. The design phase includes obtaining the services of an architectural and engineering firm to design the project. It also includes reviews by BCOM to ensure that the project design: (1) conforms to the *Capital Outlay Manual* and the Procurement Act, (2) is suitable and adequate, (3) complies with the Uniform Statewide Building Code, and (4) does not involve excessive expenditures. The execution phase begins when project drawings are completed and bidding for a general contractor commences.

Table 1

Institutional Debt as of June 30, 1994

Institution	9(c)	9(d)*	Total
Christopher Newport	$10,276,800	$0	$10,276,800
Community Colleges	2,830,000	0	2,830,000
George Mason	90,245,187	0	90,245,187
James Madison	36,939,376	20,065,000	57,004,376
Longwood	8,721,563	0	8,721,563
Mary Washington	15,339,732	0	15,339,732
Norfolk State	19,719,546	3,249,207	22,968,753
Old Dominion	35,223,354	0	35,223,354
Radford	3,457,383	0	3,457,383
Richard Bland	0	0	0
University of Virginia**	62,957,223	170,595,000	233,552,223
Virginia Commonwealth	35,506,443	59,545,000	95,051,443
Virginia Military Institute	2,792,806	0	2,792,806
Virginia State	0	50,807	50,807
Virginia Tech	54,263,533	13,070,000	67,333,533
William and Mary	28,103,058	0	28,103,058
Totals	$406,376,004	$266,575,014	$672,951,018

Note: Debt issued by the Virginia College Building Authority and allocated to institutions for equipment leasing are not included.

*9(d) debt includes specific revenue pledge debt as well as general revenue pledge debt issued pursuant to the Alternative Financing Guidelines.

**The debt of the University of Virginia may include debt issued for Clinch Valley College.

Source: Department of the Treasury, March 28, 1995.

Planning and Design

DGS, specifically BCOM, is the primary State agency involved in the review of plans and designs for capital projects. This review is focused on building code compliance, compliance with the Virginia Public Procurement Act, and identifying excessive costs in the project design. BCOM has promulgated extensive regulations, published in the *Capital Outlay Manual*, concerning topics such as design standards and contract procurement and administration. As already mentioned, DEQ coordinates an environmental review of capital projects. Project designs are also reviewed by the Art and Architecture Review Board and, in the case of most renovations, by the office of the State Fire Marshal located in the Department of Housing and Community Development.

Table 2

1992 General Obligation Bond Funding and Expenditures

Institution	Authorized*	Expended as of March 31, 1995
Christopher Newport	$17,066,156	$12,635,462
Clinch Valley	8,681,400	891,403
Community College System	76,695,200	29,176,201
George Mason	47,157,424	15,721,716
James Madison	34,260,787	6,561,849
Longwood	6,119,766	722,683
Mary Washington	12,536,107	5,136,663
Norfolk State	15,732,238	9,467,764
Old Dominion	33,420,319	4,824,037
Radford	19,427,200	9,132,060
Richard Bland	2,380,056	2,341,550
Southwest Virginia Higher Education Center	9,900,000	344,200
University of Virginia	36,594,127	34,735,878
Virginia Commonwealth	43,056,533	20,291,735
Virginia Military Institute	10,719,100	4,763,443
Virginia State	16,488,200	3,935,200
Virginia Tech	44,359,969	20,960,491
William and Mary	26,256,718	7,718,628
Totals	$460,851,300	$189,360,963

*Authorization includes allocation of $6,976,000 to provide access to handicapped persons at various institutions of higher learning.

Source: Department of the Treasury, April 25, 1995.

DGS Review of Projects. Each institution of higher education is required to submit a number of standard forms and other documentation to DGS/BCOM during the project design and execution. In addition to the review requirements listed above, the *Code of Virginia* mandates that agencies and institutions of higher education submit value engineering studies for projects having estimated costs greater than $5 million. This requirement can be waived by the Director of DGS if "compelling reasons" are given. Value engineering refers to a systematic process of review and analysis of a capital project by a team of persons not originally involved in the project. The value engineering study may challenge specific project design criteria and user requirements. This challenge is posed in order to identify alternative items or procedures that might lower construction and/or life cycle cost.

Institutions of higher education must follow DGS guidelines for the procurement of architectural and engineering services. The *Capital Outlay Manual* establishes multiple categories of procedures for procuring these services. The most commonly used of these procedures is the method necessary to attain services that are anticipated to cost $15,000 or more. This procedure requires that the institution prepare a request for proposals, advertise the project, evaluate and rank submitted proposals, interview the top respondents, and finally negotiate a fee amount. If the anticipated amount of contract is expected to be less than $15,000 but more than $2,000, the agency may select at least three firms that appear to be qualified, rank the firms, and then negotiate a fee for services using competitive negotiations. If the fee is expected to be less than $2,000, the agency may select a firm that appears to be qualified and then negotiate for services.

A more expedient procurement procedure may be used in the case of an emergency or when the fees paid to the architectural and engineering firm are less than $15,000. The final procurement option outlined in the *Capital Outlay Manual* allows for the use of open-end (or term) contracts. This type of contract allows agencies to hire a contractor to do multiple small projects over a specified period of time. There are restrictions on the use of open-end contracts. None of the individual projects within the contract may exceed $50,000, and the aggregate total of the contract may not exceed $100,000.

Once hired, the architectural and engineering firm begins development of detailed project drawings and specifications. In the process of doing so, the architectural and engineering firm must comply with extensive DGS regulations concerning engineering and technical project criteria, and project design requirements. The *Capital Outlay Manual* discusses nine broad categories of engineering and technical criteria pertaining to the following:

- architectural,
- civil,
- electrical,
- mechanical/energy,
- asbestos,
- central heating and chiller plants,
- underground storage tank systems, and
- the Chesapeake Bay program.

The project design requirements contained in the *Capital Outlay Manual* begin by noting the differences between design work for private sector projects, and that done for the State:

> The Commonwealth cannot limit bidding to a selected list of contractors known to do good work. Unless prequalification is approved for the project, any licensed contractor may bid. Therefore, drawings and specifications must leave nothing to the imagination. They must be clear, concise, and provide thorough detailing of existing and proposed construction.

A detailed cost estimate is required with each project design submitted to BCOM. The cost estimate prepared for each design submittal is expected to reflect the architectural and engineering firm's best information and experience, and is required to reflect all requirements of the contract plans and specifications. The final project cost estimate is prepared from complete drawings and specifications. The estimate must provide a full and accurate description of each building system.

ASBO Designation. State agencies may request authority from DGS to act as an Assistant State Building Official (ASBO). The ASBO designation carries the authority to conduct reviews of preliminary and working architectural and engineering project drawings and specifications internally, without having to submit them to BCOM. In order to be granted ASBO status, an institution of higher education must employ at least one registered architect. The institution must also employ at least one registered engineer in each of the following disciplines: civil/structural, mechanical, and electrical engineering. Only one state agency, the University of Virginia, currently has an ASBO designation (since 1990). Most schools do not employ the type of staff necessary to qualify for the ASBO designation.

Project Execution

Upon approval of an institution's capital project plans, DGS grants permission to advertise construction of the project for bid. In general, projects are bid on a sealed, competitive bid basis. The contract is then awarded to the lowest responsive and responsible bidder.

Competitive negotiations may be used, with the approval of DGS, for non-construction projects which cost less than $50,000. Competitive negotiations may also be used for projects using design-build or construction management contracts. A design-build approach is most commonly used with fairly straightforward designs, such as a warehouse, and involves an architect and general contractor working as a team for a fixed fee throughout the project design and execution. The construction manager provides expertise in construction technology, scheduling, cost value engineering, bid packaging, and contract supervision and management. In some cases a construction manager may hold contracts with subcontractors in lieu of the owner using a general contractor.

If issues arise during the construction phase of a project that require money to be added or subtracted from the project budget, a change order must be submitted and approved by a representative at the agency where the work is being done. Change orders that require a construction budget change of 25 percent or $15,000, whichever is less, must be approved by the agency representative as well as by the director of DGS, the Governor's designee for approval of change orders.

Once a contractor has been selected and construction is ready to begin, the inspection process also begins. The *Capital Outlay Manual* requires that all projects have a full-time inspector to assure that the facility is being built according to the Uniform Statewide Building Code. The college will also often hire inspectors in different

disciplines to conduct specialized analyses of items such as concrete and foundations. When construction is nearing completion BCOM, DEB, the Fire Marshal's Office, and DCR also conduct on-site inspections. DEB is the entity authorized to issue the certificate of use and occupancy when it is determined that all the vital components of the building are complete. When a capital outlay project is complete, the agency and its architectural and engineering firm and general contractor are responsible for filling out a series of forms related to project close-out. Upon completion of the forms and submittal of as-built drawings, BCOM closes the project file.

INSTITUTIONAL MAINTENANCE

One aspect of the State's capital outlay program not explicitly covered by the capital outlay process is institutional maintenance. Facilities at Virginia's public institutions of higher education represent a substantial share of the State's capital assets. These physical assets, which play a vital supporting role in enabling each institution to fulfill its stated mission, require prudent long-term management. Maintenance is funded through both the operating and capital budget. A lack of commitment to fund either of these can lead to costly capital projects later.

According to data provided by the Division of Risk Management in DGS, facilities at institutions of higher education currently have a replacement value of approximately $2.5 billion for their educational and general buildings. As a valuable asset for the State, the functional and financial value of these facilities need to be maintained. Maintenance of State buildings is a significant operating expense incurred by agencies of the Commonwealth and comprises an important link between the capital budget and the operating budget.

Every time a new building is constructed, an obligation for maintaining that building is created. Facilities will naturally deteriorate over time without appropriate maintenance. Deterioration can be compounded if maintenance needs are not promptly met. For example, a leaking roof that is not corrected may lead to water damage inside the building which, in turn, may lead to structural, electrical, or other problems. Where maintenance needs increase due to untimely repairs, so do the costs associated with these needs. It is in the State's best interest, therefore, to recognize the obligation of maintaining facility assets in good working order. Recognizing the link between capital projects and the operational costs associated with these projects, the State has developed two avenues of funding for institutional maintenance: maintenance funding from the operating budget and maintenance funding from the capital budget through maintenance reserve.

Ordinary Maintenance. Most maintenance expenses are paid for out of institutional operating budgets. For the institutions of higher education, these operating budgets are comprised of general fund support, as well as non-general fund sources such as tuition, fees, and auxiliary enterprise funds. Operating budget expenditures usually fund the minor or routine maintenance that makes up the day-to-day tasks of an

institution's facilities management program. DGS has issued standards, policies, and procedures governing facilities management programs at the institutions of higher education.

For example, the *Capital Outlay Manual* requires each institution to implement a preventive maintenance program involving the scheduled processes of routine inspection, cleaning, adjustment, testing and minor repair of buildings, infrastructure systems, and equipment. This is distinguishable from repairs that are made only after something breaks. These types of policies and procedures make up institutions' facilities management programs, which again are primarily funded through the operating budget.

Maintenance Reserve. Major maintenance expenses are usually appropriated from the capital budget through a special maintenance reserve fund intended to supplement operational expenditures for maintenance. This fund was created specifically for more expensive maintenance projects, usually in the cost range of $25,000 to $500,000. A percentage of unused appropriations from the fund can be carried over from biennium to biennium by the institutions. Maintenance reserve projects are normally performed through contracts with architectural and engineering firms and general contractors.

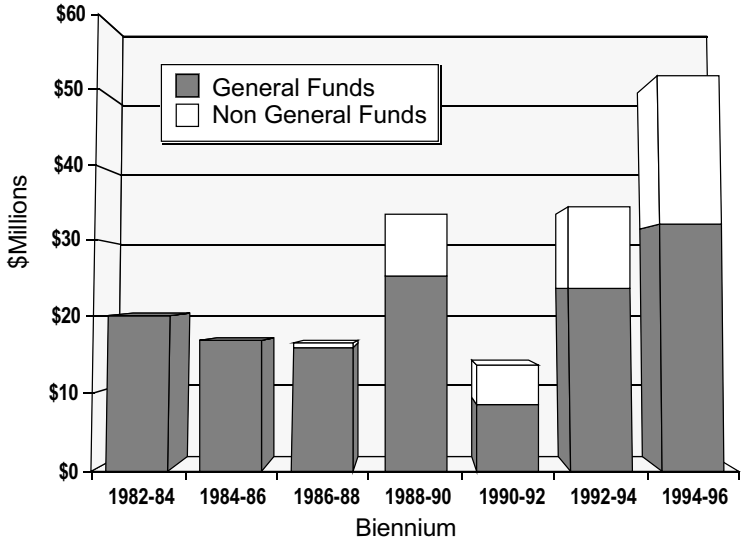
The maintenance reserve fund was established during the 1982-84 biennium. According to §2-1.F of the 1994-96 Appropriation Act, maintenance reserve is an attempt to address funding deficiencies for maintenance in the operating budget for State facilities supported wholly or in part by the general fund. Maintenance reserve is primarily intended to maintain or extend the useful life of facilities; it is not intended to enhance or upgrade facilities, except where such improvements are incidental to the main purpose of a project. In order to regulate agencies' use of maintenance reserve, DPB has established criteria for inclusion in the program. These are:

- repair or replacement of functionally obsolete, damaged, or inoperable equipment (such as elevators, furnaces, etc.);
- repair or replacement of components of plant (such as roofs);
- repair or replacement of existing utility systems (such as HVAC); and,
- corrections of problems resulting from erosion and drainage.

Since the inception of the program in 1982, more than $180 million in general and non-general funds have gone to the institutions of higher education for maintenance reserve projects. Figure 2 shows the funding history of the maintenance reserve program. All of the institutions of higher education have praised the program and the resulting improvements in the condition of facilities.

Figure 2

Maintenance Reserve Funding: 1982-1996



Source: JLARC staff analysis of Appropriation Acts.

III. Capital Planning

The 1994 Appropriation Act directed the State Council of Higher Education for Virginia (SCHEV) to prepare a report listing the unfunded capital outlay needs of public institutions of higher education for the ten-year period from 1997 to 2006. The State institutions of higher education submitted ten-year capital outlay requests to SCHEV that reflected $2.1 billion in general fund support for capital outlay over the next decade. Approximately $1.5 billion of this was for new construction. In assessing the level of valid capital outlay needs in higher education, there are five significant instruments available to guide capital planning. These include master plans, enrollment forecasts, space utilization data developed by SCHEV, SCHEV's fixed asset guidelines, and the six-year capital outlay plan. These five instruments should form the basis for systematic capital outlay planning for higher education. Some of these instruments are not available as planning tools in other areas of State government.

The Governor's Commission on Government Reform stated that a comprehensive master plan is the first step in a sound capital outlay process and must include program information for an institution. However, master planning is not as useful in capital planning for higher education as it should be. This is because the State does not have an adequate definition of what a master plan should be. Clarifying the definition of a master plan and providing broad guidance on what should be in a master plan would help improve the usefulness of the master plan in capital planning. The master plan approval process is currently non-functional, and the approval of master plans should be delegated to senior institutions' boards of visitors and to the State Board for Community Colleges.

Enrollment forecasts made by institutions and approved by SCHEV show significant growth in Virginia's system of higher education. However, this growth is concentrated in a few, predominately urban institutions. Enrollment growth should be considered in capital decisionmaking. However, SCHEV's most recent enrollment forecast does not suggest a compelling need for new construction throughout the entire system of higher education. This does not mean that there will not be substantial maintenance reserve and renovation needs.

At present, most institutions of higher education are not utilizing their existing facilities in accordance with SCHEV guidelines. The restructuring plans submitted by institutions of higher education in the fall of 1994 contain various plans by institutions to increase their utilization of existing space. SCHEV and the Secretary of Education should monitor the implementation of these elements of institutional restructuring plans.

SCHEV's fixed asset guidelines are a useful analytical framework with which to assess capital outlay needs. The fixed asset guidelines have been significantly improved by a recent revision adopted by SCHEV in February 1995. These guidelines could be made more helpful by including criteria for assessing renovation projects and the need for new campuses.

The State's funding of capital outlay needs has recently been characterized as an episodic approach. The uneven pattern of funding for higher education capital outlay presents a challenge to implementing a meaningful six-year capital outlay plan. Additional approaches for funding higher education capital outlay are needed. One of these approaches could include expansion of the Virginia College Building Authority (VCBA) as a vehicle for issuance of 9(d) debt.

MASTER PLANNING

The *Capital Outlay Manual* requires that each agency of the Commonwealth which possesses State-owned real property prepare a comprehensive master plan. The master plan is intended to depict current and future land use and guide future growth of the agency's physical plant in a planned and orderly fashion. Colleges and universities have spent from $10,000 to more than $100,000 to prepare master plans.

