The Commonwealth of Massachusetts  
Massachusetts State and Community Colleges  
Matching Facilities to Missions:  
Strategic Capital Program  

Volume 1:  
Report Summary  
July 2003

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Prepared by  
Eva Klein & Associates, Ltd.  
EKA Consulting Associates:  
C. Joseph Carter  
Philip Henry  
Harvey H. Kaiser  
Vincent Maruggi  
William D. Middleton  
Kathryn Baker Smith  

with  
Entech Engineering, Inc.  
Symmes Maini McKee Associates
The Commonwealth of Massachusetts
Massachusetts State and Community Colleges

Matching Facilities to Mission: Strategic Capital Program

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INTRODUCTION TO THE STUDY

Volume 1 is the Report Summary of the Study entitled Matching Facilities to Missions: Strategic Capital Program for the Massachusetts State and Community Colleges that Eva Klein & Associates, Ltd. (EKA) conducted for the Board of Higher Education (BHE) and the Division of Capital Asset Management (DCAM) during 2002-2003.

The introduction provides background about the Massachusetts State and Community Colleges (the colleges or the campuses), including mission and programs; enrollments; facilities; and capital funding for higher education in the Commonwealth of Massachusetts (the Commonwealth). At the end of the introduction, an overview of key issues that formed the Study’s context is provided.

The second section of Volume 1 describes the Study process, including participants, purposes, project communication strategies, and Study phases and methods.

Following that, three sections on findings provide:

- A summary of Study findings
- An overview of the Strategic Capital Programs for the individual colleges, which are provided in their entirety as Volume 2
- An overview of the Systemwide Strategic Capital Program, which is provided in its entirety as Volume 3.

Four accompanying volumes comprise the balance of this Report.

- Volume 2 provides individual Strategic Capital Programs for the 24 colleges, consisting of Summary spreadsheets for each campus of each college
- Volume 3 provides the Systemwide Strategic Capital Program, consisting of the same projects proposed for individual colleges, but sorted by a set of procedures and principles that define systemwide priorities.
- Volume 4 is a compilation of numerous interim work papers that collectively provide substantial background details about the Study’s methods, process, and interim findings.
- Executive Summary provides a brief overview of the Study and its outcomes.
The State of the Colleges

Mission and Programs

The 24 colleges include six state colleges, three specialized colleges, and 15 community colleges. The colleges vary greatly with respect to location, age, size, mission, program offerings, and student population mix.

Each of the colleges has a relatively current Mission Statement and Mission Implementation Plan. These were developed and BHE approved them in 2001. Naturally, the three specialized colleges have the most focused and distinctive missions. Program emphases vary among the state and community colleges, with some offering programs that are not widely available throughout the Commonwealth.

One additional factor in matching facilities with missions is the existence of some colleges with multiple campus locations. Multi-campus sites serve the mission purpose of providing access more conveniently to otherwise underserved populations.

A new review or assessment of mission or programs was not a component of scope for this Study. The general intent, reflected even in the title of the Study, was to match capital investment strategies as closely as possible to approved missions and programs. This intent was honored in all elements of methods.

Enrollments

In 2001-2002, the 24 state and community colleges enrolled 80,387 full-time equivalent students in credit programs, of which 76,348 were undergraduate students and 4,039 were graduate and professional enrollments. In addition, in fiscal year 2001, there were nearly 64,000 reported course registrations in non-credit courses characterized as work force/job skills development courses—as opposed to general interest or leisure non-credit courses.

For the next 10 years, it is expected that the 24 colleges collectively will experience moderate total credit enrollment growth, from about 80,000 to about 87,000 students, with certain parts of the Commonwealth, such as the southeast, growing much faster than other areas. There has been recent growth in community college credit program enrollments, in part, but not only, as a result of recessionary economic trends. Also, there has been considerable growth in non-credit enrollments at many of the community colleges.

Facilities

Condition and Code Compliance Needs

Beginning in the 1980s, growing attention has been given to the problem of deferred maintenance in higher education. Reflecting the aging of an extensive inventory of facilities constructed in the 1970s and earlier, and chronic under-funding of routine maintenance, repair, and renewal, American higher education developed a huge backlog of deferred maintenance. The magnitude of this backlog was estimated at about $32.5 billion by the 1996 study, A Foundation to Uphold—the most recent comprehensive assessment of US higher education’s deferred maintenance needs. Most professionals in this field believe that the true

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1 Credit program enrollment data used in this Study were those reported through Fall 2001.
2 Non-credit work force or job skills course enrollments at the community colleges, converted into FTEs, were included in the enrollments used in the Capacity Analysis.
An ADA study of public agencies in 1994 revealed $35 million in ADA-related needs among the 24 State and Community Colleges.

In 2001, the CAMIS study undertaken by DCAM identified $215 million in condition deficiencies, and code and ADA compliance needs for these 24 colleges.

During the last three years, the 24 colleges collectively have spent $36.5 million annually on facilities maintenance, at the rate of six percent of their operating budgets and retained fees.

Changes in technology, driving changes in instructional delivery and content, are making even physically sound buildings functionally obsolete.

Technology, Learning Delivery, Program Changes, and Modernization

In recent years, there has been growing awareness nationally that the challenges of sustaining learning environments of suitable contemporary design and quality are even more severe than those posed by deferred maintenance and ADA compliance challenges.

Rapid advances in technology, in turn creating fundamental changes in instructional delivery, are driving significant needs for equipment and infrastructure, as well as for building upgrades and reconfiguration.

Thus, as instructional models change and become increasingly dependent on technology, the problem of condition, which arises from the general aging of facilities, has become a broader issue of technological and functional obsolescence. For example, in the recent comprehensive analysis that EKA completed for The University of North Carolina (a 16-institution system), the magnitude of these qualitative needs alone was more than twice the deferred maintenance condition deficiencies of those same institutions.4

3ADA Proposed Operational Expenditures by Agency, 1994. The total ADA requirement for higher education reported in that study, including The University of Massachusetts and the State and Community College System, was $172 million.