The *Capital Outlay Manual* is the only source of guidance on preparing a master plan. This guidance only outlines technical and format requirements. Staff at some institutions said the manual requires a plan be submitted to the Department of General Services (DGS) in a format that is not in the best form for the submitting agency's use. Clarifying the definition of a master plan would increase the usefulness of these plans.

Master plans are supposed to be approved by the director of the Department of General Services, the Governor's designee for master plan approval. To be approved, the *Capital Outlay Manual* prescribes that agencies submit their master plan to DGS's Bureau of Real Property Management (BRPM). BRPM distributes master plan submissions to several agencies for review and comment prior to making an approval recommendation to the department director. Most colleges and universities do not currently have a DGS approved master plan. Therefore, the value of the master plan approval process must be questioned.

The Definition of a Master Plan Is Unclear

The definition of a master plan and how the plan is used needs to be reconsidered. DPB's study of the capital outlay process recommended that agencies should improve long-term planning by integrating strategic planning, existing space utilization analysis, and capital planning. The State's requirements for long-term capital planning appears to be manifested in the State's requirement for an approved master plan. However, these master plan requirements deal only with site planning issues.

The State's direction to agencies on master planning is limited mostly to technical format requirements as promulgated in the *Capital Outlay Manual*. The manual requires drawings and maps of existing conditions and future expansions and development. It also requires narrative detail to supplement the drawings and maps.

The drawings and maps show topographic and utility information. Program related information such as projected enrollments and special initiatives is not required. Since no program information is required, the *Capital Outlay Manual's* requirements are essentially for only a site plan.

Some college and university representatives questioned the type of detail sought by the *Capital Outlay Manual*. Most staff said the technical master plan requirements were not that useful in terms of the broad concepts with which the universities deal. Nevertheless, staff at each State university and college considered the preparation of a master plan to be a useful process. In fact, many colleges and universities went beyond the technical requirements and included program related information on their master plans.

Defining what a master plan is and providing broad guidance on what should be considered during master plan development would help clarify how the master plan represents an institution's capital planning. Master planning should evaluate an institution's long-range assessment of current resources and needs and develop goals and strategies. According to facilities management literature, these plans should include an analysis of enrollment projections, space utilization, space need projections, financial projections, future academic and program relationships, as well as land use, physical facility siting, landscaping, and utilities and service placement. Since flexibility should be encouraged for institutions to develop a plan that best meets each institution's needs, no single format should be mandated. It should be noted that SCHEV is not currently responsible for issuing master plan guidance. However, language should be added to the Appropriation Act to authorize SCHEV to issue broad guidelines that outline the issues and concepts that should be addressed in the master plan of an institution of higher education.

Recommendation (1). **The General Assembly may wish to consider revising Section 4-4.01(c) of the Appropriation Act to direct the State Council of Higher Education in Virginia to issue guidance to the institutions of higher education which outlines the components of an adequate master plan.**

Approval of Master Plans Should Be Delegated to Boards of Visitors

The *Capital Outlay Manual* requires that master plans be approved by the DGS director. The only other requirement for a master plan is implicitly made in Section 4-4.01(c) of the Appropriation Act, which states that in reviewing requested capital projects, the Governor must determine whether or not the project conforms to a site or master plan approved by the Governor for a program approved by the General Assembly.

Despite the requirement that all capital projects are supposed to be based on approved master plans, the most recent master plans or revisions have been approved for only four of 15 senior institutions and for none of the community college campuses. Exhibit 1 shows the status of the college and university master plans based on

Exhibit 1

Status of Educational Institution Master Plans as of March 1995

Educational Institution	Date of Most Recent Master Plan or Revision	Status of Most Recent Master Plan
Christopher Newport University	1991	tentative approval
Clinch Valley College	1992	on hold by institution
George Mason University*	1992	on hold by institution
James Madison University**	1993	undergoing review
Longwood College	1991	on hold by institution
Mary Washington College	1991	undergoing review
Norfolk State University	1994	undergoing review
Old Dominion University	1987	undergoing review
Radford University	1993	undergoing review
Richard Bland College	1992	on hold for mission clarification
University of Virginia	1990	on hold by institution
Virginia Commonwealth/MCV	1990/1987	withdrawn by institution/approved
Virginia Military Institute	1991	approved
Virginia State University	1989	approved
Virginia Tech	1994	undergoing review
William and Mary	1993	undergoing review
Community Colleges	28 of 37 campus plans prepared since 1993	10 undergoing review, 18 on hold by system, none approved

*Fairfax campus only

**College of Integrated Science and Technology campus only

Source: Interviews with SCHEV and college and university staff, March 1995.

discussions with institution staff. Given the current lack of approval by central agencies, the State may be better served by decentralizing the approval of master plans to the institutions' boards of visitors.

Master Plans Are Not Approved by Central Agencies. The master plan review process may be part of the reason why most college and university master plans have not been approved. Clear accountability and responsibility have not been assigned for approving master plans. This may be because master planning is an infrequently performed activity. Furthermore, there are no repercussions for failing to have an approved master plan. Unlike capital projects, which cannot proceed until various DGS reviews are completed, colleges and universities do not face any consequences for failing to have a DGS approved master plan.

The master plan approval process begins with BRPM. BRPM is charged with coordinating the reviews of these documents by several other central entities. These entities include:

- the Bureau of Capital Outlay Management,
- the State Council of Higher Education for Virginia,
- the Department of Planning and Budget,
- the Art and Architecture Review Board, and
- other appropriate agencies, including the Department of Environmental Quality.

Some agencies, such as DPB and SCHEV, have no formal authority to review master plans except for a reference in the *Capital Outlay Manual* that states master plans are to be reviewed by these agencies. Consequently, these agencies have no specific procedures to respond to review requests or to guide their reviews. Exhibit 2 displays the agencies that review master plans, their authority to review plans, and what the agency reviews the plans for. Figure 3 shows the current master plan approval process.

The current master plan review process appears to be non-functional because institutions prepare master plans, at considerable time and expense, and they are not approved by central agencies. Representatives at several institutions stated that they never received any notification of approval for their master plans, yet these were the plans on which they based their capital project requests. In addition, staff at some institutions with master plans on hold stated that they had submitted their plans for approval. However, because their plans did not meet DGS's format requirements, the plans were returned for modification. Since the institutions had achieved their objectives in preparing a master plan, the staff did not make it a priority to reformat the plans to satisfy the DGS requirements.

Approval Could Be Delegated to Boards of Visitors. The different reporting relationship of institutions of higher education to the Governor may warrant a different approval process than the approval process used for most other State agencies. Senior institutions are all governed by boards that are appointed by the Governor. These boards have a fiduciary responsibility to oversee the direction of the institution.

Similarly, community colleges are all governed by the State Board for Community Colleges. Having master plans approved only by the governing board may be all that is necessary. Given the current approval process of master plans, this is essentially the level of master plan approval now in effect for most institutions. Furthermore, some institutions' representatives have indicated that the only question they ever receive from central review entities about master plans is whether a proposed capital project is on their master plan. If this is the case, all the reviews by central agencies appear to be adding little value.

Recommendation (2). **The General Assembly may wish to consider amending Section 4-4.01(c) of the Appropriation Act to delegate final approval of senior institutions' master plans to the institutions' boards of visitors and community college master plans to the State Board for Community Colleges.**

Exhibit 2

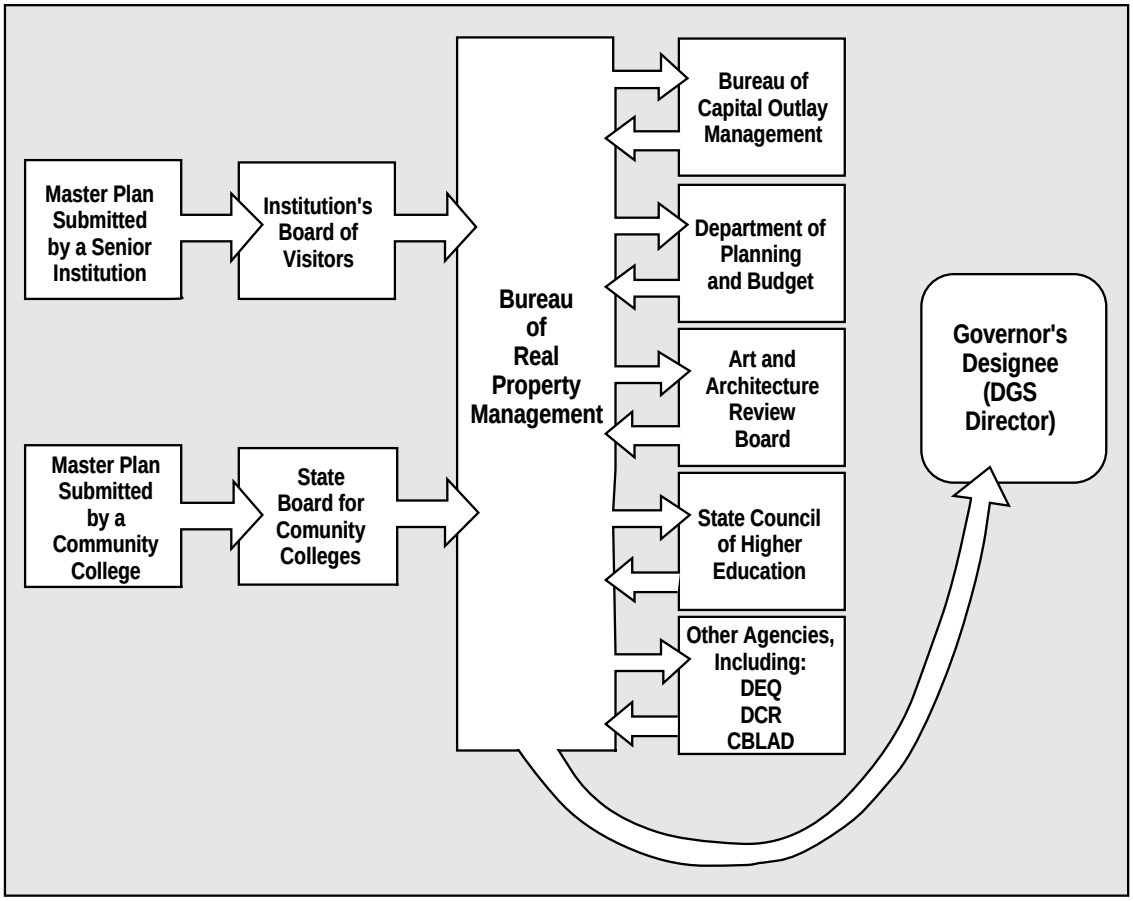
Master Plan Approval Agencies

Agency	Authority for Review	Scope of Review
Bureau of Real Property Management of DGS	*Capital Outlay Manual*	Check property borders and land use
Bureau of Capital Outlay Management of DGS	*Capital Outlay Manual*	Check compliance with technical and format requirements specified in the *Capital Outlay Manual*
Department of Planning and Budget	*Capital Outlay Manual*	General
Art and Architecture Review Board	*Capital Outlay Manual* and indirectly §2.1-488.4 of *Code*	Provides advice on artistic character
State Council of Higher Education for Virginia	*Capital Outlay Manual*	General
Department of Environmental Quality	*Capital Outlay Manual* and indirectly §10.1-1188 of *Code*	Check need for permits and compliance with environmental regulations
Chesapeake Bay Local Assistance Department	*Capital Outlay Manual* and indirectly §10.1-2114 of *Code*	Check consistency with local Chesapeake Bay preservation area plans
Department of Conservation and Recreation	*Capital Outlay Manual* and indirectly §10.1-603.5 of *Code*	Check compliance with storm water management regulations

Source: JLARC staff interviews with State agency staff, January-March 1995.

Figure 3

Current Master Plan Approval Process



ENROLLMENT PROJECTIONS AFFECT CAPITAL OUTLAY NEEDS

Enrollment at Virginia's colleges and universities is expected to increase between the present and 2008. However, this growth will be concentrated at a few institutions of higher education and should not be interpreted as creating a generalized need for new construction of facilities throughout Virginia's system of higher education. SCHEV's most recent enrollment projections, from April 1995, show that growth in enrollment is concentrated among a few colleges and universities. Most other institutions of higher education will experience relatively modest increases in enrollment or, in some cases, no enrollment increase at all.

SCHEV staff caution that, in reviewing enrollment projections, selective institutions have more control over their ability to realize projected enrollment. Less selective or non-selective institutions are in a more tenuous position in terms of attracting needed enrollment. For example, during the current school year some institutions have suffered operating deficits due to lower-than-expected enrollments, either in terms of total number of students or, in some cases, the proportion of out-of-state students.

Senior Institutions Expect Substantial Growth, But Some Are Experiencing Enrollment Shortfalls

Enrollment among senior institutions is projected to grow substantially between 1994 and 2008, but most of this growth is projected to be accommodated by five institutions, several of which are located in urban areas of the State. Approximately 42,000 full-time equivalent (FTE) additional students are expected to come to State-supported senior institutions by 2008. The fall headcount is projected to increase by approximately 57,000. Table 3 reflects current enrollment and projected enrollment changes from 1994-95 school year to 2007-08 school year for senior institutions.

Table 3

Projected Enrollment Changes at Senior Institutions from 1994-95 to 2008-09

Institution	1994-95 Annual FTE	Projected Change in Annual FTE 1994-2008	1994-95, Fall Headcount	Projected Change in Fall Headcount 1994-2008
Christopher Newport	3,580	1,659	4,705	1,745
Clinch Valley College	1,182	238	1,414	299
George Mason University	15,925	13,699	21,774	25,282
James Madison University	11,800	3,447	11,680	3,655
Longwood College	3,440	624	3,351	801
Mary Washington	3,640	2,842	3,727	3,047
Norfolk State University	7,589	1,652	8,667	1,931
Old Dominion University	13,038	5,207	16,490	6,729
Radford University	8,668	1,915	9,105	1,922
University of Virginia	20,288	1,996	21,421	2,221
Virginia Commonwealth	17,166	4,794	21,523	5,128
Virginia Military Institute	1,428	160	1,179	121
Virginia State University	3,732	1,403	4,007	1,621
Virginia Tech	25,666	1,456	25,842	1,564
William and Mary	7,470	482	7,547	480
Totals	144,612	41,574	162,432	56,546

Source: JLARC staff analysis of SCHEV's April 1995 draft enrollment projections.

Of the projected growth in enrollment among senior institutions, approximately 33 percent of the increase in annual FTE and 45 percent of the increase in headcount is projected for George Mason University. Four other institutions, Old Dominion University, Virginia Commonwealth University, James Madison University, and Mary Washington College are also projecting substantial growth. These five senior institutions account for 72 percent of the projected enrollment growth in annual FTE and 78 percent of the growth in fall headcount among senior institutions.

Most of the other ten senior institutions expect some growth between 1995 and 2008. However, these ten senior institutions combined account for less than one-third of the projected enrollment growth in annual FTE and less than one-quarter of the expected growth in fall headcount system-wide. Some of these institutions are projecting significant growth in terms of their current size. Christopher Newport University projects its annual FTE to increase by nearly 50 percent; however, the university has recently acquired Ferguson High School, which substantially increases its available space. Virginia State University is also anticipating significant growth in terms of its current size, as are Norfolk State University and Radford University. One of the challenges for the State's decisionmakers will be determining the extent to which senior institutions, especially those having trouble meeting enrollment now, will be able to meet their enrollment projections in the future. This is partially dependent on policy decisions such as tuition, admission standards, and curricular changes.

Community College Growth is Concentrated in Urban Institutions

The concentration of enrollment increases among a few urban institutions is even more pronounced among community colleges than among senior institutions. According to SCHEV projections, the community college system should anticipate an additional 9,000 FTE students and 15,000 fall headcount by 2008. Like the growth in the four-year institutions, the growth in community college enrollment will be largely concentrated in urban institutions. Northern Virginia Community College will absorb nearly 50 percent of the enrollment growth among community colleges. Another 43 percent of the total enrollment growth will be absorbed by three other colleges: Sargeant Reynolds Community College, John Tyler Community College, and Tidewater Community College.

The remaining 19 community colleges are projected to account for less than ten percent of the growth in annual FTE and less than 15 percent of the growth in fall headcount system-wide. In fact, nine community colleges are projected to have declines in enrollment between 1994 and 2008. Table 4 shows projected enrollment changes for community colleges.

Richard Bland College projects that its fall headcount will increase from 1,223 in 1994-95 to 1,562 in 2007-2008. Annual FTE at Richard Bland is projected to increase from 932 to 1,186 during the same period.