4In the UNC case, condition deficiencies alone amounted to $880 million in 1998. The total condition and quality need, which included the condition deficiencies, but also UNC’s modernization requirements that included 18 new buildings to replace 18 entirely obsolete science buildings, amounted to $3 billion.
In Massachusetts, as in other states, capital investments made in college campuses are influenced heavily by changing conditions in state finances and allocations of debt capacity to other state priorities. In general, funding has not been based on an “investment model.”

**Capital Funding**

State Bond Authorizations

In the main, infusions of capital funding for the 24 colleges derive from bond authorizations for higher education within the Commonwealth’s general obligation bond program. Sets of projects are approved in periodic legislative authorizations. Then, priorities are selected for inclusion in the BHE 5-Year Capital Spending Plan—a rolling plan that is updated annually. Projects move from the Plan to active planning, design, and construction based on various factors, including spending caps, priorities, and project development capacity of DCAM, to which the Commonwealth’s bond funds are appropriated.

Like virtually every other public higher education system in the US, this System has had its capital funding levels and priorities established more by state financial conditions than by a systematic capital investment model. Thus, like most others, the System has a history of decades of capital funding based on shifting executive priorities, political preferences, and funding caps—rather than on comprehensive, systematic analysis of needs and a funding level aimed at meeting a planned portion of those needs. The result, as in most public systems, is chronic under-funding and, occasionally, funding of some projects that, if examined analytically, would not be accorded highest priority. And, in this System, problems of chronic under-funding and accumulating needs are exacerbated by the growing number of multiple campus locations among the community colleges.

Unlike most other public higher education systems, state bond funding, in the Commonwealth, traditionally has supported projects that elsewhere would more typically be self-financed from fee revenues. Examples include athletic facilities and parking facilities.

Other Funding Sources

In addition to appropriations supported by state debt, state colleges achieve additional capital funding for projects with associated revenue pledges, e.g., dormitories and dining facilities, via bonds sold through the Massachusetts Health and Educational Facilities Authority (HEFA) or the Massachusetts State College Building Authority (MSCBA). Community colleges are not authorized to finance through the MSCBA, but they may debt-finance facilities through HEFA.

A limited number of capital projects are accomplished via federal, local, or private fund sources. These include energy projects funded by shared savings, philanthropic gifts or grants for designated facilities, and private development on or near campuses.

Given the pressures on state resources, BHE leadership has been in the process of investigating avenues to augment state bond funding with other sources of capital. Several institutions also are exploring alternatives.

**Current Matching Fund Requirement**

Under current BHE practice, colleges are required to match state bond funding with 50 percent other funding for non-academic facilities and with 25 percent other funding for academic facilities. The colleges can use any combination of matching fund sources, including debt funding via one of the two debt issuance conduit authorities, local funds, gifts or grants, or internal funds.
Recent Funding Summary

1987 Capital Study and 1988 Bond Bill
A long-range capital study and plan for Massachusetts higher education was published in 1987 that identified total needs of $954 million for both the State and Community College System and The University of Massachusetts. Of this total, the 24 System colleges had a total of $335 million in identified needs.

The 1987 study/plan served as the basis for the 1988 bond bill, Chapter 208. In Chapter 208, the state colleges were allocated a total of $24 million and the community colleges were allocated a total of $81 million. The University of Massachusetts was allocated $221 million for capital projects.

1995 Bond Bill
Prior to the Study reported herein, the most recently compiled list of capital needs was the subject of the 1995 bond bill, Chapter 267. In Chapter 267, a total of $621 million in projects was authorized. Of that total, $143 million was allocated to the State Colleges and $152 million to the Community Colleges. The balance of $326 million was for capital projects at the campuses of The University of Massachusetts.

Funding Summary: 1994 to 2002
Based on data provided by DCAM, from 1994 through 2002, total capital expenditures, including money from all sources, for the 24 State and Community Colleges, was $225 million. Average total spending per year for that period was $25 million, and the average per college was slightly more than $1 million, in a range of $475,000 to $2.3 million.

Overall, the levels of capital investment in these institutions have been low for some time, and may have included very little for major renovations or modernization.

Key Study Issues
The overriding theme of this Study was to seek to match facilities to missions of the colleges. Underlying that general theme, there were several key issues that BHE, the colleges, and DCAM were confronting that provided context for this Study:

- **Facilities Condition Deficiencies** reflected by the large volume of deferred maintenance reported in the CAMIS study
- **Health, Safety, and ADA Needs** identified through CAMIS and a specific ADA study
- **Qualitative/Modernization Needs** required to correct obsolescence or to renew facilities for contemporary programs in teaching and campus support facilities
- **Technological Upgrades** required to incorporate advances in teaching and information technology
- **Capacity Needs** at fast-growth campuses, at which significant space shortages already exist or will develop during the 10-year planning period
- **Chronic Under-Funding** of routine maintenance, repair, and renewal needs, requiring both better funding and improved oversight to assure long-term asset preservation
- **Need for a New Bond Bill Authorization** requiring that needs be studied and identified
Need for Alternative Funding Sources/Methods to enable BHE and the institutions to achieve more capital development than state allocations permit.

THE STUDY PROCESS

Study Participants

Based on this general context and anticipating submission of a bond bill for higher education in early 2003, BHE and DCAM undertook a collaboration to conduct an analysis of capital facilities needs for the System’s 24 State and Community Colleges. The University of Massachusetts elected not to participate in the Study, as it had its own process to develop capital needs.

Via a competitive process undertaken from August through December 2001, BHE and DCAM selected Eva Klein & Associates, Ltd. to conduct this Study. EKA’s proposal suggested adaptation of approaches and methods from EKA’s landmark capital study in North Carolina (1998-2000).

The extensive client-consultant team of participants for this Study included:

- Chancellor Judith Gill, BHE Board member Aaron Spencer, and other BHE senior staff from Finance, Academic Affairs, and Planning
- DCAM Commissioner David Perini and other DCAM senior staff
- DCAM project management staff
- BHE project management staff
- Working teams at each of the 24 colleges, including presidents, chief academic officers, chief finance/business officers, and facilities officers, with participation of other College personnel and local board members in the Enrollment Analysis Study, Campus Visits and other reviews
- A 12-person EKA consultant team, including team members with expertise in higher education mission/program strategy; finance; four-year comprehensive institutions; community colleges; higher education facilities planning and management (architects and engineers); and statistical enrollment projection models.

Thus, in this Study, well more than 100 people were engaged to help shape the methods, to conduct or review the analyses, and to develop or review findings.

Study Purposes

Objectives

Based on all the foregoing background and the specific key issues, the objectives of this Study were to:

- Identify capital needs for renovation/modernization of existing facilities and for new facilities to meet capacity needs or other special requirements of the 24 State and Community Colleges for a ten-year-plus planning period.
- Synthesize capital needs into a coherent and balanced Strategic Capital Program for each college
Provide principles for prioritization of all capital needs into a Systemwide Strategic Capital Program.

**Inputs to Capital Needs Assessment and Strategic Capital Programming**

In the big picture, there are three primary inputs to any effort to assess capital requirements and to design a **Strategic Capital Program**, as illustrated in Figure 1.

**Figure 1—Inputs to Capital Needs Assessment and Strategic Capital Program**

- **Enrollments**
  - Current & Future

- **Existing Capital Assets**
  - Preservation & Functionality

- **Mission & Programs**
  - Nature & Distribution

**Capital Needs Assessment**
- Capacity
- Condition Quality/Suitability
- Special Purpose
- Infrastructure/General Campus Development

**Strategic Capital Program and Priorities**

This Study sought to engage thinking about all three critical inputs, although in differing degrees:

- **Mission and Programs**. The scope of this Study excluded assessing or proposing changes in extant missions or programs or their distribution throughout the Commonwealth. The Study did take into account existing, approved mission statements and program realities.

- **Enrollments**. Enrollments received greater attention, via creation of 10-year projections and use of those projections in estimating future capacity needs.

- **Existing Capital Assets**. Greatest emphasis of all was devoted to the state of existing assets—as a primary aim of the Study’s strategy and methods was to refocus investment from higher education’s habitual additions of new space to a new emphasis on renovation, modernization, and upgrade of existing facilities.
Four important guiding strategic philosophies undergirded the Study methods.

- Balance systemwide analyses and policy with attention to specific college missions and differences
- Develop a comprehensive statement of needs—not just a list of bond bill projects
- Sustain the highest priority on asset modernization and preservation
- Give adequate consideration to infrastructure and general campus features (including Health/Safety/ADA).

**Four Guiding Strategic Philosophies**

Therefore, in support of the objectives above, BHE, DCAM, and EKA adopted four extremely important guiding strategic principles that pervaded the entire design and conduct of this Study, from inception to finish.

- Balance systemwide analyses and policy with attention to specific college missions and differences. While systematic analyses were applied to all colleges, to achieve a fair identification of needs and to match facilities to missions, it also was important to take into account the specific variations in missions, programs, and physical facility situations among the colleges.

- Develop a comprehensive statement of needs—not just a list of bond bill projects. At the direction of BHE and DCAM, the Study was to identify all real capital needs, without regard to the eventual capital funding source. It always was understood that some portion of project needs would be the subject of the new bond bill and state financing, while other needs would be met from other sources.

- Sustain the highest priority on asset modernization and preservation. The overriding priority for capital investment was (and is) preservation, upgrading, and extension of functionality of existing capital assets. Additions of new facilities were to be based only on demonstrable capacity deficits or highly specialized facilities needs.

- Give adequate consideration to infrastructure and general campus features (including Health/Safety/ADA). It also was assumed that an appropriate level of attention and priority should be focused on those categories of capital needs that often are most neglected or underfunded, including campus infrastructure and general campus features, with some particular emphasis on health, life safety, and ADA compliance features of the campus environment.

**Despite a challenging project schedule, communications were a high priority for BHE, DCAM, and the EKA consultant team, and took a variety of forms.**

**Project Communication Strategies**

From the outset, BHE, DCAM, and EKA all agreed on the importance of maintaining effective communications throughout the work. This was an especially challenging goal, given that the time period for the Study permitted less than one year for completion of numerous sequential and concurrent tasks. The primary methods for communication included:

- Two Project Summit meetings with the colleges early on, to explain the Study, answer questions, and obtain input
- BHE’s periodic Project Bulletins to the colleges
- Additional memoranda to the colleges regarding forthcoming Study activities
- EKA’s periodic issuance of Work Papers on various elements of the Study
- Site visits to each college by the engineer members of the EKA team (Entech Engineering), to conduct on-site evaluations/meetings for the Facility Condition and Quality Assessment (FCQA)
- EKA team visits to each college, to review and confirm or refine the first drafts of the 24 Strategic Capital Programs
This complicated Study was organized into five phases:

- **Phase 1—Project Contract Organization, Initiation, and Methods Refinement**
- **Phase 2—Data Collection and Needs Assessments**
- **Phase 3—Strategic Capital Programs and Campus Visits**
- **Phase 4—Systemwide Prioritization**
- **Phase 5—Deliverables.**

### Study Phases and Methods

The work program for the Study was organized into five phases. The focus of activities and methods of each phase were as follows.

#### Phase 1—Project Contract Organization, Initiation, and Methods Refinement

From late December 2001 through early April 2002, BHE, DCAM, and EKA worked together to more precisely define the scope of work, tasks, and schedule for the Study. In addition, work on methodology, including meetings, presentations, and initial work papers occurred during Phase 1. DCAM approved the final scope of work relating to the base scope and two additional scope elements (for the Facility Condition and Quality Assessment (FCQA) and the Enrollment Analysis Study) on April 11, 2002.

Phase 1 began formally with Project Summit #1, held at Framingham State College on February 12, 2002, at which Chancellor Gill and Commissioner Perini introduced the Study and its goals. The consultant team presented an overview of approach.

Phase 1 also included work to customize Entech’s FM-Assistant software application, for the EKA team’s use in the Study. In addition, early in Phase 1, Entech loaded CAMIS and other data into the team’s database, in preparation for the analyses.

Phase 1 culminated in Project Summit #2, held at Worcester State College on May 1, 2002, at which time the EKA team presented detailed Study plans to representatives of the colleges, BHE, and DCAM.