Table 4

Projected Enrollment Changes at Community Colleges from 1994-95 to 2007-08

Community College	1994-95 Annual FTE	Projected Change in Annual FTE 1994-2008	1994-95, Fall Headcount	Projected Change in Fall Headcount 1994-2008
Blue Ridge	1,421	74	2,746	137
Central Virginia	1,982	-47	3,959	-55
Dabney S. Lancaster	847	-21	1,414	-20
Danville	1,874	4	3,339	4
Eastern Shore	393	13	659	24
Germanna	1,347	229	2,577	434
J. Sargeant Reynolds	5,448	727	9,379	1,363
John Tyler	2,628	734	5,626	1,437
Lord Fairfax	1,573	146	3,017	274
Mountain Empire	1,822	-22	2,722	-38
New River	2,067	180	3,126	457
Northern Virginia	21,494	4,216	37,655	7,656
Patrick Henry	1,495	-18	2,335	-32
Paul D. Camp	820	22	1,478	54
Piedmont Virginia	1,864	316	3,729	628
Rappahannock	1,034	48	1,893	110
Southside Virginia	2,032	-157	3,731	-273
Southwest Virginia	2,836	-151	4,355	-188
Thomas Nelson	4,395	345	7,483	673
Tidewater	10,629	2,394	17,749	2,986
Virginia Highlands	1,318	-32	1,938	-27
Virginia Western	3,319	-80	6,136	-85
Wytheville	1,512	-37	2,464	-34
Totals	74,150	8,883	129,510	15,485

Source: JLARC staff analysis of SCHEV's April 1995 draft enrollment projections.

UTILIZATION OF EXISTING FACILITIES BY INSTITUTIONS OF HIGHER EDUCATION NEEDS IMPROVEMENT

SCHEV staff calculate utilization of existing facilities at institutions of higher education by comparing class scheduling and class enrollment data with an institution's room-by-room inventory of space. Based on a spot check of selected buildings at eight institutions by JLARC staff, there appear to be inaccuracies in the room-by-room inventory. SCHEV should increase its efforts to ensure the accuracy of this database.

Based on SCHEV's 1994 utilization data, most institutions of higher education are not meeting SCHEV standards for utilization. These standards are currently 40 hours per week for classrooms and 24 hours per week for laboratories. Utilization of existing facilities is one issue that should be considered in examining capital outlay requests.

Institutions of higher education submitted restructuring plans in the fall of 1994 that address, among other issues, approaches to increase space utilization. SCHEV should monitor the implementation of these plans. SCHEV should also compile lessons learned from the implementation of these plans in terms of best practices for increasing space utilization.

SCHEV's Room-by-Room Inventory Contains Some Inaccuracies

SCHEV's room-by-room inventory of space is based on data submitted by institutions. SCHEV staff are responsible for maintaining the database and verifying its accuracy. JLARC staff tested the accuracy of this database by visiting eight colleges and universities and reviewing a sample of buildings at each institution. For each building, the room-by-room inventory was compared with JLARC staff's on-site observations. JLARC staff checked the space inventory against their on-site observations in the following areas:

- verifying the existence of rooms on the inventory and ensuring that no additional space existed in the building that was not listed on the inventory,
- verifying that room usage (classroom, science laboratory, computer laboratory, office, etc.) was correctly stated on the space inventory,
- verifying the number of stations for each applicable room (JLARC staff counted the number of stations as correct if their on-site observation came within ten percent of the stated number).

At two of the institutions that were a part of this spot check, JLARC staff did not find any significant discrepancies. However, at the remaining six institutions, JLARC staff identified a significant number of discrepancies in terms of room usage and the number of stations indicated. Table 5 summarizes these discrepancies. It should be emphasized, however, that the number of errors noted, while significant in absolute terms, is relatively small in terms of the total number of rooms reviewed.

SCHEV staff stated that they periodically audit data submitted by colleges and universities for the room-by-room inventory. Because of the important role that this database plays in making important capital outlay funding decisions, SCHEV staff should attach a higher priority to data validation of the room-by-room inventory. This should include periodic and thorough on-site inspections of a sample of buildings from this inventory.

Table 5

Errors Noted in SCHEV Room-by-Room Inventory

Type of Error	Number of Errors
Incorrect room usage	24
Incorrect number of stations (classroom)	42
Incorrect number of stations (laboratory)	20
Room not listed but observed	3
Total number of errors	89

Source: JLARC staff spot check of selected buildings at eight colleges and universities, March 1995.

Recommendation (3). **The State Council of Higher Education for Virginia should increase its review of the accuracy of the room-by-room inventory of space maintained by the State Council. SCHEV should periodically perform on-site reviews of institutions to ensure that the information reported is accurate.**

Most Institutions of Higher Education Are Not Meeting SCHEV Utilization Standards

SCHEV promulgates utilization standards for classroom and laboratory space as part of its fixed asset guidelines. According to these standards, classroom space is to be utilized an average of 40 hours per week (with 60 percent of the stations filled on average) and laboratory space is to be utilized an average of 24 hours per week (with 75 percent of the stations filled on average). These standards, adopted by SCHEV in February 1995, are similar to the previous standards.

Actual utilization for 1992 and 1994 is shown in Table 6. As can be seen from this table, only five senior institutions met the SCHEV classroom utilization standards in 1994. Table 6 also shows that only two community colleges met utilization standards for classrooms in 1994, though 18 community colleges met the standards for laboratories.

The Governor's Commission on Government Reform recommended that the General Assembly adopt a policy of not funding new instructional space at institutions that are not meeting the current utilization standard. Institutions of higher education interviewed suggested that this statement was worthwhile as a goal, but unique circumstances at some institutions, such as Virginia Military Institute, should be recognized. However, utilization of existing facilities should be one issue considered by the General Assembly in reviewing requests for additional space.

Table 6

Average Weekly Utilization of Classrooms and Laboratories at State-Supported Colleges and Universities in 1992 and 1994

Institution	Classroom Utilization Hours		Regular Laboratory Utilization Hours	
	1992	1994	1992	1994
Christopher Newport University	52.4	52.0	13.1	17.6
George Mason University	41.0	48.0	24.0	28.0
Virginia Commonwealth University	47.2	47.0	24.0	21.0
James Madison University	36.0	41.8	17.0	25.7
Radford University	35.9	41.6	15.4	17.0
Virginia Tech	34.2	37.8	16.0	21.0
Old Dominion University	38.5	34.0	22.6	21.0
Clinch Valley College	*	29.9	*	12.1
University of Virginia	29.8	29.3	13.0	13.2
Mary Washington College	18.4	27.7	11.2	9.8
College of William and Mary	26.4	27.6	10.9	18.0
Norfolk State University	30.1	27.4	14.3	12.5
Longwood College	*	25.6	*	12.8
Virginia State University	*	22.0	*	10.0
Virginia Military Institute	12.8	13.2	7.1	7.7
Richard Bland College	*	13.0	*	12.6
Lord Fairfax Community College	40.8	43.4	29.9	26.5
Patrick Henry Community College	27.8	40.4	13.0	27.8
Blue Ridge Community College	33.2	39.7	29.5	36.7
Mountain Empire Community College	*	39.4	16.4	36.7
Southwest Virginia Community College	27.7	39.4	28.1	26.2
Germanna Community College	35.4	39.1	31.7	35.0
Piedmont Community College	35.0	38.2	33.1	30.4
Northern Virginia Community College	29.9	37.7	21.4	28.6
Thomas Nelson Community College	35.4	37.3	38.3	48.5
Tidewater Community College	36.9	37.0	23.6	27.2
Central Virginia Community College	31.0	35.8	26.5	22.9
Danville Community College	36.2	34.8	19.1	21.6
Virginia Western Community College	36.4	34.4	32.2	34.8
Dabney S. Lancaster Community College	26.2	34.1	21.7	26.2
New River Community College	39.0	33.6	31.4	30.5
J. Sargeant Reynolds Community College	31.8	33.1	27.4	27.5
Southside Virginia Community College	25.3	32.6	20.8	30.2
Virginia Highlands Community College	34.7	32.3	28.9	27.8
Paul D. Camp Community College	31.0	28.0	23.0	17.2
John Tyler Community College	22.8	27.4	30.6	29.9
Eastern Shore Community College	22.4	27.2	12.6	16.3
Wytheville Community College	25.3	23.2	27.0	28.3
Rappahannock Community College	21.1	20.9	15.8	16.3
SCHEV's Standard	40.0	40.0	24.0	24.0

*SCHEV's 1992 data did not include these institutions.

Source: JLARC analysis of SCHEV's utilization data, April 1995.

On the whole, the senior institutions in urban settings (with significant commuter student populations), have much higher utilization of facilities than do primarily residential institutions. This is because commuter schools have regular night and weekend utilization of facilities that does not occur (at least in the sense of class scheduling) at primarily residential colleges and universities. In considering the SCHEV utilization data in funding new projects, the General Assembly needs to consider to what extent, if any, cultural resistance at some institutions to classes in the evening, on weekends, or at other non-peak times should be allowed to excuse relatively low utilization of existing facilities when new space is requested.

Recommendation (4). **The General Assembly should consider an institution's utilization of its existing facilities when considering its capital project requests for additional space.**

Institutional Restructuring Plans for Increasing Space Utilization

Institutions of higher education were required by the 1994 Appropriation Act to prepare restructuring plans. The State Council of Higher Education for Virginia and the Secretary of Education developed criteria for these restructuring plans. One of these criteria was increasing the use of facilities. Each institution's restructuring plan addressed increased utilization of facilities to some extent, though some were much more detailed in their responses than others.

Commonly mentioned approaches for improving utilization of existing space included implementing a central scheduling system for classrooms, discontinuing the practice of academic departments controlling classrooms, increasing the use of night and weekend classes, increasing the use of technology, and ensuring that classification of existing space was correct. Some institutions also discussed sharing space and possibly taking buildings that were not actively used out of service.

In interviews with JLARC staff, representatives of several institutions indicated that they had not fully implemented or had not yet implemented elements of their restructuring plan concerning increased space utilization. SCHEV should monitor the implementation of restructuring plans, both to ensure that they are implemented and to identify lessons learned from the implementation of these plans. SCHEV staff have indicated that these efforts are already underway.

Recommendation (5). **The State Council of Higher Education for Virginia should develop recommendations for assisting institutions of higher education in meeting the SCHEV guidelines for utilization. These recommendations should be based on, but not limited to, approaches articulated in institutional restructuring plans such as centralized classroom scheduling, sharing agreements with other institutions, and extended day scheduling. SCHEV should present its recommendations to the Senate Finance and House Appropriations Committees prior to the 1996 General Assembly session.**

Recommendation (6). **The State Council of Higher Education for Virginia should report to the Senate Finance and House Appropriations Committees prior to the 1996 General Assembly on the implementation status of commitments in institutional restructuring plans regarding increased utilization of facilities.**

SCHEV'S FIXED ASSET GUIDELINES

Section 23-9.9 of the *Code of Virginia* requires SCHEV to make capital outlay recommendations (as well as operating budget recommendations) to the Governor and General Assembly. SCHEV is also statutorily mandated to develop "policies, formulae, and guidelines for the fair and equitable distribution and use of public funds among institutions of higher education, taking into account enrollment projections." As part of the capital budget process, copies of all higher education capital budget requests are also provided to the State Council of Higher Education for Virginia. SCHEV reviews all these proposals in terms of whether they are "space justified" according to its fixed asset guidelines and submits its recommendations to the Governor. SCHEV also makes its analyses available to the General Assembly.

SCHEV plays a distinctive and important role in the capital planning and budget process by maintaining its fixed asset guidelines and making recommendations to the Governor and General Assembly based on these guidelines. SCHEV's revised fixed asset guidelines are a significant improvement over previous guidelines. These guidelines can be made more useful by providing an analytical framework for assessing renovation requests and requests for new campuses.

SCHEV's Revised Fixed Asset Guidelines Are an Improvement Over Previous Guidelines

In accordance with the *Code of Virginia*, SCHEV maintains fixed asset guidelines to assess of the capital outlay needs of the State's institutions of higher education. SCHEV developed the fixed asset guidelines to evaluate requests for capital outlay funding. These guidelines are used to define types of educational space and to develop standards for the amount of space needed by institutions in particular categories. SCHEV modified these guidelines and formally approved new space guidelines in February 1995. These guidelines are a significant improvement over previous guidelines.

The new guidelines reduced the number of space categories from 15 to six, with a seventh guideline for technology, privatization, and shared use of space. This guideline allowed institutions to trade space for technology funding. For example, George Mason requested technology funding in lieu of a space-justified building. The university thought that it could deliver instruction more cost effectively using technology than with new building construction.

For four of the six categories of space, SCHEV's fixed asset guidelines provide quantitative parameters for determining whether an institution has adequate space in the given category. For example, SCHEV's standard for classroom space is 42.5 square feet per full-time equivalent student (FTE), plus up to an additional 7.5 square feet per FTE. SCHEV staff determine if a building is "space justified" by comparing an institution's inventory of existing space in a given category with its projected enrollment and then comparing the result with the fixed asset guidelines.

SCHEV's revised guidelines also address quality of space. SCHEV staff determine quality of existing space by using a facility condition index. This issue is discussed in more detail in Chapter V.

Staff at institutions of higher education interviewed by JLARC staff also regard the new simplified guidelines as a significant improvement over the previous guidelines. In particular, higher education staff praise SCHEV's decision to reduce the number of categories of space, to make allowances for technology, and to address the quality of space needed as well as the quantity of space required. DPB staff interviewed by JLARC staff indicated that they rely on SCHEV's space planning guidelines in reviewing capital project requests.

Renovation of Existing Space and Technology Upgrades

In their ten-year capital outlay plans, institutions of higher education requested $555 million in general and non-general funds for renovation of existing space, and approximately $118 million in general and non-general funds for technology or infrastructure upgrades. The fixed asset guidelines should be expanded to provide an analytical framework for reviewing renovation requests. While the fixed asset guidelines appropriately recognize the importance of technology, it is also important for the General Assembly to recognize the potential need for technology to be more frequently replaced than buildings.

Renovation of Existing Space. Under current State policy, renovation of existing space is given priority over construction of new space. In the ten-year capital outlay plans submitted to SCHEV, institutions of higher education requested almost $484 million in general funds and approximately $71 million in non-general funds to renovate existing facilities. In some cases, the purpose of the proposed renovation project is to reprogram existing space. For example:

> *Virginia Tech's "upper-Quad conversion" project is taking existing dormitories and converting them into classrooms and faculty offices. This project allowed Virginia Tech to forgo building additional instructional and office space. The program has, however, involved the construction of additional dormitories.*

Renovation requests require a different sort of analysis than requests for new space. Renovation requests are not necessarily justified based on increased enrollment

(which is typically the case with new construction). Present State policy generally assumes that renovations are less expensive than new construction. While this may be generally true, JLARC's review of the 900 East Main renovation project highlights some of the uncertainties that are involved in projecting the costs of renovations. Because of these uncertainties, cost projections for renovations will generally be less precise than cost estimates for new construction.

Even if only a small fraction of the renovation requests submitted by institutions of higher education were to be funded, renovation of space in higher education will represent a significant investment of resources for the Commonwealth. The State may benefit from SCHEV's developing more precise guidelines to assist the State's decisionmakers in reviewing renovation requests. SCHEV's existing fixed asset guidelines provide general criteria for renovation projects, but they do not provide an analytical framework for prioritizing these requests.

Technology Upgrades. Some institutions have already received permission from the State Council of Higher Education for Virginia to request technology upgrades in lieu of a space justified academic building. For example:

> *George Mason University's restructuring plan notes that it has already replaced the need for one building with technology and intends to take this approach with at least one more building. University staff explained that technology upgrades on the campus allowed some classes to be delivered to students in their dormitory rooms or in other locations besides a traditional classroom.*
>
> * * *
>
> *Old Dominion University's TELETECHNET uses satellite technology to deliver advanced undergraduate instruction to students at community college sites across the State. This technology allows the university to reach a substantial student audience statewide and allows these students to earn an Old Dominion bachelors degree.*

While increased use of technology can both expand access to higher education and reduce spending on conventional buildings, technology may not necessarily be less expensive than new construction in the long run. The reason for this is that technology can quickly become outdated, certainly more quickly than a building. As a result, technology-based capital projects may have a much shorter useful life than more traditional building projects.

While technology is, in many cases, a worthwhile investment for the Commonwealth, technology funding should be considered in terms of long-term replacement costs, not just initial costs. SCHEV acknowledges the potential long-term costs of technology in its space planning guidelines. The General Assembly should consider these long-term costs in funding renovation projects.