#### Phase 2—Data Collection and Needs Assessments

Phase 2 of the Study was comprised of the separate analyses of capital needs in four categories and the first steps toward compilation/synthesis of these various needs into 24 draft Strategic Capital Programs. The four defined capital need categories are illustrated immediately below in Figure 2. The methods for each are summarized below.

Phase 2 also included the Enrollment Analysis Study, the results of which were required for use in the Capacity Analysis.
Figure 2—Four Capital Need Categories—The Study Framework

- Capacity Needs
- Condition & Quality Needs
- Special Purpose Needs
- Infrastructure & General Campus Needs

Strategic Capital Program

Enrollment Analysis Study
Adequate space capacity for instruction and academic support functions (i.e. classrooms, laboratories, offices, and library) is especially critical to assuring that the colleges can accommodate present and coming student enrollments. To assess the capacity of existing facilities and to identify legitimate needs for additional space to support these functions, it was necessary for the Study to project the magnitude of enrollments for the 24 colleges as a whole and then to derive estimates of each college’s share of System enrollments for the next ten years.

The projections were made employing two complementary methodologies. Methods of the Enrollment Analysis Study are described in Appendix 2-A.

Part 1 of the Enrollment Analysis Study used statistical estimation models developed by the consultant team to take into account:

- Historical and predicted population data differentiated by age cohort
- Demographic, economic, and organizational characteristics that have demonstrated effect on college enrollments
- Historical enrollment patterns in geographic service areas defined for each college.5

Part 1—the statistical estimation model produced baseline projections for 2006 and 2011 headcount enrollments for the System, differentiated by enrollment in undergraduate and graduate credit instruction at the four-year colleges and by enrollment in credit instruction and non-credit workforce development training at the community colleges. The systemwide enrollment projections are contained in Appendix 2-B.

Then, these estimates were further identified with individual institutions and translated into full-time-equivalencies. Results of the

5 Existing service area definitions (1987) were used.
Part 1 statistical estimation by individual colleges is contained in Appendix 2-C.

Part 2 of the Enrollment Analysis Study was a review to consider educational trends, program developments, and institutionally specific circumstances that could not be addressed by statistical analysis and projection. These considerations emerged from the consultant team’s interviews with representatives of the colleges, institutional planning documents, discussions with BHE staff members, and EKA team experience elsewhere.

From these inputs, a number of issues were identified that might affect future enrollments at one, several, or all System colleges. An initial set of these issues was described in a work paper, included as Appendix 2-D. In their final form, the issues that were considered for potential impact included:

- Re-definition of institutional service regions
- More comprehensive enrollment data
- Impact of international, out-of-state, and immigrant populations on future enrollment
- Constraints of facility and funding deficiencies on historical enrollments
- Differential space requirements among academic disciplines
- Whether or not current growth acceleration will be a long-term trend
- Impact of new program development on future enrollments
- Impact upon colleges that physically host student/course enrollments of other public colleges
- Means to meet educational needs of students who fail to pass the State’s MCAS test battery.

Taking a conservative approach, EKA ultimately made a limited number of subjective adjustments to the baseline projections derived from the statistical model. The changes made, to projected enrollments for 7 colleges, amounted to a total systemwide increase of 1,093 FTE students.

A critical element of this Study, the Capacity Analysis ensures that new space will be added only where there are (or will be) demonstrable deficits of space.

The combined findings of Parts 1 and 2 are the final projections of the Enrollment Analysis Study and are contained in Appendix 2-E.

Quantitative Space Requirements Analysis (Capacity Analysis)

A major premise of this Study was that priority in general would go to upgrading existing capital assets. Therefore, it was assumed that new facilities should be considered to be legitimate capital needs and added to the Strategic Capital Programs only where demonstrable capacity deficits exist, or in the case of Special Purpose needs (the latter are discussed below).

The Capacity Analysis therefore was done so that EKA could determine which campuses have capacity needs, and in what amounts. Using an aggregated Space Planning Standards model, the Campus Space Inventory each College had previously completed for DCAM, and EKA’s Enrollment Analysis Study, a series of calculations were done to compare predicted space needs with actual space in the Inventory.
Capacity Analysis applied to the four primary academic space types:
- Classrooms
- Teaching laboratories
- Offices
- Library.
Other space types were evaluated qualitatively, as Special Purpose facilities.

Current capacity was analyzed using a three-year average of FTE enrollments (1999-2001). For future capacity, the FTE enrollment projections for 2006 and 2011 were used. In defining capital needs, the 2011 capacity figures were used.

Only the four primary academic space types that most typically are the subject of Space Planning Standards in higher education were included in the Capacity Analysis. They are:
- Classrooms
- Teaching Laboratories
- Offices (and Conference)
- Library/Study.

All other campus space types were treated as Special Purpose projects and evaluated by a different method. (see below).

The Capacity Analysis was done based on current enrollments (using an average of the last three years) and for future enrollments at 2006 and 2011, based on the Enrollment Analysis Study. The calculations show totalAssignable Square Feet (ASF) surpluses or deficits for each of the four academic space categories for the years 2001, 2006, and 2011, plus a total ASF surplus or deficit for the entire campus.

Based upon this analysis, EKA formulated new facility projects to address deficits, and used the Capacity Analysis findings to review campus submissions for new buildings that included proposed academic space. For defining capital projects, the end-point capacity projections (for 2011) were used.

Specific methods for use of Space Planning Standards in a Capacity Analysis must be designed, in part, based on available data. In this Study, the consultant team considered various versions of Space Planning Standards in order to arrive at a methodology that could be deployed with available Massachusetts data and that would produce findings that could be used with confidence. Colleges were afforded numerous opportunities to update and refine data in their space inventories. In addition, space inventories were adjusted to account for projects currently in planning and construction and for permanent leased space.

Based on the level of time, attention and corrections that went into this Capacity Analysis, the results are as reliable as is possible for a first-time effort. In future years, it would be possible to refine the analysis based on updated and refined data. Appendix 3-C provides the final findings of the Capacity Analysis.

Facility Condition and Quality Assessment (FCQA)

Based on EKA’s prior work for The University of North Carolina, the EKA team developed for this Study a methodology that, unlike the condition audit, has not been common practice in higher education.

A condition audit, such as the CAMIS study, typically seeks to assess the work and costs that would be required to restore a building to its original as-built condition and to correct code compliance problems. The generally accepted measure for the magnitude of these condition deficiencies is the Facility Condition Index (FCI), which is calculated by dividing the total cost of correcting condition deficiencies by the replacement cost of the facility. Based on national experience, an FCI of less than 0.05 is considered good condition, an FCI of 0.05 to 0.10 is considered fair condition, and an FCI greater than 0.10 is considered poor condition.

In contrast, the aim of EKA’s innovation, the Facility Condition and Quality Assessment (FCQA) is to estimate work and costs that would be required to bring the facility to the equivalent of a modern one, as if constructed today. The measure developed by EKA to express the
The magnitude of these condition and quality deficiencies is the Facility Condition and Quality Index (FCQI), which represents the total project cost to modernize the facility, divided by the total cost of replacing the facility with a new building meeting Baseline Facility Quality Criteria, a set of criteria that define contemporary requirements and standards.

The basic benchmarks for EKA’s FCQA methodology were a series of Baseline Facility Quality Criteria reflecting the quality and functionality characteristics that should be present in fully adequate facilities of each particular type. Drafted by the consultant team and reviewed by BHE/DCAM and the individual institutions, these Baseline Facility Quality Criteria formed the basis for an evaluation of facilities at each campus by EKA/Entech team members.

With the assistance of campus facilities staff knowledgeable about the characteristics and condition of facilities, in most cases also with participation of academic personnel, campus buildings were evaluated against the Criteria and order of magnitude costs were developed for work required to bring facilities into conformance with the Criteria.

Entech staff entered details of corrective and modernization work required and associated cost data into the project database and integrated these FCQA findings with condition deficiency data developed under the earlier CAMIS condition audit, to provide total project cost estimates for modernization of each facility included in the assessment.

From this assessment, a Facility Condition and Quality Index (FCQI) was developed for each building. These provide a relative measure of modernization needs that helps in prioritization.

Also, if the FCQI is near 1.0 or higher, it may be more economic to replace the facility, or to modernize it for a less demanding use, at a lower cost.

Special Purpose facilities were defined as those required for a particular program function or to support campus functionality. These are everything other than the four basic academic space types, including, for example, athletics, student unions, maintenance buildings, and specialized program facilities, like greenhouses.

An FCQI was developed for each building renovation and modernization project. These FCQIs provide a useful indicator of the relative magnitude of the deficiencies in each building, and thus a tool for prioritizing modernization needs within a campus.

Sometimes, the FCQI indicates that renovation and modernization may be uneconomic (i.e., when the FCQI is close to, equal to, or greater than 1.0), it may be that the subject building should be demolished or converted to a lower level function. Exceptions are made for historic buildings or buildings that relate to institutional identity.

Renovation and modernization projects developed in this manner were incorporated into the Strategic Capital Program developed for each of the 24 colleges. An important focus of the methodology was to emphasize whole-building modernizations, rather than piecemeal renovations. While this holistic approach may not always be practical, it was the general intent of this methodology to define and stage comprehensive building modernizations to the greatest extent practicable.

Appendix 4-A provides further details about the FCQA methods and the Baseline Facility Quality Criteria. Information about the site visits the EKA team conducted at the colleges to do this assessment is provided in Appendices 4-B and 4-C.

Special Purpose Facilities Needs

The campuses were asked to identify needs for new campus facilities required to support a particular program’s functional requirements or to provide adequate campus support and community life, and that were not identified through the Capacity Analysis or the

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6 For each campus, with DCAM and college input, the team selected facilities for inclusion in the FCQA. Not all facilities were included. For example, extremely new facilities and marginal structures, like salt sheds, were excluded.

7 EKA developed the FCQA methodology for North Carolina and has applied it in Massachusetts for a second time. There are therefore no nationally recognized benchmarks yet for FCQIs, as there are for FCIs.
FCQA. These were intended to be space or facilities other than the four academic space types addressed in the Capacity Analysis. Examples would be dining halls, greenhouses, maintenance facilities, theaters, or athletic facilities.

A standard template was created and provided to the colleges for their use in submission of Special Purpose requirements, together with supporting program information and other relevant data. The consultant team evaluated these submissions, with particular attention to campus mission and programs, campus operations and functionality, and other factors.

Notwithstanding the project definition of Special Purpose, some of the campus submissions received were for basic academic building types, rather than for true Special Purpose facilities. In those cases, EKA evaluated the proposed facilities in light of the Capacity Analysis findings for that college.

Appendix 5-A provides the methods for this analysis. Appendix 5-B provides a list of all the projects submitted, on templates, for both this analysis and for analysis of Infrastructure and General Campus Features (discussed below).

Infrastructure and General Campus Needs

The fourth category of capital needs consisted of utilities and other infrastructure needs and general campus features. Thus sub-study was a hybrid of the methodologies for the FCQA and for Special Purpose projects, as infrastructure needs can be either a question of renovation to existing elements or identification of new elements needed. Thus, there were two approaches.

First, infrastructure and general campus elements were assessed as part of the FCQA site visits conducted by the EKA/Entech team members, and based upon Baseline Quality and Adequacy Criteria established for evaluation of existing infrastructure. These Criteria are provided in Appendix 6.

In addition, EKA requested that the colleges submit project proposals for infrastructure and general campus features. The colleges were asked to provide current plan status, need/rationale, project scope, cost and schedule, and other information for each requirement, using a standard project template EKA provided for this purpose.

This category of needs ranged widely from critical utilities infrastructure to roads, walks, parking, and circulation, to security, lighting and other safety elements, to esthetic elements such as campus entrances and grounds improvements. (The project submissions are summarized in Appendix 5-B, as noted above.)

The consultant team evaluated the project submissions from the colleges in concert with our own site observations and determined the validity of these needs.