Recommendation (7). **The State Council of Higher Education for Virginia should develop an analytical framework for prioritizing renovation requests for institutions of higher education. SCHEV should consider facility conditions, programmatic issues, life and safety features, overall efficiency and other appropriate criteria when prioritizing renovation requests.**

Recommendation (8). **In considering requests for technology upgrades, the General Assembly should consider the long-term replacement costs of the proposed technology project in addition to the initial costs of the project.**

The State Needs Improved Guidelines for Evaluating New Campuses

Since the approval of the General Obligation Bond Referendum in 1992, several institutions of higher education have received or requested funding for new campuses. In their ten-year capital outlay plans, institutions of higher education requested approximately $292 million in general fund support for new campuses. Several factors that motivate this type of expansion are:

- high growth rates in a community and projected enrollment increases,
- economic development potential,
- geographic access to higher education,
- new programmatic initiatives, and
- realization of long-term plans.

At present, the State does not have adequate guidelines for approval of new campuses. The State needs to develop or improve its guidelines for (1) justification of space at new campuses, (2) financial contributions expected of localities in which new campuses of senior institutions are located, and (3) assessment of economic development impacts of new campuses. In addition, the State needs to define a policy on geographic access to advanced undergraduate and graduate education.

High Growth Rates in Existing Communities and Enrollment Increases. SCHEV's *The 1993 Virginia Plan for Higher Education (Virginia Plan)* recommends development of several new campuses to help meet a projected increase in student enrollment. Most of the proposed new campuses discussed in the *Virginia Plan* are in the State's fast-growing urban crescent. One concern about the State's ability to assess new campuses is the way these new campuses are addressed in terms of space justification. New campuses are considered separately from existing campuses of the same institution, rather than considering utilization and available space at existing campuses. Therefore, an institution with low utilization and excess capacity at one campus can be "space justified" for an additional campus because projected enrollment for that campus is considered separately, rather than in conjunction with the capacity of the existing campuses. In some cases, it may serve the State's interest to more fully utilize an existing campus rather than to construct a new campus. In these cases, it would be helpful to consider whether the existing campus can be utilized more fully before construction of the new campus is considered.

Economic Development. Localities appear to be increasingly viewing new campuses of institutions of higher education as a source of economic development. In some cases, the direct impact of the campus in terms of jobs created at the campus constitutes the economic development impact. However, new campuses are also being justified in terms of their indirect economic development impact on attracting industry (by providing a skilled workforce in the locality and access to higher education for a firm's workers).

As economic development is increasingly used to justify new campuses (as well as new schools or curricula on existing campuses), it would be appropriate for the State to develop an analytical framework for assessing the economic development impact of a new campus or site. This is particularly true of the potential indirect impacts of a new campus, such as attracting new industry or retaining existing industry. SCHEV should develop appropriate indicators for economic development impacts of new campuses and an analytical framework for measuring these indicators.

Geographic Access to Higher Education. Geographic access to higher education is another issue used to justify new campuses. Geographic access to higher education has been discussed with respect to the community college system since the system was founded in the 1960s. More recently, geographic access to higher education is being discussed in terms of access to advanced undergraduate and graduate education.

The issue of appropriate geographic access to advanced undergraduate and graduate education has not been formally defined as a matter of State policy, though geographic access is now used to justify new campuses for senior institutions. The *Virginia Plan* implicitly suggests that new campuses are needed to provide Virginia residents access to at least four years of higher education, though this is not explicitly linked to geographic access and does not address access to graduate education. In contrast, the Commonwealth has a well-established policy, dating to the 1960s, to make community college instruction available within commuting distance to all Virginians. To the extent that geographic access will drive creation of new campuses, the State should adopt a policy on geographic access to advanced undergraduate and graduate instruction.

Contributions Expected of Localities. Localities within which a new campus of a senior institution is located are increasingly being expected to make a financial contribution to development of the new campus. However, there is no formal policy as to what this contribution should be, and whether the financial contribution should be a one-time transaction (such as the donation of land) or an ongoing commitment. This contrasts with the community college system, for which local responsibility for site work and other issues is well-established as a matter of State policy. To ensure fair treatment of localities, as well as to allow the State to project its own financial obligations for a new campus, the State should develop a consistent policy regarding the financial contributions expected of localities in which new campuses or sites of institutions of higher education are proposed.

New Programmatic Initiatives and Fulfilling Long-term Plans. A college or university may be motivated by a major new programmatic initiative which it believes is popular enough to support a new campus. In such instances, the new campus supporting this program initiative has generally been proposed to be near or adjacent to the original campus. An example of this type of initiative is the College of Integrated Science and Technology (CISAT) at James Madison University.

Expansion may also result from the original plan for the institution, which called for additional satellite campuses. For example, the Norfolk campus of Tidewater Community College was envisioned as part of the community college system when this system was established in the late 1960s and early 1970s.

Need for Better Standards with Which to Evaluate Proposed New Campuses. Given the level of requests for funding of new campuses or sites (approximately $292 million in general funds), it would be appropriate to develop more precise analytical guidance to assist the General Assembly in reviewing the appropriateness of new campuses. These guidelines should be developed by SCHEV, with the cooperation of the Secretary of Education and Virginia Community College System. These guidelines should address capacity and utilization of existing facilities, financial contributions expected of localities in which a new campus is located, indicators for the economic development impact of a new campus, and geographic access to advanced undergraduate or graduate instruction.

Recommendation (9). **The State Council of Higher Education for Virginia should develop guidelines for the approval of new campuses and sites. These guidelines should address, but should not be limited to, contributions to be expected of localities where the new campus is to be located, consideration of utilization at existing campuses, alternatives to the construction of new campuses or sites, and the economic development impact (if relevant) of the new campus or site. SCHEV should also develop a policy statement regarding geographic access for Virginians to undergraduate and graduate instruction.**

FINANCIAL PLANNING

The demand for capital projects is substantially greater than available funding. During the past four biennia, institutions requested capital projects worth approximately $3.2 billion, and $1.86 billion was appropriated for capital projects (Table 7). The State has begun using a six-year capital outlay plan to assess capital needs in terms of debt capacity. However, according to the six-year plan the General Assembly will need to provide consistent funding of higher education capital outlay. Financing of 9(d) projects could be enhanced if the enabling legislation of the Virginia College Building Authority (VCBA) were expanded to permit the use of pooling of debt of smaller institutions. This would lessen the debt issuance costs and reduce interest costs for smaller institutions.

Table 7

Total Higher Education Capital Project Budget Requests and Subsequent Appropriations

Biennium	Total Amount Requested	Total Amount Appropriated
1988-90	$517,491,691	$410,532,285
1990-92	787,065,996	427,729,513
1992-94	1,066,769,449	304,276,895
1992 GOB	na*	460,851,300
1994-96	$798,505,420	$257,930,900

Note: Maintenance reserve requests and appropriations are not included.

*No formal project request process was used exclusively for the 1992 General Obligation Bond.

Source: JLARC analysis of DPB listing of capital budget requests and bond authorization and appropriation acts, 1988-1996.

Six-Year Plan Requires Consistent Funding to Be Meaningful

In part to address limited funding of capital outlay in higher education, the State has introduced a six-year plan to assist decisionmaking in capital outlay. DPB presented its first six-year capital outlay plan in the 1992-94 biennium. The development of a six-year capital outlay plan was recommended in 1990 by the Secretary of Finance in a report entitled *An Assessment of Debt Management in Virginia*. That report advocated the development of a six-year plan because it would provide a unified approach to the capital budgeting and debt authorization process.

The report found that the current capital budgeting process was limited for the most part to the two-year horizon of the biennial budget. Since capital outlay projects are authorized and funded from a variety of pay-as-you-go and debt financing sources, the report stated that decisionmakers needed to have a sense of the capital needs of the future, as well as those of today to evaluate financing options and allocate the Commonwealth's cash and debt financing resources. A six-year capital outlay plan allows the Governor and General Assembly to more clearly identify available funding sources and provide a more focused structure to the allocation of resources between competing capital projects and program areas.

The six-year plan focuses on capital expenditures for the current biennium and the two subsequent biennia. The plan is developed through the normal capital outlay budget process and it prioritizes all State capital project requests. The plan distinguishes between immediate demands and longer-term needs, assesses the State's ability to meet its highest priority needs, and outlines an approach for addressing priorities in terms of costs, benefits, and financing mechanisms. The six-year plan is considered a proposed list of projects that serve as an agenda for discussions between the executive and legislative branches.

To date, two six-year plans have been presented by DPB. Table 8 presents a summary of the most recent six-year plan as it pertains to higher education. According to this plan, additional funding will be needed from several sources. The plan calls for a total of more than $328 million in general funds during the 1996-1998 and 1998-2000 biennia combined. In addition, more than $250 million in debt financing is also planned for the next two biennia.

Table 8

1994-2000 Six-Year Capital Outlay Plan for Higher Education

Biennium	General Funds	Non-general Funds	9(c) Debt	9(d) Debt
1994-1996	$16,435,000	$111,130,000	$77,820,000	$40,488,000
1996-1998	161,644,900	155,875,400	84,184,000	116,520,000
1998-2000	$166,898,000	$69,113,000	$38,374,400	$11,396,000

Source: JLARC analysis of 1994-2000 Six-Year Plans.

The six-year capital outlay plan represents an improvement in capital outlay decisionmaking. However, a plan is only meaningful when funding is consistently available for planned capital projects. The most recent six-year plan shows the executive branch's estimate that a substantial amount of funding is planned for capital projects in the next four years. The source of funds to address these plans is not clear. The lottery fund, which was designed to provide funding for capital outlay projects of all agencies, did not develop as once anticipated. As a result, the higher education system has sought other sources of revenue to address its capital project needs. The absence of any kind of steady funding source has created a cycle of peaks and valleys of capital outlay funding dependent on issuance of general obligation debt.

Expansion of the VCBA Could Enhance Ability of Institutions to Issue 9(d) Debt

The six-year plan has identified substantial funding to be provided by 9(d) debt. This type of debt is issued by the individual institutions and is not tax-supported. It is not a feasible alternative for many smaller institutions. However, if the debt of smaller State colleges were pooled into a different financing vehicle, greater use could be made of 9(d) debt. Legislation was introduced during the 1994 General Assembly session to expand the VCBA for this purpose; however, the bill was later withdrawn.

Expanding the VCBA would allow more institutions to make use of 9(d) debt financing. Currently only a few of the larger institutions use 9(d) debt financing. This is because institutions need financial strength to be able to sell their bonds at reasonable interest rates and many institutions lack the technical expertise to make these arrangements. While the State's general obligation debt gets the most favorable of all interest

rates because of its AAA debt rating, institutions using 9(d) debt typically get a rating of A. On a hypothetical $10 million, 20-year bond at current rates, the difference in total interest payments between these two credit ratings would be about $773,000.

The 1994 proposed legislation would have provided the Virginia College Building Authority the means to collectively issue the debt of several institutions to obtain a better credit rating as well as to achieve some economies of scale. According to staff at the Department of the Treasury, the proposal would have placed a moral obligation pledge on these bonds enabling the bonds to get a rating of AA. The difference in total interest payments between AA and A ratings on a $10 million bond amounts to about $423,000 over the life of the bond. This represents a potential savings to the institutions.

Furthermore, institutions currently seeking to use 9(d) debt financing must arrange the bond issue themselves. Since there are certain fixed costs with all sizes of a bond issuance, this proposal would save issuance costs by condensing all the separate bond issues into one. Treasury staff estimate that issuing separate bonds at one institution would cost $125,000. If six institutions did this, $750,000 would be paid in issuance costs. However, with Treasury's proposal to issue bonds through the VCBA, the issuance cost would be $125,000 for all institutions combined.

Recommendation (10). **The Department of the Treasury should present options to the General Assembly to expand the Virginia College Building Authority to permit the use of collective debt pools to fund capital projects.**

IV. Role of Central Agencies in Capital Project Design and Execution

Two recent reviews of the State's capital outlay process found that it is predicated on a lack of trust in the ability of agencies and institutions of higher education to design and construct cost-effective, safe, appropriate facilities. As a result, the capital outlay process involves multiple reviews of projects by central agencies. It is argued that these reviews save the Commonwealth money and prevent abuses.

However, the current capital outlay process is time consuming because of the multiple reviews involved, and projects often require supplemental funding despite close scrutiny by central agencies of proposed project expenditures. In particular, building code compliance (code compliance) review appears to take much longer for State projects than is the case for private colleges or other Southeastern public universities. Multiple reviews by central agencies also diffuse responsibility from the institution of higher education and the firms it retains to design and construct facilities. The State should streamline its reviews to determine an appropriate budget for cost effective facilities. In addition, the State should further decentralize its management of capital outlay projects to the institutions of higher education. Similar proposals (involving all State agencies and not just higher education) have been made by the Governor's Commission on Government Reform.

Decentralization of capital outlay management for higher education requires several changes. One change would be to use alternative sources for code compliance instead of review by the Department of General Services' (DGS) Bureau of Capital Outlay Management (BCOM). In addition, review by the Art and Architecture Review Board (AARB) should be clarified as a strictly advisory review to the institutions of higher education. Review by environmental agencies should be consolidated, and review for fire safety should be consolidated in the State Fire Marshal's office within the Department of Housing and Community Development (DHCD).

Administrative thresholds for approval of change orders by the Governor's designee, the director of DGS, should be raised. Institutions of higher education should also be allowed to more routinely use alternative construction approaches such as design-build and construction management. However, institutions should more consistently document the performance of their design professionals and contractors at the completion of projects.

REVIEW OF PROJECT DESIGN SHOULD BE STREAMLINED

The process for code compliance reviews can be very time consuming. However, a significant portion of the time involved in these reviews is not directly attributable to BCOM staff. Completion of code compliance reviews also involves time needed by

institutions of higher education and their architectural and engineering firms to respond to BCOM comments. The State process for code compliance review takes considerably longer than is the case with private colleges in Virginia and public universities in other states contacted by JLARC staff. The State should examine alternatives to BCOM review of code compliance such as increased use of the Assistant State Building Official (ASBO) designation, use of private firms, and use of local building officials.

The General Assembly should clarify the role of BCOM in reviewing project designs for suitability and cost effectiveness. The General Assembly may wish to: (1) remove language from 4.401(c) of the Appropriation Act directing the Governor to examine the adequacy and suitability of project designs, (2) direct that BCOM's review of a project for expenditures take place before a project budget is established, and (3) restrict BCOM's review for cost effectiveness to overall project costs, not discrete design choices.

The General Assembly may also wish to clarify the role of the AARB and consider making this an advisory review for institutions of higher education. The Secretary of Administration should examine the environmental impact review process to streamline the number of agencies asked to comment on each project.

The Code Compliance Review Process Is Time Consuming

The Bureau of Capital Outlay Management reviews project designs for code compliance as part of the Division of Engineering and Buildings' statutory function as the State's building official. Most projects require multiple submissions of project designs. BCOM sets an internal standard of 21 days for reviewing documents, but many reviews take longer than this standard. The multiple reviews involved in a typical project make the process time consuming.

In fact, the State's review process takes significantly longer than code compliance reviews performed for private colleges or for public institutions in other states surveyed by JLARC staff. The State's process is more time consuming because, in addition to code compliance reviews, it involves a review for suitability of design and for excessive expenditures. BCOM's mandate to perform these types of reviews should be clarified.

Some Reviews Exceed 21-Day Standard. BCOM sets an internal goal of reviewing a complete set of designs and specifications in three weeks; the *Capital Outlay Manual* also references a review time frame of three weeks (21 days). To quantify the time involved in review of project designs by BCOM, JLARC staff analyzed BCOM's historical database that tracks when a set of schematics, preliminary drawings, or working drawings was received by BCOM and when review comments were sent to the institution and its project architectural and engineering firm. JLARC staff analyzed this data in two ways. First, JLARC staff analyzed the average time it took BCOM staff to complete each discrete review submission of a project (schematics, revised schematics,

preliminary drawings, revised preliminary drawings, working drawings, revised working drawings). This analysis is reflected in Table 9.

Table 9

Average BCOM Review Time for Design Submittals

Type of Review	Number of Submittals	Average Review Time (Cal. Days)	Submittals* Requiring >51 days
Schematic	75	39 days	23%
Preliminary Submittal	241	41 days	28%
Revised Preliminary Submittal	36	15 days	6%
Working Drawings	571	37 days	20%
Revised Working Drawings	508	10 days	2%

*The *Capital Outlay Manual* states review of submittals will be completed in 21 days

Source: JLARC staff analysis of BCOM historical database, using all higher education capital outlay projects from July 1, 1990 to December 31, 1994.

Second, JLARC staff examined the average total time involved in review of project design by BCOM for a typical project when the total time to conduct the multiple reviews involved is considered. This included original and revised submissions for each step of the current State review process (schematics, preliminary drawings, and working drawings). The purpose of this analysis was to analyze the average time that a typical project is under review at BCOM. This analysis is shown in Table 10. On average, it takes BCOM between 78 and 142 days to complete all of its reviews of a typical project.