Phase 3—Strategic Capital Programs and Campus Visits

The focus of Phase 3 of the Study was to organize and synthesize the capital needs identified in the four separate Phase 2 analyses into a coherent and balanced program of capital development for each college. This was accomplished in the course of numerous team meetings and extensive analytical iterations—both before and after Campus Visits.

An initial draft of a Strategic Capital Program for each college was reviewed at BHE and with colleges in extended visits and meetings on campus. These Campus Visits were scheduled and conducted from...
late September to mid-November, 2002. BHE and DCAM staff accompanied two EKA visit teams.

The next step was a series of work sessions, communications, and editing to modify and refine the drafts, with the benefit of additional input from the colleges. Late project proposals and numerous data corrections were received and incorporated into many rounds of refinements up through January 2003.

In many cases, as noted above, colleges proposed projects in the Special Purpose category that represented buildings consisting of the primary academic space types that were covered in the Capacity Analysis. For this reason, one important feature of this synthesis of Strategic Capital Programs was to merge the Special Purpose and Capacity needs analyses, reviewing proposed new facilities in light of the capacity findings.

The format that the EKA team designed for the presentation of the Strategic Capital Programs was based on intent to reflect the philosophical premises of the Study and to incorporate prioritization, at the college level.

The Study assumed that the number, scope, and cost of the needed projects would demand that they be distributed across a long-term period of capital development. By Study design, it was established that the Strategic Capital Program would be stated as a 10-year plan period.

Given a stated 10-year plan period, as a first approach to prioritization, both for colleges, and systemwide, the “10-year” needs were further subdivided into “Phase 1,” nominally representing years 1 through 5 and “Phase 2,” nominally representing years 6 through 10. (In reality, depending on the flow of available state funding and other financing alternatives, it may take longer than 10 years to complete this Strategic Capital Program.)

Also, as stated at the outset of this Report Summary, this entire Study was designed to focus priority on achieving suitability, quality, and efficient use in existing facilities to meet contemporary needs. Also to be recognized were needs for:

- Additional capacity to accommodate present and projected enrollments
- Specialized facilities to serve particular programs or to support campus functionality
- Campus infrastructure improvements and expansions.

These considerations formed the basic format and inherent order of internal prioritization for the 24 individual college Strategic Capital Programs, as summarized in Figure 3.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Strategic Priority Levels (Internal to Colleges)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Major Renovations and Modernization—High Priority</td>
</tr>
<tr>
<td>2</td>
<td>Major New Construction—High Priority</td>
</tr>
<tr>
<td>3</td>
<td>Limited Scope Renovations—High Priority</td>
</tr>
<tr>
<td>2</td>
<td>Major Renovations and Modernization—Deferred to Phase 2</td>
</tr>
<tr>
<td>5</td>
<td>Major New Construction—Deferred to Phase 2</td>
</tr>
<tr>
<td>6</td>
<td>Limited Scope Renovations—Deferred to Phase 2</td>
</tr>
</tbody>
</table>
Next, once the Strategic Capital Programs were stated in two phases and six Strategic Priority Levels, the EKA team reordered projects within the categories, based on campus preferences, to the extent that campuses indicated such priority preferences.

Volume 2 and Appendix 7-A provide more details about the organization and internal prioritization of the 24 college Strategic Capital Programs.

**Phase 4—Systemwide Prioritization**

Development of a recommended systemwide prioritization of project needs identified for all 24 Colleges built upon the prioritization work done for the 24 individual Strategic Capital Programs, described immediately above. In the Systemwide Strategic Capital Program, there are 11 “System Priority Levels.”

Systemwide prioritization then was based upon a set of 21 premises, principles, and secondary factors, developed by the consultant team:

- Seven philosophical or policy premises were articulated that have guided the Study from its beginning and that provide a context for prioritization.
- Seven primary prioritization principles were established to guide prioritization among the many important needs within the System.
- Seven secondary factors were established, as factors for additional consideration in prioritization.

Of these three sets of parameters, the most important set is the seven prioritization principles.

Rather than attempt to develop one single rank-ordered systemwide priority list of more than 500 projects, projects were ranked within one of several groups within each of the two phases established for the college and systemwide Strategic Capital Programs, each at a successively lower System Priority Level.

Prioritization was a two-step process:

- The first step was a relatively mechanical sort of the projects based upon use of a matrix that considered both facility essentiality and project urgency to sort all Phase 1 projects into five System Priority Levels, and all Phase 2 projects into five additional System Priority Levels.
- An additional System Priority Level 11 was created for a capacity project for Holyoke Community College (in Phase 2-A).
- Once sorted in this manner, priorities then were considered in a more subjective manner based upon the established collective prioritization premises, principles and secondary factors to determine the final recommended System Priority Level for each project.

Appendix 7-B provides the methodology for systemwide prioritization, including the 21 premises, principles, and secondary factors, and a description of the two-part prioritization process. The Systemwide prioritization is also summarized in Volume 3.

**Phase 5—Deliverables**

The final phase of the Study consisted of compiling and organizing all Study materials into this Volume 1—Report Summary and the accompanying Volumes 2, 3, and 4, and Executive Summary.
Deliverables also included numerous electronic spreadsheets and other materials, delivered to BHE and DCAM for ongoing use.

In addition, BHE and DCAM have access to the EKA’s team database application for one year.

SUMMARY OF STUDY FINDINGS

In this section, Study findings are summarized. Throughout the section, there are references to more detailed information contained in Volume 2, Volume 3, or Volume 4 (Appendices).

Enrollment

Figures 4, 5, 6, and 7 show the summary results, in total FTEs, of the Enrollment Analysis Study, expressed in enrollments for 2001, 2006, and 2011.8

Figure 4 groups Massachusetts College of Liberal Arts with the six state colleges.9 Figure 5 includes the two other specialized colleges. Figures 4 and 5 include both undergraduate and graduate enrollments. Figures 6 and 7 provide credit and non-credit (workforce development) enrollments for the community colleges.10

Following are selected highlights of the Enrollment Analysis Study findings:

- Four of the state colleges (Bridgewater State, Framingham State, Westfield State, and Worcester State) are projected to experience enrollment growth throughout the 10-year period.
- Two colleges, (Salem State and Fitchburg State) are projected to grow through the first half of the 10-year period to 2006, and then to decline slightly in enrollments through 2011.
- Massachusetts College of Liberal Arts is projected for modest growth to 2006, and level enrollments through 2011.
- Massachusetts College of Art and Massachusetts Maritime Academy are projected to experience slight to modest growth, primarily up through 2006.
- Several (but not all) the community colleges are likely to experience notable growth in credit enrollments. In a few cases, growth through 2006 may be followed by level or slightly declining enrollments through 2011.
- There is considerable growth projected in non-credit workforce development enrollments at a number of the community colleges.

---

8 All references to 2001 are actually a 3-year average of Fall enrollments for 1999, 2000, and 2001, as this was what was used to represent current enrollment in the Capacity Analysis.
9 Throughout this presentation, Massachusetts College of Liberal Arts is grouped with the state colleges, although it is classified as a specialized college. This is because, for facilities purposes, its issues and needs more closely resemble those of state colleges—unlike Massachusetts Maritime Academy and Massachusetts College of Art, whose facilities configurations and issues differ.
10 For the community colleges, analysis of workforce development/job skills enrollments were based on the only data available, which were course registrations. EKA therefore developed a method to convert these into FTEs, based on non-credit funding formulas in use in other states, and assumptions to estimate the portion of these that would have impact on campus facilities.
Figure 4
State Colleges and Mass College of Liberal Arts
Total Student FTE Enrollment for 2001, 2006, and 2011

Figure 5
Specialized Colleges--Mass College of Art and Mass Maritime Academy
Total Student FTE Enrollment for 2001, 2006, and 2011
Figure 6
Community Colleges
Total Student FTE Credit Enrollment for 2001, 2006, 2011

Figure 7
Community Colleges
Workforce Development FTEs for 2001, 2006, and 2011
As in any system where quantitative analyses of capacity have not typically been done and where there have been varied historical growth patterns, it is inevitable that one finds a wide variation in surpluses and deficits of space capacity among the colleges.

In the Capacity Analysis graphs, bars above the line indicate a surplus of space and bars below the line indicate a deficit of space.

In defining capital needs, The consultants used the endpoint numbers—projected capacity for 2011.

**Capacity**

As can be expected in a System that has built buildings for decades without applying quantitative space planning guidelines and that has experienced varying enrollment growth trends, there are the inevitable wide variations in total Assignable Square Feet (ASF) surpluses and deficits in campus academic facilities.

Again, it should be noted that this analysis includes four space types representing core academic space—classrooms, teaching laboratories, office/conference space, and libraries. No other facility types are included.

Figures 8, 9, and 10 show the total ASF surplus/deficit calculations for the state colleges and Massachusetts College of Liberal Arts, the other two specialized colleges, and the community colleges, for the current period (called 2001, but actually a three-year average), and for 2006 and 2011, based on the Enrollment Analysis Study.

In Figures 8, 9, and 10, graph bars above the zero line represent a surplus of academic space. Bars below the zero line represent a deficit of academic space.

As noted earlier, in development of the Strategic Capital Program for each college, the consultant team used the endpoint (year 2011) projections of surplus or deficit to determine capacity project needs, if any.

![Figure 8](image_url)

**Figure 8**

State Colleges
Total ASF Surplus/Deficit

- Fitchburg
- Worcester
- Mass Coll Lib Arts
- Westfield
- Framingham
- Salem
- Bridgewater

- 2001
- 2006
- 2011
The six State Colleges and MCLA vary considerably in capacity—from surpluses to deficits.

- Fitchburg State will use some of its current excess capacity by 2006 and will grow excess capacity again by 2011.
- Worcester State will absorb most of its current excess capacity by 2011.
- Massachusetts College of Liberal Arts will continue to grow its current excess capacity through 2011.
- Westfield State and Framingham State will use their current excess capacity and will have slight deficits by 2011.
- Salem State has a current deficit of space and this deficit will grow through 2006, but then shrink again by 2011.
- Bridgewater State has a deficit and this deficit continues to grow through 2011.

The large apparent calculated space surpluses shown for Massachusetts College of Arts and Massachusetts Maritime Academy arise from a methods issue and are substantially overstated. The consultant team does not consider them meaningful.

If/as data resources permit in the future, a refined version of this analysis could be done with lab space allowances that are varied by discipline.

As Figure 8 above shows, the six state colleges and Massachusetts College of Liberal Arts vary considerably in capacity.

- Fitchburg State will use some of its current excess capacity by 2006 and will grow excess capacity again by 2011.
- Worcester State will absorb most of its current excess capacity by 2011.
- Massachusetts College of Liberal Arts will continue to grow its current excess capacity through 2011.
- Westfield State and Framingham State will use their current excess capacity and will have slight deficits by 2011.
- Salem State has a current deficit of space and this deficit will grow through 2006, but then shrink again by 2011.
- Bridgewater State has a deficit and this deficit continues to grow through 2011.

For two specialized colleges—Massachusetts College of Art and Massachusetts Maritime Academy, Figure 9 below shows that both appear to have calculated surpluses of academic space, for current and projected periods.

It is extremely important to interpret these findings for Massachusetts College of Art and Massachusetts Maritime appropriately. The measures used in the Capacity Analysis were designed to be applied to 24 institutions in a System. They are primarily based on assumptions of a general college curriculum, with a “typical” distribution of space types. More specifically, the Space Planning Standard used in this Study for teaching labs, 12 ASF per FTE student, was selected as an average for all disciplines and programs and applied systemwide to all three college classifications. In reality, this space allowance is far lower than typical ASF of lab needs for arts and engineering/maritime disciplines. Therefore, the large calculated surpluses for these two specialized colleges are overstated and not meaningful.

In a future iteration of the Capacity Analysis, when more detailed course and room data are available, it would be possible to define variable teaching lab space allowances, including much larger standard allowances for art lab spaces and maritime lab facilities. A revised future version of the Capacity Analysis, with varied lab allowances, would show more normalized findings for these two institutions.
Finally, Figure 10 below shows the range of capacity findings for the 15 community colleges. As with the state colleges, there is a great range—from substantial available capacity to marked capacity deficits, both current and projected, among these institutions:

\[\n\]

Like the State Colleges, the Community College campuses were found to vary considerably, from surplus capacities to deficits.

\[\n\]

- Four colleges (Greenfield, Massasoit, Roxbury, and Berkshire) appear to have available current capacity that will not be fully absorbed through the next decade.