It is important to emphasize that the time required for BCOM's review of each design submittal is less than the total time required for a project to navigate the design review process. Table 10 does not include the time required for a design professional to respond to BCOM comments. This is not included in the analysis shown in Table 10 as it is a variable beyond the control of BCOM staff.

In contrast, DPB's review of the capital outlay process found that, on average, it took 167 days for a review of project design to be completed. DPB calculated this time frame by analyzing average time for completion of preliminary and working drawings. DPB found that a submitted C0-5 form (reflecting completion of preliminary designs) required 91 days to complete. DPB found that completion of a C0-6 form (reflecting completion of working drawings) required 76 days to complete. It must be emphasized that a significant portion of this time involves redesign by architectural and engineering firms and review by institutions of higher education, not BCOM review time.

To further examine the range of BCOM review time, JLARC staff analyzed the number of projects that fell within particular review time frames (one to ten days, 11-21

Table 10

Average BCOM Review Times for Various Combinations of Reviews

Review Stages Involved:					
Schematics	Preliminary Design	Revised Preliminary Design	Working Drawings	Revised Working Drawings	Average Time* for BCOM Review
	●		●		78 days
	●		●	●	88 days
●	●		●		117 days
●	●		●	●	127 days
●	●	●	●	●	142 days

*Calendar days

Note: A preplanning study often takes the place of a schematic submittal.

Source: JLARC staff analysis of BCOM historical database, using all higher education capital outlay projects from July 1, 1990 to December 31, 1994.

days, etc.). Table 11 illustrates this analysis. As can be seen from Table 11, BCOM reviewed a significant number of submittals (565 of 1,431 or 39 percent) within ten days, but 41 percent (580 of 1,431) of submittals required more than 21 days to review. About four percent of submittals (58 of 1,431) required 100 days or more to review.

The *Capital Outlay Manual* sets a standard of 21 days to complete reviews of submittals. As reflected in Table 9 a significant proportion of reviews of initial submittals (schematics, preliminary drawings, working drawings) extended at least 30 days beyond the *Capital Outlay Manual*'s 21-day target. Twenty-three percent of schematics submittals, 28 percent of initial preliminary drawing submittals, and 20 percent of initial working drawing submittals took BCOM staff 51 days or more to review. When BCOM's reviews of project designs extend beyond the goal of three weeks, there are five factors that appear to be involved:

- project complexity (some complex projects may take longer than 21 days to review),
- staffing constraints,
- competing workload priorities related to the State budget process (particularly preplanning studies),

Table 11

Number of Project Submittals Reviewed by Time Frames

Submittal Type	1-10 days	11-21 days	22-51 days	52-99 days	100+ days	Total
Schematics	18	12	28	11	6	75
Preliminary Drawings	46	44	83	51	17	241
Revised Preliminary Drawings	21	9	4	2	0	36
Working Drawings	122	130	202	83	34	571
Revised Working Drawings	358	91	48	10	1	508
Totals	565	286	365	157	58	1,431

Source: JLARC staff analysis of BCOM historical data base.

- agency submittal of incomplete designs, and
- the episodic nature of capital outlay in the State, for which workload will vary greatly over time.

Given the significant variation in BCOM workload (depending on the number of active capital outlay projects statewide) and the present emphasis on downsizing central agencies of State government, the State should examine alternatives to BCOM's review of code compliance for higher education capital projects. These alternatives include increased use of Assistant State Building Officials, private architectural and engineering firms, and local building officials. These options will be discussed in a subsequent section of this chapter.

Time Required for Code Compliance Reviews in State Projects Exceeds Time Required for Projects in Private Colleges and Other Southern Universities. JLARC staff conducted structured interviews with the chief facilities officers and chief business officers at six private Virginia colleges and universities. JLARC staff also conducted telephone interviews with the chief facilities officers at six public universities in the South (generally the major campus in the case of statewide systems). In each case, JLARC staff found that code compliance review is a fairly routine part of each project, conducted formally only at the working drawings stage, and generally requiring 30 days or less to complete. All institutions surveyed indicated that revised submissions are relatively rare. Exhibit 3 summarizes responses to JLARC's telephone survey of other states.

The private institutions of higher education in the State rely on local building officials to perform a code compliance review of their project designs. Staff at the institutions of higher education JLARC staff visited said that the local building official

Exhibit 3

Role of Central Agencies in Other States

State	Agency Conducting Code Compliance Review	Estimated Time for Code Compliance Review	Central Approval of Change Orders - Level Required	Use of Design -Build or Construction Management	Central Review for Expenditures or Suitability of Design
Virginia	Department of General Services	several reviews 78-142 days total review time	Changes over $15,000 or 25 percent of the contract approved by the DGS director	Use of either approach must be approved by DGS; guidelines for both issued by the Secretary of Administration in 1990	Performed by DGS as part of code compliance review
Florida	State Fire Marshal	30 working days or less by statute (one review)	Changes in scope or reductions of contingency below 3 percent approved by system chancellor	Use both routinely as deemed appropriate (no approval needed by central agencies)	None
Georgia	State Fire Marshal	30 days or less	Review by system office	Have used construction management ($35 million project)	None
Kentucky	State Fire Marshal	30 days or less (one review)	None	Use design-build routinely	None
Maryland	No formal review	na	None	Have used design-build frequently; considering use of construction management	None
North Carolina	State Insurance Department	30-60 days (multiple reviews on complex projects)	Routinely approved by Office of State Construction	No	Done separately from code compliance review (by Office of State Construction)
Tennessee	State Fire Marshal	30 days or less (one review)	Change orders over 10 percent of the contract amount are approved by the State Building Commission	No	None

Source: JLARC staff telephone survey.

reviewed working drawings within 30 days. JLARC staff called the building officials in each of these areas, and they also stated that these inspections were completed within 30 days.

JLARC staff were able to obtain records of the length of time these inspections took for several of the localities. The records confirmed that local officials' code review was completed within 30 days. While formal reviews are not conducted before the working drawings, the building official would do preliminary reviews of plans and construction if the college had any concerns.

Comparing Virginia's process for code compliance review to the process followed in other Southern states and by private colleges suggests that Virginia's capital outlay process for code compliance review is unusually lengthy. This review should be an important, but routine and fairly straightforward part of a capital project. Instead it is often a time consuming, frustrating process involving as many as five reviews of a complex project (in the case of multiple resubmissions of working drawings). Architectural and engineering firms hired by institutions of higher education are licensed professionals trained and contractually obligated to design projects to meet the building code. It is difficult to see why the multiple reviews now required by the State are necessary if competent firms are retained to provide architectural and engineering services for the State.

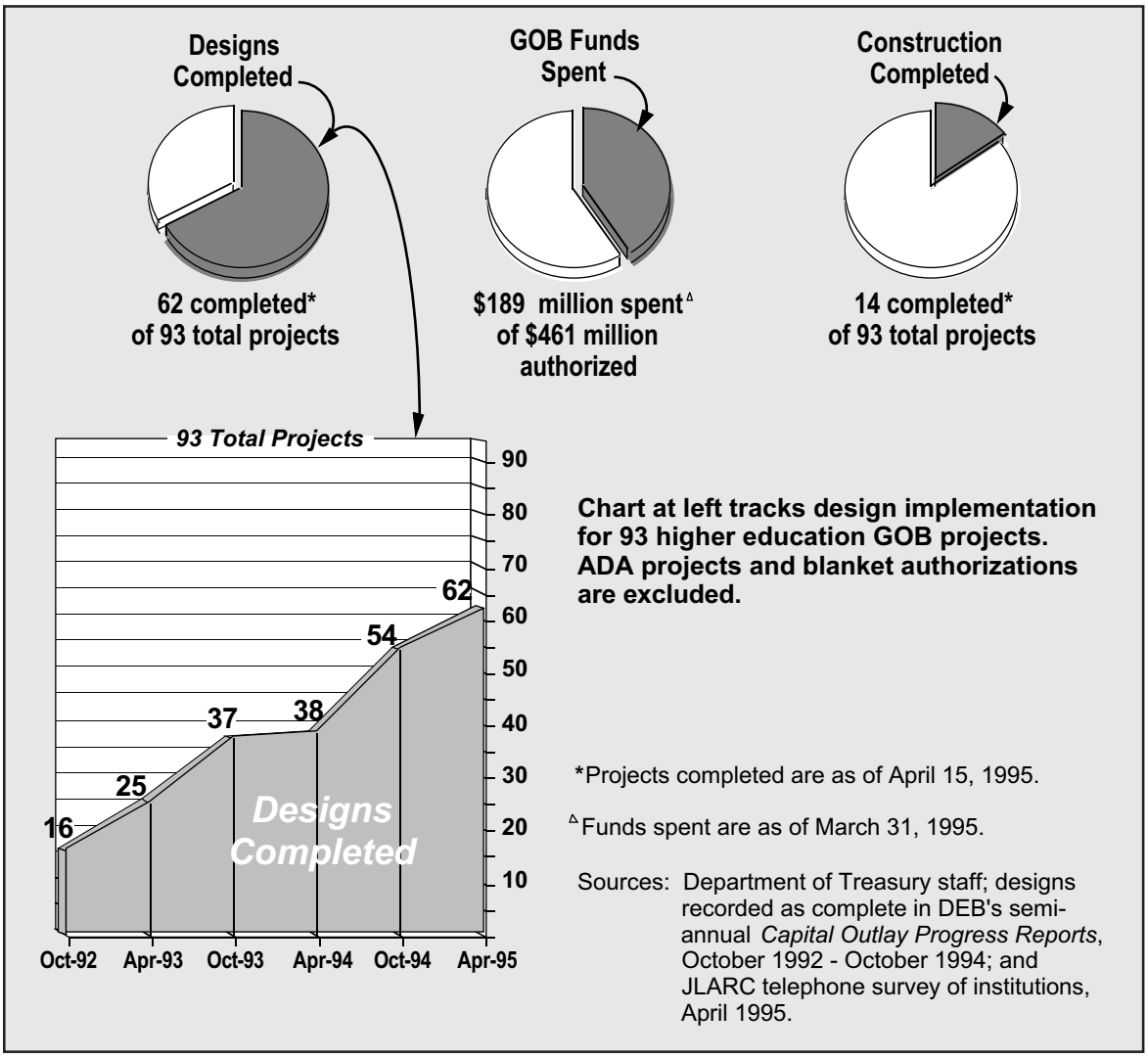
The time required for a project to complete code compliance review has been one contributing factor to the relatively slow pace of 1992 General Obligation Bond Projects. As of April 15, 1995, 67 percent of the projects (62 of 93) had completed design (Figure 4). Of the projects completing design, 14 had completed construction, though an additional 16 were more than 90 percent complete. As of March 31, 1995 only $189 million of the $461 million authorized for higher education projects had been spent. Approximately $281 million had been obligated, including project funds not provided by the GOB. Each of these figures for the General Obligation Bond projects excludes museum projects.

BCOM's Mandate for Reviewing Project Designs Should Be Clarified. The Governor is required by Section 4-4.01(c) of the Appropriation Act to ensure the cost effectiveness and suitability of project designs. BCOM reviews for these issues as part of its code compliance review. Performing these reviews has contributed to the length of reviews for code compliance.

Section 4-4.01(c) of the Appropriation Act directs the Governor "to determine whether the proposed plans and specifications for each capital project are suitable and adequate, and whether they involve expenditures which are excessive for the purposes intended." Determining whether plans are "suitable and adequate" is an ambiguous mandate that invites significant second guessing of project design. Architectural and engineering firms are retained by the Commonwealth to provide, at a minimum, suitable and adequate designs (and designs that are code compliant).

Figure 4

Status of 1992 Higher Education GOB Projects



BCOM's review of the adequacy of project designs has the potential effect of moving responsibility (and liability) from the architectural and engineering firm to the Commonwealth, notwithstanding BCOM's standard disclaimer that its reviews are performed as a service to the agency and do not relieve the architectural and engineering firm or the agency from following all applicable guidelines. The General Assembly may wish to consider eliminating language concerning suitability and adequacy from Section 4-4.01(c) of the Appropriation Act to keep the onus of responsibility for producing adequate project designs where it belongs, on the architectural and engineering firm and the responsible State institution of higher education.

BCOM maintains a historical database of the costs of various projects for different types of building systems. BCOM determines excessive costs by analyzing the

project's cost per square foot and compares this cost with the cost of similar types of projects constructed in the State. BCOM maintains a historical database of the costs of various projects for different types of building systems. BCOM staff look to eliminate excessive finishes, large open spaces, excessive exterior glass, or other items which may lead to a higher than average cost per square foot. According to the BCOM director, BCOM staff are particularly thorough in reviewing buildings that have a higher than average cost per square foot for the type of space under construction.

However, BCOM staff also probe a project's design for expenditure control beyond determining whether a project is within an appropriate range for per-square-foot cost. While the estimated per-square-foot cost can be determined by reviewing the preplanning or schematic design, discrete design features that BCOM staff may consider excessive are not identified until the preliminary drawing or working drawing review. At this time the project budget is already established, so cost savings identified at this point cannot be deducted from the project budget.

At present, BCOM staff's mission with respect to review of a project's cost effectiveness is not well-defined in statute or in the Appropriation Act, despite the general language in Section 4-4.01(c) of the Appropriation Act. The State should develop a process to ensure that capital projects are not delayed by disputes over the appropriateness of cost for design features once a project budget has been established. Both the Governor's Commission on Government Reform and DPB evaluation staff agreed that major design decisions that significantly affect project cost should be clarified before a project budget is established. BCOM's review of a project for excessive expenditures should be completed before the project's budget is established, not after.

Many State Projects Require Supplemental Funding. Despite the close scrutiny of project expenditures, a number of State capital outlay projects require additional funding once the project budget is established. DPB's review of the capital outlay process found that 42 percent of the 359 files reviewed had at least one revised CO-2 form, which initiates a capital project and establishes its scope and project budget. During an in-depth review of 68 higher education project files, JLARC staff also found 30 projects (44 percent) with revised CO-2 forms. Typically, a revised CO-2 was submitted to infuse additional funds into a capital project. Several projects contained multiple CO-2 revisions. For example:

> *A renovation project at one university was budgeted at $2,680,360 in a CO-2 signed in May 1986. In May 1987, the project budget was set in a revised CO-2 at $3,409,360. In December 1987 an additional $230,000 was infused into the project for asbestos removal. Finally, in November 1992 a fourth revised CO-2 was signed, setting the new project budget at $4,057,930.*
>
> * * *
>
> *A new construction project was originally budgeted at $11,738,100 in a CO-2 signed in June 1990. Three subsequent CO-2 forms, completed*

from February 1992 to August 1994: (1) infused $753,365 in auxiliary funds into the project, (2) reduced the equipment portion budget from $1,160,950 to $400, and (3) infused $420,445 in gifts and grants into the project (largely to restore some of the equipment funding).

The Commonwealth now has the paradoxical situation of slowing projects considerably to review them in detail for excessive expenditures and having the frequent need to infuse additional funds into projects. Further, as noted above, excessive design features are often identified after a project budget has been established and elimination of these proposed features does not cause the project budget to be revised downward. Therefore, the State does not necessarily capture these savings.

The General Assembly should consider revising the general conditions of the Appropriation Act to clarify whether this expenditure review performed by BCOM should focus on the total project cost (to ensure that the total cost is not excessive) or whether BCOM should be involved in questioning discrete design features. The State's interest may be best served by having BCOM focus, in the case of higher education projects, on establishing a realistic overall project budget, with less attention paid to individual design features. This approach would place the onus of decisionmaking for individual design choices on the institution of higher education responsible for the project and its architectural and engineering firm.

Moreover, the General Assembly should consider whether or not it is necessary and appropriate to have BCOM review non-general fund projects for cost effectiveness. Requests for projects supported by non-general funds are routinely approved by the General Assembly; however, the budgets for these projects are often revised by BCOM's review of a preplanning study. In addition, non-general fund projects go through the same type of expenditure review that projects supported by general funds or general obligation debt undergo. The General Assembly may wish to consider excluding projects funded exclusively by non-general funds from BCOM review of expenditures, though BCOM would continue to be involved in setting the project's budget. This would allow institutions of higher education to make their own management decisions about design features in projects funded with the institution's resources and would allow BCOM's review to focus on projects funded with general funds or general obligation debt.

With BCOM's role focused on establishing an appropriate project budget, code compliance review could be accomplished at the working drawings stage in a straightforward manner, using:

- BCOM staff (who at this stage would be strictly limited to code compliance review),
- agencies with ASBO status,
- an institution's own ASBO team (supplemented as necessary by consultants),

- private architectural and engineering firms, or

- local building officials.

These options are discussed in the next section of this chapter.

Recommendation (11). **The General Assembly may wish to consider revising section 4-4.01(c) of the Appropriation Act to clarify the role of the Bureau of Capital Outlay Management in review of capital projects for institutions of higher education. The General Assembly may wish to consider removing language requiring the Governor to ensure that project designs are "suitable and adequate." The General Assembly also may wish to consider specifying that BCOM's review should focus on the appropriateness of the overall cost of the project for the purposes intended, not the cost effectiveness of discrete design choices. Finally, the General Assembly may wish to exempt projects funded entirely by non-general funds from review for cost effectiveness by BCOM, though BCOM would continue to be involved in setting the project's budget.**

Options for Conducting Code Compliance Review Should Be Considered

There are three principal options available to the State for supplementing BCOM's review of project design. These include expanded use of the Assistant State Building Official designation (ASBO), use of private architectural and engineering firms, and increased use of local building officials. The State may wish to expand its use of one or all of these options to allow BCOM to focus more on budget issues and post-audit. Essentially, use of these three options would exempt institutions of higher education from the mandatory BCOM review of project design for code compliance.

Increased Use of Assistant State Building Officials. An Assistant State Building Official is an agency or institution of higher education authorized by the Division of Engineering and Buildings to review its own project designs for code compliance. DEB retains the right to audit project reviews and to revoke the ASBO status if the reviews conducted by the ASBO are not in accordance with the *Capital Outlay Manual*. As of April 1995, the University of Virginia is the only State agency that has been designated an Assistant State Building Official (ASBO). Other agencies, most notably Virginia Tech, have discussed obtaining this status but have not yet done so. As described by the *Capital Outlay Manual*, ASBOs must:

- have a registered architect or engineer as the agency's principal capital outlay official to serve as the building official,

- have a full-time staff that has the primary responsibility of plan and specification review,

- have on staff at least one registered professional in architecture, civil/ structural engineering, mechanical engineering, and electrical engineering.

Most institutional staff with whom JLARC staff met indicated that they did not plan to apply for ASBO status, due to the resource commitment it required and the episodic nature of their capital outlay programs. However, staff at several institutions expressed an interest in using ASBOs to review their project designs, as an alternative to having them reviewed by BCOM. At present, with the exception of assistance provided by the University of Virginia to Clinch Valley College (which is overseen by the UVA board), other agencies and institutions do not have the opportunity to use ASBOs.

University of Virginia staff indicated a willingness to review other agencies' project designs, as resources permit and with appropriate compensation for their review. The State would benefit from encouraging appropriate agencies and institutions of higher education to attain ASBO status and similarly encouraging these agencies and institutions to work with smaller agencies or institutions of higher education as resources permit. This would provide an outlet for addressing overflow work that BCOM staff cannot address in a timely manner. The State would benefit from a more timely review of project design and would thereby provide agencies and institutions of higher education additional flexibility in completing project code compliance review.

The DPB review of capital outlay raised the concern that too much use of the ASBO designation would not be cost effective, because economies of scale would be lost. In some respects this argument, if carried to its logical conclusion, would be true of other decentralization initiatives in purchasing, payroll, and personnel compensation and classification. With the loss of economies of scale that occurs in decentralization, the State potentially gains by reducing the transaction costs and delays involved in central agency review. Moreover, the expansion of ASBO status beyond the University of Virginia would probably involve only Virginia Tech and perhaps one or two other doctoral institutions, each of which already has a substantial capital outlay staff. Therefore, the resource commitment required by the institution would be limited.

Use of Private Architectural and Engineering Firms. Another option available for supplementing BCOM review of agency project designs is use of private architectural and engineering firms. This approach was recommended on a broad scale by the Governor's Commission on Government Reform and on a more limited basis by the Department of Planning and Budget's review of capital outlay. As envisioned by the Governor's Commission on Government Reform, private architectural and engineering firms would essentially compete with BCOM. Discussions with institutions of higher education suggest that this would, in effect, eliminate BCOM's role in review of project designs, as most institutions of higher education would opt to use private architectural and engineering firms rather than BCOM, particularly if BCOM were converted to an internal service fund that required agencies to pay to use its services.

This recommendation by the Governor's Commission on Government Reform raises the generalized concern about whether it is appropriate to have private companies performing regulatory review functions. In particular, concerns were expressed by some

individuals interviewed by JLARC staff that private architects and engineers would not be sufficiently rigorous. The concern was also raised that private architects and engineers do not like to review one another's work. With these concerns in mind, DPB's review of capital outlay developed a more limited recommendation regarding use of private architectural and engineering firms in review of project design.

As envisioned by DPB, use of private architects and engineers would be by BCOM only. BCOM could use contract engineers or architects to supplement its staff at peak times or for particularly specialized or complex issues. This would allow BCOM to address its own staffing shortages while retaining control of the use of private architects and engineers in review of project design.

While DPB's recommendation has merit, it would be useful to expand the recommendation to allow ASBOs to contract with private architectural and engineering firms to supplement their staffs. This would help to address DPB's concern that the use of ASBOs is not cost effective by allowing agencies to contract for specific skills on an as-needed basis, rather than having the needed skills provided by a full-time staff member. Private architects and engineers could then be hired by both BCOM and ASBOs using either open-ended contracts or, if appropriate, the P-14 hiring authority. It is possible under this scenario that two or more institutions might collaborate to form an ASBO team.

The recommendation of the Governor's Commission on Government Reform to contract with private firms to perform the entire code compliance review should also be considered. Under this scenario, rather than form an ASBO team, an institution of higher education could simply contract with a qualified firm to perform the code compliance review. If this option were to be adopted, the Secretary of Administration should promulgate guidelines for contracting with qualified firms.

Use of Local Building Officials. All private colleges interviewed by JLARC staff indicated that they use local building officials to conduct the code compliance review for their projects. Each private college stated that local officials are able to complete this review within 30 days in most cases. Local building officials clearly are not equipped to deal with the volume of projects generated by institutions with large capital outlay programs; however, they may be a suitable avenue for certain projects at colleges and universities with smaller capital programs. It is expected that local building officials would be a desirable option only with respect to a limited number of relatively small projects. Recognizing local governments' concern about State mandates, it would also be appropriate to give local building officials the option to decline to review projects for State institutions.

Recommendation (12). **The Department of General Services should allow Assistant State Building Officials to review project designs for other agencies, as resources permit and with appropriate reimbursement of expenses.**

Recommendation (13). **The Department of General Services should allow Assistant State Building Officials to contract with private architects and engineers for professional services needed in reviewing project design for code compliance instead of requiring that all members of the ASBO team be full-time State employees.**

Recommendation (14). **The Governor should consider adopting the recommendation of the Governor's Commission on Government Reform regarding privatization of code compliance review. The Secretary of Administration should promulgate guidelines on the use of private architectural and engineering firms to conduct code compliance reviews.**

Recommendation (15). **The Secretary of Administration should promulgate guidelines for the use of local building officials as an option for State agencies and institutions of higher education for performing code compliance reviews on small capital outlay projects. These guidelines should include appropriate compensation for the locality and clearly state that localities have the option to decline to review any project.**

Review of Project Design by Other State Agencies Should Be Streamlined

There are three principal types of reviews of capital outlay projects other than code compliance reviews that are conducted by State agencies. The first of these is an environmental review coordinated by the Department of Environmental Quality (DEQ); this review involves several State agencies. The second is a review of projects by the State Fire Marshal. The third is a review of projects by the Art and Architecture Review Board (AARB), which reviews building plans for artistic character on behalf of the Governor.

Environmental reviews of projects appear to be appropriately coordinated by DEQ and do not require major changes, though some streamlining of the agencies involved may be appropriate. Review of projects by the State Fire Marshal for fire code compliance has the potential to overlap, in some instances, with fire safety review performed by BCOM. Finally, the review of projects conducted by AARB in some cases overlaps with or conflicts with reviews performed by BCOM.

Coordination of Environmental Reviews by DEQ. The Department of Environmental Quality coordinates reviews of a capital outlay project's environmental impact report (EIR) by concerned State agencies. In addition to DEQ, this includes: the Department of Conservation and Recreation, the Chesapeake Bay Local Assistance Department, the Department of Game and Inland Fisheries, the Department of Forestry, the Virginia Department of Health, local planning district commissions, and the Department of Historic Resources. DEQ is required by statute to complete its review of the EIR within 60 days, although at times review may be suspended if an agency's EIR requires significant revision. DEQ's coordination of the EIR appears to be working reasonably well. JLARC staff did not hear any complaints regarding this review process. Some private architects interviewed did note that the State's environmental review goes

beyond that which is typically required on a private sector construction project of the same scope.

However, in conducting structured interviews with the agencies involved in reviewing the EIR, it became clear that some review agencies need to be involved in only a small percentage of the State's capital projects. In many cases, agencies indicated that they return an EIR without comment after a cursory review determines that the project contains no relevant issues for the given agency.

In other cases, more than one agency is involved in reviewing for the same issue. For example, on projects within the purview of the Chesapeake Bay Act, both the Department of Conservation and Recreation and the Chesapeake Bay Local Assistance Department are involved in reviewing for erosion and sediment control on capital outlay projects. It is possible that the EIR review process may be beneficially streamlined. The Secretary of Administration should examine streamlining the EIR review process for State capital projects. In the event statutory changes are required, these could be proposed to the 1996 General Assembly.

Review of Projects by State Fire Marshal. The State Fire Marshal is organizationally located within the Department of Housing and Community Development. At one time, DHCD performed all fire safety reviews of State capital projects. However, currently DHCD staff perform reviews of project design for renovations only. DGS staff (located within BCOM) review new construction and renovations which add space or significantly change the programmatic use of the space (for example converting a dormitory to administrative space). However, DHCD staff perform on-site fire safety inspections for all projects.

It would be appropriate to consolidate fire code compliance review for State projects either in the State Fire Marshal's Office or in BCOM. The reason for dividing this responsibility originally appears to have been motivated by budget reductions in DHCD. BCOM assumed the responsibility, because the reviews needed to be conducted and there was no other appropriate State agency.

Consolidating fire safety review in one agency would eliminate the potential for conflicting or overlapping comments and would make one agency of the Commonwealth responsible for fire safety issues in State buildings. The State Fire Marshal's Office would seem to be a logical location for consolidating fire safety review, simply because this office already has the regional structure with which to conduct on-site inspections.

Review of Projects by AARB. The Art and Architecture Review Board is required by the *Code of Virginia* to review State construction projects for "artistic character" on behalf of the Governor. AARB is composed of five citizen members and the Director of the Department of Historic Resources, who is an *ex officio* member. The five citizen members are appointed by the Governor, with the following statutory stipulations:

- one member is to be appointed from a list submitted by the Virginia Society of the American Institute of Architects,

- one member is to be appointed from a list nominated by the Board of Visitors of the University of Virginia,

- one member is to be appointed from a list nominated by the board of trustees of the Virginia Museum of Fine Arts, and

- two members are to be appointed from the Commonwealth at large, one of whom must be a painter or sculptor.

At present, AARB reviews all new construction and renovation capital outlay projects, as well as demolition of State buildings. At times, AARB's review of projects appears to conflict with BCOM review of the same project. For example:

> *On a project for a senior institution, AARB strongly endorsed the design concept of a "spine concourse," a glass enclosed walkway. BCOM strongly opposed this design concept due to cost concerns. The institution used AARB's support for the design concept as a way to justify it.*
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> *On a project for a new campus of a community college, BCOM opposed inclusion of a sky light due to cost concerns. AARB strongly supported this concept for aesthetic reasons. AARB's support of the concept was used as one rationale by the agency in support of this feature.*

The General Assembly may wish to clarify that AARB's review of capital projects for institutions of higher education should be strictly advisory. This is particularly true given that, as of February 1995, only two of AARB's members were registered architects. Other members included an attorney, a business journalist, and an artist. In particular, the potential for conflict between cost considerations and aesthetics is one that is best resolved by the agency or institution responsible for the capital outlay project, DGS, DPB, and the Governor. AARB's review of projects is yet another step in an already complicated capital outlay process for higher education that may be appropriate to eliminate as a mandatory review. To the extent that institutions of higher education wish to act on AARB's recommendations, they would remain free to do so.

Recommendation (16). **The Secretary of Administration should examine the review process for environmental impact reports on State capital outlay projects to ensure that only agencies that need to comment on a given environmental impact report are sent copies of the report for review. Opportunities should also be examined to reduce, wherever feasible, the number of agencies involved in the review process.**

Recommendation (17). **All fire safety review of State capital outlay projects should be consolidated in the State Fire Marshal's Office within the Department of Housing and Community Development.**

Recommendation (18). **The General Assembly may wish to consider adding a statement to the Appropriation Act clarifying that review of capital projects by the Art and Architecture Review Board should be advisory to institutions of higher education.**

REVIEW OF PROJECT CHANGE ORDERS

Central agencies become involved in a project's execution phase in three ways. First, the Director of the Department of General Services is responsible for reviewing and approving certain change orders, with staff assistance from BCOM. Second, the State Fire Marshal's Office and the Department of Conservation and Recreation conduct on-site reviews of the project. Finally, BCOM staff attend a project's substantial completion or final completion inspection to recommend to the Director of the Division of Engineering and Buildings whether to issue a certificate of use and occupancy for the project. JLARC staff identified a significant issue only with respect to project execution in the area of project change orders.

Any change that is recommended for a capital outlay project during construction that changes the contract price, construction time, or scope of the project must be documented and approved with a change order. According to the *Capital Outlay Manual*, change orders are submitted "to deal with unforeseen conditions, omissions, errors or user directed changes." All change orders must be approved by the State agency or institution responsible for the project, and changes in a construction contract that require an increase or decrease in the contract price of $15,000 or more must be approved by the Governor's designee, the Director of the Department of General Services. Also, an individual change order or group of change orders that increases the initial contract price by 25 percent or more require prior written approval of the Governor or his designee, the Director of DGS. The *Capital Outlay Manual* further stipulates that a change order which alters the scope of the project as defined by the capital project request or preplanning study must first be approved by the Director of DGS. Change orders for design services must be submitted for approval by the DGS director only when they exceed $10,000 or 25 percent of the contract, whichever is greater.

The rules regarding change orders in the *Code of Virginia* (§11-55A) are not as stringent as those outlined in the *Capital Outlay Manual*. The *Code of Virginia* requires that the Governor or his designee approve change orders that are $10,000 or 25 percent of the contract price, whichever is greater. The minimum threshold for approval in the statute is 25 percent of the total contract price (except in the case of a small project where $10,000 equals more than 25 percent of the construction contract), but the minimum criteria according to the *Capital Outlay Manual* is $15,000 (except in the case of a small

project where 25 percent of the contract price is less than $15,000). Change order requests, regardless of magnitude, are rarely denied. The BCOM Director recalls only a few change orders that were denied in the past year. He notes, however, that some change orders have been modified as a result of DGS review. JLARC staff's file review identified several change orders that were modified but none that were rejected outright.

Currently, institutions of higher education appear to adequately follow the more stringent requirements imposed by the *Capital Outlay Manual*. However, many institutions of higher education complain that $15,000 is too low of a limit, particularly on large projects. The Governor's Commission on Government Reform agreed with this point of view and recommended that the threshold for review of change orders be raised to 25 percent of the contract amount or $10,000, whichever is greater.

JLARC staff review of BCOM project files revealed instances where change order approval was delayed, but ultimately granted, for relatively minor changes in the project. For example:

> *During one university's construction of a bookstore, the university requested a change order of $43,390.73 (on a project budget of approximately $13 million) to change the type of tile in the bookstore from vinyl mosaic tile to glazed mosaic tile. The university felt that the glazed mosaic tile would be easier to maintain and would have a lower life cycle cost that would offset the higher upfront cost. This change order was requested by the university on March 1, 1994. On April 20, 1994 the BCOM director wrote the university requesting a 20-year life cycle analysis. This was provided by the university on May 3, 1994. On May 4, 1994 BCOM staff provided the BCOM director with their own life cycle cost analysis, questioning the university's analysis. The change order was finally approved by the DGS director on May 17, 1994 after the university's executive vice president met with the DGS director and the Secretary of Administration.*
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> *During the construction of a facility at a community college a change order was requested to remove unsuitable soil materials from a site and replace them with proper foundation soil. BCOM staff, in their review of the change order, stated that the contractor had inflated the cost for this service. BCOM refused to approve the change order until a lower price was agreed upon. The college, VCCS, and the contractor all sent letters to BCOM justifying the original cost estimate. After a delay of more than a month, BCOM approved the original change order.*

The change order process would be improved if the *Capital Outlay Manual's* requirements for change order approval were modified. One option would be to adopt the recommendation of the Governor's Commission on Government Reform and change administrative limits on change orders to match the statutory limits. Another option

would be to link change order approval with the construction contingency amount established in the project's form CO-8. Change orders exceeding the project contingency could then be reviewed and approved by the Governor's designee.

Recommendation (19). **The Department of General Services should consider adopting the recommendation of the Governor's Commission on Government Reform on change order approval limits. Alternatively, DGS should revise the change order approval threshold to require approval by the Governor's designee of change orders that exceed the construction contingency established in the project's form CO-8.**

PROCUREMENT OF PROFESSIONAL AND NONPROFESSIONAL SERVICES

JLARC staff's review of the capital outlay process in higher education identified two issues regarding procurement of professional and non-professional services. First, the State may wish to allow institutions of higher education to more routinely use alternative construction approaches, such as construction management or design-build, when the institution's management determines that such an approach is most appropriate for a particular project. Second, the State needs to maintain better records of the performance of contractors and particularly architectural and engineering firms who work on State capital outlay projects.

Use of Alternative Construction Approaches

Institutions of higher education commented on two general approaches to construction that they would like to use, in addition to the conventional practice of retaining a general contractor using sealed bid. The first of these is construction management. The second approach is design-build. At the direction of the General Assembly, the Secretary of Administration promulgated guidelines for using both of these approaches in 1988. However, these guidelines appear to need revision to make them more helpful in employing alternative construction approaches when appropriate.

Use of Construction Management. Construction management has several variations, but generally stated it is a process in which a construction manager is hired at the beginning of design in lieu of hiring a general contractor at the beginning of construction. Construction management, under the current guidelines, has been used by institutions of higher education, including three large projects at George Mason University. The construction manager serves as part of the design team and then works with the owner in choosing subcontractors to perform the actual construction. The construction manager is chosen through professional negotiation, while the subcontractors are selected using competitive bid.

Representatives at four of the six independent colleges JLARC staff visited stated that they often use some form of construction management for their major capital outlay projects. This approach allows the college to hire a construction manager at the onset of a project instead of a general contractor after the designs have already been completed. Representatives at these colleges stated that this results in an overall cost savings because the construction manager is able to make suggestions on cost saving construction features during the design phase of the project of which the architect and engineer might not be aware. Users of this approach also contend that it significantly decreases the number of change orders requested because communication between all the parties involved is more substantial. Having the construction manager on staff at the beginning of a project and paying him or her for that service is thought to create less of an adversarial relationship between the contractor and the college. This approach also typically allows the college to have more input into the subcontractors that are used because the construction manager, who will coordinate the use of subcontractors, is on the payroll when subcontractors are being selected. The more traditional approach requires that the general contractor submit a bid based on what he knows he can attain certain subcontractors for. This often means that the general contractor has a set group of subcontractors who have been chosen before the school selects a general contractor.

The University of Virginia (UVA) requested permission to use a variation of construction management as part of its law school expansion and renovation project. The university's restructuring plan points to construction management as one of the ways it will reduce its capital outlay costs and improve its ability to construct and renovate buildings quickly. The university argues that the per-square-foot cost of using construction management will probably be lower, and the time to construct projects will be reduced. The belief is based on the experience of New York University and the University of Delaware in using construction management. More generally, it is expected that use of construction management will eliminate the adversarial relationship that sometimes characterizes the owner-general contractor relationship, because the construction manager is part of the design team.

The Division of Engineering and Buildings approved UVA's request to use construction management. This project can be used as a pilot test of this construction management approach on State projects. While construction management may not be a panacea for the problems of capital outlay, its use does not appear to be uncommon outside of State government. In addition to the examples cited by UVA, JLARC staff found that public universities in Florida and Kentucky routinely use construction management when they deem it appropriate (generally on complex projects).

Use of Design-Build. The 1988 General Assembly revised the Appropriation Act to explicitly allow use of the design-build approach to capital outlay projects. Under this approach, an architect-contractor team is hired for a negotiated fixed price to design and construct a project. The General Assembly directed the Secretary of Administration to develop policies and procedures governing the use of design-build. These procedures require that:

- the project meet one of several general categories (warehouse, garage, single story administrative building, maintenance shop, etc.);

- the project be approved for design-build by the DEB director;

- selection of a design-builder be based on a two step competitive negotiation process, with the design-builder ultimately selected based on a technical proposal and negotiations.

As presently constituted, the guidelines for design-build require such a detailed submission by design-build teams, without any certainty of receiving any compensation, that it is difficult to attract qualified teams. As a result, design-build is used infrequently. When the process has been used, it has sometimes been difficult to attract qualified teams. For example:

> *One university used design-build procedures for a dormitory. While several firms expressed an interest in the project, only one firm ultimately submitted a technical proposal.*

Design-build is used in other states and in the private sector as a matter of course when the owner determines it is the most cost effective approach for a project. The State may benefit from examining its current procedures for design-build to determine if these could be beneficially modified to make it more cost-effective for qualified teams to compete for design-build contracts on State projects. As with construction management, the Secretary of Administration should examine the current guidelines to determine if they should be revised. It may be appropriate, in revising these guidelines, to leave the decision to use an alternative construction approach with the agency or institution's management, rather than with the DEB director.

Recommendation (20). **The Secretary of Administration should consider revising the 1988 guidelines regarding use of construction management and design-build procedures. The Secretary of Administration should consider the advisability of allowing variants on both of these procedures, consistent with the requirements of the Procurement Act. The Secretary should also consider allowing agencies or institutions of higher education to make the decision to use alternative contract approaches at their discretion, as long as the project meets applicable criteria.**

Failure of Agency to Fill Out Final Evaluation of Contractor and Architectural and Engineering Firm

The *Capital Outlay Manual* requires that agencies complete and submit to BCOM an evaluation of their architectural and engineering firm and contractor upon completion of all capital projects. However, very few agencies actually fulfill this requirement. The evaluation process was designed to keep a record of the quality of

various firms in the State so that agencies could use the information as a reference when selecting contractors, architects, and engineers for their projects. The evaluation form lists 12 categories for architectural and engineering firms and 21 areas where general contractors are to be rated using a scale from one to four. When the form is completed it is to be submitted to BCOM. If the evaluation is negative, BCOM will send a copy to the contractor or the architect and engineer and allow them to respond. If there is a response, it is kept on file with the agency's evaluation. The BCOM director speculated that agencies do not like to complete this evaluation because agencies fear the firms will sue them if they do not like their evaluation.

After speaking with representatives from several institutions of higher education it appears that many are not aware that there is an evaluation form to complete. The reason for this might be tied to the failure of agencies to fully close most project files. In the *Capital Outlay Manual* the evaluation form is after the CO-14, the final project close out form, which is also rarely completed.

During interviews with JLARC staff, several colleges and universities expressed concern that they were unable to identify and select contractors who were known to produce the best work. If these evaluations were routinely completed and submitted to BCOM, they would provide a valuable resource for institutions of higher education and other State agencies which are in the process of selecting a general contractor or architectural and engineering firm. This information would probably be particularly helpful in selecting architectural and engineering firms, because the professional negotiation process lends itself more easily to the use of evaluation data than does the sealed bid process. Concerns about legal liability in completing these forms should be addressed with DGS and the Office of the Attorney General.

Recommendation (21). **The Secretary of Administration should reiterate to heads of all State agencies the requirement of the *Capital Outlay Manual* to complete an evaluation form on contractors and architectural and engineering firms. The Department of General Services should conduct random audits to ensure that this requirement is being followed.**

V. Institutional Maintenance

The performance of institutional maintenance has a profound impact on the capital outlay needs of the State's institutions of higher education. Institutions generally perform two types of maintenance: ordinary (routine) maintenance and major maintenance. Routine maintenance, such as painting and minor roof repairs, is performed to address normal deterioration. Routine maintenance is funded through the operational budgets of the institutions of higher education. Major maintenance, which includes items like roof replacements, is performed to extend the useful life of a facility. Major maintenance is addressed by the State's maintenance reserve program through the capital budget.

Most institutions appear to be maintaining an appropriate facilities reinvestment rate for routine maintenance. However, institutions of higher education have reported to the State Council of Higher Education for Virginia (SCHEV) that they have a routine maintenance backlog of approximately $83 million. SCHEV should work with institutions of higher education to develop an analytically sound method of validating this self-reported data and better estimating maintenance expenditures.

The General Assembly has invested significant resources in the maintenance reserve program. However, the State has a backlog of validated maintenance reserve projects in excess of $100 million. This maintenance reserve backlog has a significant, negative impact on the condition of university and college facilities.

ROUTINE MAINTENANCE INVESTMENT MEASURE NEEDS TO BE RE-EXAMINED

Routine maintenance, classified by professionals in the field as capital asset management, is performed to offset normal plant deterioration over the life cycle of building components. This includes preventive maintenance, repairs to building equipment, painting, and other routine maintenance tasks. Failure to conduct routine maintenance leads to deferred maintenance, and significant funding is needed to address the resulting backlogs of deferred maintenance needs.

JLARC staff estimated maintenance expenditures of the institutions of higher education. The expenditures were compared to the replacement value of institution buildings to determine a facility reinvestment rate. SCHEV's Fixed Asset Guidelines essentially incorporate the industry standard for facility reinvestment rates of between 1.5 and 3.0 percent of replacement value as the standard for investment in routine maintenance at Virginia's higher education facilities. Based on this standard, it appears that institutions are making adequate reinvestment in their facilities in maintenance.

However, while facility reinvestment appears adequate given the existing standard, institutions also believe that they have a routine maintenance deficiency. The

State has no method to validate routine maintenance deficiencies. SCHEV should work with the institutions to standardize the method of quantifying these maintenance deficiencies.

The Standard for Facilities Reinvestment Should Be Reconsidered and Better Means are Needed for Estimating These Expenditures

The Commonwealth has made significant financial commitments in appropriating routine maintenance funds at the public institutions of higher education. Once appropriated, the institutions have a great deal of discretion in expending those funds according to their maintenance priorities. In order to determine the actual level of expenditures for routine maintenance, JLARC staff reviewed the Department of Planning and Budget's (DPB) Program Budgeting System for selected expenditure codes under Educational and General (E&G) program codes. This estimate was then verified by staff at each of the institutions of higher education as to its accuracy. Table 12 presents this information by institution for the last three completed biennia.

Table 12

Estimated Routine Maintenance Expenditures by Institution, 1988-1994

Agency	1988-90	1990-92	1992-94
Virginia Tech	$29,317,135	$29,537,479	$35,478,696
Community Colleges	24,534,783	26,067,953	30,079,182
Virginia Commonwealth	17,377,265	19,280,326	20,351,760
University of Virginia	14,565,786	16,139,672	18,604,442
William and Mary	8,793,617	7,770,642	10,659,801
George Mason	9,021,778	9,687,573	10,257,313
James Madison	10,124,429	8,488,765	10,013,839
Old Dominion	9,775,292	9,867,794	9,662,106
Norfolk State	5,955,226	6,425,452	6,853,667
Radford	5,377,983	4,950,522	6,294,118
Virginia State	6,521,771	6,281,317	5,267,436
Mary Washington	4,893,831	5,005,755	4,925,582
Longwood	3,893,578	3,890,172	4,285,911
Virginia Military Institute	4,002,236	3,839,674	3,862,987
Christopher Newport	1,878,970	2,400,723	2,726,739
Clinch Valley	986,095	1,288,685	1,199,349
Richard Bland	870,581	847,328	864,109
Totals	$157,890,356	$161,769,832	$181,387,037

Source: JLARC staff analysis of PROBUD data with institutional adjustments and verification.

The facility reinvestment rate (FRR) is derived by taking annual maintenance expenditures and dividing these expenditures by the replacement value of an institution's facilities. By dividing the DPB data in Table 12 (which includes appropriate modifications made by institutions) in half to produce annual routine maintenance expenditures, and then dividing these annual expenditures by the Division of Risk Management's facility replacement values for E&G buildings, JLARC staff calculated the FRR for the 14 senior institutions (Clinch Valley College was excluded due to insufficient data), the community college system, and Richard Bland College for the past three completed biennia. Table 13 presents the facility reinvestment rates for each institution.

Professionals in the field of maintenance have suggested an annual FRR between 1.5 percent and 3.0 percent as an acceptable standard in facilities maintenance. The Association of Physical Plant Administrators and the National Association of College

Table 13

Average Facility Reinvestment Rates by Institution 1988-1994*

Institution**	1988-90 Annual FRR	1990-92 Annual FRR	1992-94 Annual FRR
Radford University	5.8%	5.3%	6.8%
Longwood College	6.0	6.0	6.6
Mary Washington College	5.5	5.6	5.5
Christopher Newport	3.6	4.7	5.3
Norfolk State University	4.5	4.9	5.2
Virginia State University	5.7	5.5	4.6
George Mason University	4.0	4.3	4.6
Virginia Tech	3.5	3.5	4.2
William and Mary	3.4	3.0	4.1
Community Colleges	3.2	3.4	3.9
James Madison University	3.8	3.2	3.8
Virginia Commonwealth	3.1	3.4	3.6
Richard Bland College	3.6	3.5	3.6
Old Dominion University	3.3	3.3	3.3
Virginia Military Institute	2.7	2.6	2.6
University of Virginia	1.4	1.5	1.8
Averages	3.9%	4.0%	4.3%

*Replacement values are held constant at the July 1994 level.

**Clinch Valley College was excluded due to insufficient data.

Source: JLARC staff analysis of PROBUD and Institutional Replacement Values.

and University Business Officers, however, recommend a FRR of at least 2.0 or 2.5 percent. These associations state that analysis has shown that a FRR of 1.5 percent or less may contribute to overall growth in deferred maintenance, whereas a FRR of 2.0 or 2.5 percent will "prevent further deterioration of an existing backlog of deferred maintenance and facility conditions." SCHEV has essentially adopted the 1.5 to 3.0 percent standards for Virginia's institutions of higher education in its Fixed Asset Guidelines.

The data for Virginia's institutions of higher education show that all institutions meet or exceed a minimal standard of 1.5 percent annual reinvestment in facilities (except for the University of Virginia in the 1988-1990 biennium). While this indicates that Virginia has recognized the significance of facilities maintenance, concerns continue to exist that routine maintenance may not be adequately funded. Three caveats must be made in drawing conclusions about the adequacy of current levels of routine maintenance spending.

First, there are substantial deferred maintenance needs identified by the institutions of higher education in both the routine maintenance and maintenance reserve programs. Due to such high levels of deferred maintenance, as well as the current age and condition of facilities at Virginia's institutions of higher education, the standard reinvestment rates are probably not appropriate for Virginia's institutions of higher education. The industry standard facilities reinvestment rate assumes that facilities are in good condition, which is not the case for a significant portion of the Commonwealth's higher education facilities. SCHEV should reexamine the appropriate facilities reinvestment rate for Virginia's institutions of higher education.

Second, there has been some concern voiced by members of the higher education community that replacement values for institutional facilities may not adequately represent an accurate replacement value, and in fact may be substantially less than the actual replacement value. Replacement values are used primarily for insurance purposes, not for calculations on facility investment rates or condition indexes. Replacement values reported to the Division of Risk Management do not include the foundation and certain aspects of the sub-structure.

While agencies can request that building replacement values be raised, there is little incentive to do so as this would increase the insurance premium on the buildings. If the replacement values understate the actual replacement cost of the buildings, the FRRs for these institutions would be artificially inflated and would be overstating the investment in facilities maintenance. However, it should be noted that the analysis in Table 13 uses the 1994 replacement value for each biennium calculation. This would tend to understate the facilities reinvestment rate for the 1988-1990 and 1990-1992 biennia (as replacement values then would presumably be lower than replacement values for 1994).

A final caveat regarding both Table 12 and Table 13 is that JLARC staff analysis is based on DPB data and hence represents an estimate rather than an exact figure. This is because institutions of higher education typically track their expenditures on their own

internal budgeting systems. This analysis required institutional staff to "cross-walk" expenditures from an internal expenditure category to a DPB category. This process may not always be exact. Moreover, neither the DPB nor most internal university budget systems have a comprehensive expenditure category for maintenance. Therefore, maintenance expenditures must be estimated using relevant expenditure categories that may, in some cases, include expenditures that should not reasonably be considered maintenance, such as custodial services. However, all institutions were contacted to validate JLARC staff's estimate of maintenance expenditures and all agreed that the estimates appeared reasonable.

The General Assembly may wish to consider using the facilities reinvestment rate as a benchmark for determining the adequacy of routine maintenance funding. While SCHEV has already incorporated the concepts of the facility reinvestment rate into its Fixed Asset Guidelines, SCHEV should re-examine the appropriate reinvestment rate for Virginia's institutions of higher education, considering applicable maintenance backlogs, facility conditions, and the age of Virginia's higher education facilities. SCHEV should also work with DPB to identify appropriate expenditure categories for calculating the facility reinvestment rate. Institutions of higher education which may be concerned that the replacement values of their facilities are not accurate should update the replacement values of their facilities with the Division of Risk Management.

Recommendation (22). **The General Assembly may wish to consider the facilities reinvestment rate as a benchmark for assessing the adequacy of routine maintenance investments. The State Council of Higher Education for Virginia should re-examine the appropriate facilities reinvestment rate for Virginia's institutions of higher education, considering the age of facilities, the current deferred maintenance backlog, and the existing condition of facilities. SCHEV should develop guidance on appropriate expenditure categories to consider in calculating the facility reinvestment rates.**

Recommendation (23). **Institutions of higher education should validate the accuracy of the replacement values of their facilities in the Division of Risk Management's records. Institutions should report any necessary updates to the Division of Risk Management.**

The State Lacks a Method to Validate Routine Maintenance Deficiencies

Unlike the maintenance reserve program, where institutions' requests for maintenance reserve projects are validated by DPB, there is no method to validate routine maintenance needs. To develop an estimate of routine maintenance deficiencies, which have not been traditionally tracked at the State level, SCHEV asked institutions to self-report an estimate of their routine maintenance deficiencies in July 1994. SCHEV staff indicated, however, that they believe the institutions' reports to be of uneven accuracy because it was the first time such information had been reported. Institutions' self-reported routine maintenance deficiencies are shown in Table 14.

Table 14

Self-Reported Routine Maintenance Deficiencies as of July 1994

Institution*	Routine Maintenance Deficiency
University of Virginia/UVAH	$21,633,175
Virginia Commonwealth/MCV	19,410,996
Virginia Tech	15,520,886
Community Colleges	10,991,049
George Mason University	4,168,058
William and Mary/VIMS	2,756,750
Virginia State University	2,707,000
James Madison University	1,899,045
Radford University	912,885
Virginia Military Institute	845,315
Old Dominion University	728,910
Longwood College	332,604
Norfolk State University	324,200
Mary Washington College	246,546
Christopher Newport University	244,400
Richard Bland College	0
Total	$82,721,819

*Clinch Valley College was excluded due to insufficient data.

Source: JLARC staff analysis of SCHEV facility condition data, July 1994.

The State would benefit from having an accurate estimate of routine maintenance deficiencies available for the Governor and General Assembly. However, routine maintenance deficiencies do not lend themselves to being validated on a project-by-project basis, as maintenance reserve projects do. SCHEV should identify best practices among institutions for documenting routine maintenance deficiencies, and they should use this information to develop appropriate guidance for institutions to use in identifying routine maintenance deficiencies.

Recommendation (24). **SCHEV should develop guidelines to assist institutions in identifying and quantifying the cost of their routine maintenance deficiencies. This guidance should be based on the best practices of the State's institutions of higher education.**

MAINTENANCE RESERVE BACKLOG IS SUBSTANTIAL

The maintenance reserve program represents the State's commitment to maintenance in the capital portion of the budget. Since the inception of the program in the 1982-84 biennium, approximately $144 million in general funds and $42 million in non-general funds have been appropriated to the institutions of higher education for maintenance reserve projects.

Since 1982 it has been the Commonwealth's written policy to prioritize maintenance ahead of other capital projects. Presently, §4-4.01(n) of the 1994-96 Appropriation Act states, "the first priority of any agency or institution requesting capital outlay appropriations shall be maintenance reserve funds." There has been general agreement among the institutions of higher education that maintenance reserve should remain the first priority in the State's capital budget. Furthermore, virtually all of the institutions of higher education have praised the maintenance reserve program and the improvements in facility conditions that have resulted from the Commonwealth's commitment to funding major maintenance projects through the capital budget.

However, the State has accumulated a substantial backlog of deferred maintenance reserve projects. DPB has recognized approximately $118 million in validated, unmet maintenance reserve needs as of February 1995. As of July 1994, institutions of higher education reported to SCHEV that they had a backlog of maintenance reserve projects requiring approximately $177 million. While the additional $58 million in deferred maintenance reserve projects has not been validated by DPB, it is clear that the State faces a substantial maintenance reserve backlog in higher education.

JLARC staff used both estimates of the maintenance reserve backlog, with estimates of routine maintenance deficiencies reported by institutions of higher education to SCHEV, to calculate a facilities condition index for Virginia's institutions of higher education. SCHEV has begun efforts to identify funding needed to improve the facilities condition index of all institutions to acceptable levels. SCHEV should report on this issue to the 1996 General Assembly.

Maintenance Reserve Deficiencies Exceed $100 Million

While maintenance reserve has been a significant investment for the Commonwealth at the institutions of higher education, these institutions have identified to SCHEV more than $177 million in unfunded maintenance reserve needs as of July 1994. DPB, on the other hand, has identified outstanding needs in maintenance reserve of $118 million. DPB's information is based on annual updates to the maintenance reserve plans of each institution of higher education submitted by institutions and validated by DPB staff.

Table 15 presents the DPB maintenance reserve deficiency data relative to the corresponding SCHEV data. There are several possible explanations for the discrepancy

Table 15

Comparison of SCHEV and DPB-Identified Maintenance Reserve Needs

Institution*	SCHEV-Identified MR Needs As Of 7/94	DPB-Identified MR Needs As Of 2/95	Difference
Virginia Commonwealth/MCV	$48,099,324	$14,511,990	$33,587,334
University of Virginia/UVAH	32,160,225	28,746,647	3,413,578
Virginia Tech	27,674,539	23,625,453	4,049,086
William and Mary/VIMS	15,644,500	8,790,210	6,854,290
Community. College System	12,520,550	9,513,601	3,006,949
James Madison	9,452,882	4,768,780	4,684,102
Radford	8,958,755	4,278,550	4,680,205
Old Dominion	6,349,800	8,910,179	(2,560,379)
Virginia Military Institute	5,006,500	4,813,981	192,519
Longwood	3,440,698	2,097,053	1,343,645
Mary Washington	3,131,000	290,800	2,840,200
George Mason	1,715,000	2,456,838	(741,838)
Norfolk State	974,608	1,908,436	(933,828)
Richard Bland	845,000	300,000	545,000
Virginia State	758,200	2,806,779	(2,048,579)
Christopher Newport	453,500	684,508	(231,008)
Totals	$177,185,081	$118,503,805	$58,681,276

*Clinch Valley College was excluded due to insufficient data.

Source: JLARC staff analysis of SCHEV and DPB data.

between the two estimates of maintenance reserve deficiencies. One probable reason is that institutions did not submit all their maintenance reserve needs to DPB because they knew the probability of receiving additional funds was low. Another is that some of the institutions may have approached the SCHEV data collection effort as an opportunity to make a point about the need for additional maintenance funds, and therefore, they may have included some items that are not valid maintenance reserve projects. In any event, the unmet need of validated maintenance reserve projects is in excess of $100 million.

Facility Conditions Index for Higher Education Is Heavily Influenced by Maintenance Reserve Deficiencies

In order to place deferred maintenance in context, JLARC staff calculated a facilities condition index for each institution of higher education. Professionals in the field of facilities management have established the facilities condition index (FCI), which allows a comparison of maintenance backlogs to the total replacement value of the plant.

The actual calculation is:

FCI = Total Cost of Deficiencies/Current Replacement Value

For example, a building with a replacement value of $2 million and maintenance deficiencies totaling $50,000 would have an FCI of .025, or 2.5 percent. If the building had a replacement value of only $750,000, the FCI would be .067, or 6.7 percent.

According to generally accepted standards, a FCI less than five percent indicates a facility in "good" condition; a FCI between five and ten percent indicates a facility in "fair" condition; and a FCI greater than ten percent indicates a facility in "poor" condition. In applying the scale to the above examples, the first building, with a FCI of 2.5 percent, would be considered to be in good condition, whereas in the second scenario, with a FCI of 6.7 percent, the building would be considered only fair. SCHEV has adopted these indicators in its Fixed Assets Guidelines. By utilizing the FCI, it is possible to determine the relative urgency of maintenance needs on a building by building level.

JLARC staff developed an estimate of the FCI for each institution of higher education using data reported to SCHEV on routine and maintenance reserve deficiencies (as of July 1994), as well as the Division of Risk Management's replacement values for E&G facilities at the institutions of higher education. JLARC staff also derived an FCI for each of the higher education institutions by substituting the maintenance reserve need identified by DPB in place of the SCHEV maintenance reserve deficiency. For both calculations, the routine maintenance deficiency identified by the institutions to SCHEV (as of July 1994) was added to the maintenance reserve deficiency. Depending upon which of the two data sets are used, there are significant differences among the institutions' FCIs. This is due to the differences between the DPB and SCHEV maintenance reserve deficiency data.

Facility condition index ratings based on the SCHEV data are shown in Table 16. As indicated from the data, only three institutions, Old Dominion, Norfolk State, and Christopher Newport, are considered to be in good condition by the FCI. More importantly, six institutions, Virginia Commonwealth, Radford, William and Mary, Longwood, University of Virginia, and Virginia Tech, are all considered to be in poor condition according to the FCI based on the self-reported SCHEV data.

Using the maintenance reserve deficiency data from DPB significantly changes the assessment of facility conditions based upon the FCI. Table 17 reports the FCI for each institution using DPB's validated maintenance reserve projects. As Table 17 shows, when only validated maintenance reserve projects are included in computing the maintenance reserve funding need, only two institutions, Virginia Commonwealth and Radford University, are considered to be in poor condition. Ten institutions are in fair condition, with four institutions in good condition.

To illustrate the significance of maintenance reserve deficiencies in calculating the FCI, JLARC staff eliminated any consideration of routine maintenance deficiencies and calculated the FCI for each institution using only the DPB data for validated

Table 16

Facilities Condition Index Using SCHEV's Maintenance Reserve Deficiency Levels and Rating for Virginia Public Institutions of Higher Education as of July 1994

Institution*	Replacement Value as of 07/01/94	Total Deficiency	FCI	Overall Rating
Virginia Commonwealth/MCV	$279,759,598	$67,510,320	24.13%	Poor
Radford	46,562,127	9,871,640	21.20	Poor
William and Mary/VIMS	140,985,803	19,759,107	14.01	Poor
Longwood	32,292,472	3,773,302	11.68	Poor
University of Virginia/UVAH	523,554,144	53,793,400	10.27	Poor
Virginia Tech	424,817,533	43,195,425	10.17	Poor
James Madison	132,704,126	11,351,927	8.55	Fair
Virginia Military Institute	74,645,813	5,851,815	7.84	Fair
Mary Washington	44,738,799	3,377,546	7.55	Fair
Richard Bland	12,166,357	845,000	6.95	Fair
Virginia State	56,799,817	3,465,200	6.10	Fair
Community Colleges	388,698,450	23,511,599	6.05	Fair
George Mason	112,709,195	5,883,058	5.22	Fair
Old Dominion	148,446,433	7,078,710	4.77	Good
Christopher Newport	25,775,746	697,900	2.71	Good
Norfolk State	$65,523,001	$1,298,808	1.98	Good

*Clinch Valley College was excluded due to insufficient data.

Source: JLARC staff analysis of SCHEV facilities condition data.

maintenance reserve deficiencies. Table 18 reflects this analysis, which is based on two conservative assumptions: (1) that routine maintenance deficiencies are non-existent (an assumption that is made only for illustrative purposes), and (2) that DPB's generally lower estimate of maintenance reserve deficiencies is accurate.

Even with these two conservative assumptions, eight institutions rate only fair on their FCI. This suggests that the maintenance reserve deficiency has, by itself, a serious impact on the overall condition of a large portion of Virginia's higher education system. When routine maintenance deficiencies are considered, as in Tables 16 and 17, the need for continued investment in maintenance is clear. SCHEV is currently developing an analysis of the funding required to allow all institutions of higher education to achieve an FCI of no more than five percent. This analysis is being developed using various scenarios for the time frame in which to meet the goal (for example, six, eight, or ten years). SCHEV should report its findings to the 1996 General Assembly.

Table 17

Facilities Condition Index Using DPB's Maintenance Reserve Deficiency Levels and Rating for Virginia Public Institutions of Higher Education as of February 1995

Institution*	Replacement Value as of 07/01/94	Total Routine and Maintenance Reserve Deficiency	FCI	Overall Rating
Virginia Commonwealth/MCV	$279,759,598	$33,922,986	12.13%	Poor
Radford	46,562,127	5,191,435	11.15	Poor
Virginia State	56,799,817	5,513,779	9.71	Fair
University of Virginia/UVAH	523,554,144	50,379,822	9.62	Fair
Virginia Tech	424,817,533	39,146,339	9.21	Fair
William and Mary/VIMS	140,985,803	12,087,083	8.57	Fair
Virginia Military Institute	74,645,813	5,659,296	7.58	Fair
Longwood	32,292,472	2,429,657	7.52	Fair
Old Dominion	148,446,433	9,639,089	6.49	Fair
George Mason	112,709,195	6,624,896	5.88	Fair
Community Colleges	388,698,450	20,504,650	5.28	Fair
James Madison	132,704,126	6,667,825	5.02	Fair
Christopher Newport	25,775,746	928,908	3.60	Good
Norfolk State	65,523,001	2,232,636	3.41	Good
Richard Bland	12,166,357	300,000	2.47	Good
Mary Washington	$44,738,799	$537,346	1.20	Good

*Clinch Valley College is excluded due to insufficient data.

Source: JLARC staff analysis of SCHEV facilities condition data and DPB validated maintenance reserve needs.

However, SCHEV's recommendations should be based on validated maintenance reserve projects and on analytically sound estimates of routine maintenance deficiencies.

Recommendation (25). **The State Council of Higher Education for Virginia should report to the 1996 General Assembly on the funding required to meet a goal of a Facility Condition Index of no greater than five percent for each institution of higher education. SCHEV should base its analysis on analytically sound estimates of routine maintenance deficiencies and on validated maintenance reserve projects.**

Table 18

Facilities Condition Index Using DPB's Validated Unfunded Maintenance Reserve Projects Only (Routine Deficiencies Assumed to be 0)

Institution*	Replacement Value as of 07/01/94	Validated Maintenance Reserve Deficiency	FCI	Overall Rating
Radford	$46,562,127	$4,278,550	9.19%	Fair
Longwood	32,292,472	2,097,053	6.49	Fair
Virginia Military Institute	74,645,813	4,813,981	6.45	Fair
William and Mary/VIMS	140,985,803	8,790,210	6.23	Fair
Old Dominion	148,446,433	8,910,179	6.00	Fair
Virginia Tech	424,817,533	23,625,453	5.56	Fair
University of Virginia/UVAH	523,554,144	28,746,647	5.49	Fair
Virginia Commonwealth/MCV	279,759,598	14,511,990	5.19	Fair
Virginia State	56,799,817	2,806,779	4.94	Good
James Madison	132,704,126	4,768,780	3.59	Good
Norfolk State	65,523,001	1,908,436	2.91	Good
Christopher Newport	25,775,746	684,508	2.66	Good
Richard Bland	12,166,357	300,000	2.47	Good
Community Colleges	388,698,450	9,513,601	2.45	Good
George Mason	112,709,195	2,456,838	2.18	Good
Mary Washington	$44,738,799	$290,800	0.65	Good

*Clinch Valley College is excluded due to insufficient data.

Source: JLARC staff analysis of DPB validated maintenance reserve plans.

Appendix A

Senate Joint Resolution No. 135
1989 Session

Identification of higher education study topics by the Joint Legislative Audit and Review Commission.

WHEREAS, the Legislative Program Review and Evaluation Act (§ 30-65 et seq. of the *Code of Virginia*) provides for the evaluation of state government according to schedules and areas designated for study by the General Assembly; and

WHEREAS, Senate Joint Resolution No. 18 adopted by the 1988 General Assembly identified higher education as a functional area of state government to be reviewed at such time as sufficient Commission resources become available; and

WHEREAS, § 30-67 of the *Code of Virginia* provides that prior to the year in which a functional area of government is designated for review, the Joint Legislative Audit and Review Commission may identify to the extent feasible the agencies, programs or activities selected for review and evaluation from the functional area; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That pursuant to § 30-65 et seq. of the *Code of Virginia*, the agencies, programs, or activities subject to review and evaluation in the functional area of higher education shall be: (i) relationships between secondary schools and institutions of higher education; (ii) the Virginia Community College System; (iii) capital outlay, land an maintenance; and (iv) a review of the State Council of Higher Education in Virginia; and, be it

RESOLVED FURTHER, That pursuant to the powers and duties specified in § 30-58.1 of the *Code of Virginia*, the Joint Legislative Audit and Review Commission shall plan and initiate reviews of these agencies, programs, or activities, including consideration of matters relating to any previous Joint Legislative Audit and Review Commission report of these areas; and, be it

RESOLVED FINALLY, That in carrying out this review, the institutions of higher education, the State Council of Higher Education in Virginia, and the Auditor of Public Accounts shall cooperate as requested and shall make available all records and information necessary for the completion of the work of the Commission and its staff.

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