- Two colleges (Mt. Wachusett and Northern Essex) will go from some surpluses to small deficits by 2011.

- Two colleges, (Cape Cod and Holyoke) have relatively smaller surpluses currently and will absorb all their capacity or have small deficits by 2011.

- At the other end of the spectrum, six Community Colleges (Middlesex, Mass Bay, Bunker Hill, Bristol, Quinsigamond, and North Shore) have 2001 academic space deficits, varying from minor to quite significant in the cases of Quinsigamond and North Shore Community Colleges. These colleges, without new space, will have rising and noticeable deficits by 2011.

- Springfield Tech Community College (STCC) is an outlyer in this analysis because responsibility for extensive unoccupied space in the historic Springfield Arsenal is assigned to the College, and counted in its Inventory. Therefore, the Capacity Analysis findings, although shown in Figure 10, are not realistic or meaningful for STCC. Rather they illustrate the magnitude of the stewardship challenge presented by the Arsenal property.
Due to inclusion of the many historic Springfield Arsenal buildings in its properties, Springfield Tech Community College has far more space than it normally would require. The Capacity Analysis findings for STCC are not meaningful and therefore STCC capacity was treated in a separate analysis.

By a special analysis, the consultants determined that STCC needs 289,000 ASF to meet 2011 enrollment levels. This equates to 491,000 GSF of space to be renovated. An additional 580,000 GSF of Arsenal space is planned for decommissioning. A detailed planning study is needed—to determine which buildings will be used and which will be decommissioned and stabilized.

Special Analysis—Springfield Technical Community College (STCC)

The Capacity Analysis anomaly above illustrates the special challenge in planning for STCC. The Arsenal property and more recent buildings total to 1,071,000 GSF of campus—well more than the college needs.

This circumstance led the consultant team to employ a unique approach in developing the Strategic Capital Program for STCC. It was assumed that portions of the Arsenal complex should be renovated to accommodate STCC’s programs in facilities the condition and suitability of which would be commensurate with ones designed for the purpose, and equivalent to contemporary space. It was further assumed that the Commonwealth’s responsibilities for preserving the Arsenal would call for decommissioning and stabilizing of all space not required by STCC.

First, to determine the amount of space that should be planned for STCC, normative space standards, from national and Commonwealth sources, were used to estimate appropriate quantities and kinds of space. This proved to be 289,000 ASF based on 2011 enrollment estimates. Based on DCAM’s guidance, this ASF was grossed up by 25 percent to 361,000 GSF of space needs for STCC. To arrive at the area for decommissioning and stabilization, the STCC space was grossed up by 1.7 to a total of 491,000 GSF. This leaves 580,000 GSF of Arsenal space that STCC does not need, and that therefore must be decommissioned and stabilized.

Provision then was made for comprehensive space planning to be the first project undertaken in implementing STCC’s Strategic Capital Program, in order to determine the most cost-efficient and program-
In the Strategic Capital Program, there are 18 capacity-driven projects, amounting to $226 million, or 19% of total needs of the System.

As they do for individual buildings, the overall campus FCQIs provide a relative measure of qualitative deficiencies of the colleges.

Effective way to fit the College's needs into selected buildings. A cost allowance of $217 per GSF was estimated for comprehensive renovations and modernization of the space STCC will use.

Decommissioning/stabilization costs then were estimated based on DCAM experience, at $40 per GSF.

These estimates then defined funding allowances associated with STCC's Strategic Capital Program. These allowances are not definitive project costs. They will be refined based upon further study and detailed analyses in the context of a campus master plan that will be undertaken as a critical first step at the College. Complete information about the STCC methodology is provided in Appendix 1-G.

Summary

In the Strategic Capital Program, there are 18 projects that are proposed solely on the basis of needed capacity, totaling to about $226 million, or 19 percent of the total needs. Other capacity needs are planned to be met in projects for modernization of existing buildings and, in a few cases, as a result of Special Purpose facilities.

Facility Condition and Quality

FCQIs—Relative Measure of Qualitative Needs

Individual FCQIs calculated for each project provided a measure of the relative severity of the deficiencies and modernization requirements in each facility and thus assisted in internal prioritization of campus needs.

Similarly, aggregated data provides an overall FCQI for each college as a useful indicator of the overall condition and qualitative deficiencies of each entire campus, compared with the other campuses and with group averages, as depicted below in Figure 11, 12, and 13.

The group average FCQI for state colleges, including MCLA, is 0.36. Four colleges have lower FCQIs, indicating better than group average quality of facilities. Three have higher FCQIs, indicating worse than group average quality, with Worcester State being in clearly worst position, with an FCQI of 0.662.
While there are, as yet, no generally accepted thresholds for these FCQIs, as there are for FCIs, EKA can make a comparison with the outcome of EKA’s similar assessment of the 16-campus system of The University of North Carolina. While the average group FCQIs for the three groups of BHE campuses range from about 0.17 to 0.36, the overall FCQI for UNC was slightly higher, at 0.42, indicating that the UNC system overall had greater qualitative deficiencies than this System’s colleges.

In comparing among Massachusetts institutions, by the three categories, it becomes apparent that the state colleges as a group have significantly greater qualitative deficiencies than the community colleges as a group.

Mass College of Art and the two campuses of Mass Maritime Academy differ. The group average FCQI is 0.17. Mass Maritime’s campuses are qualitatively better than the College of Art campus.

For the community colleges, a group average is more realistic if STCC’s “outlier” FCQI is omitted. Thus, for 18 campuses of the other 14 community colleges, the group average FCQI is 0.183.
Reflecting an increasing volume of condition deficiencies resulting from deferred maintenance, a growing problem of obsolescence of an aging facilities inventory, and a basic policy premise of the Study, the FCQA produced the largest part of the projected 10-year capital needs for the 24 colleges. Altogether, a total of 247 needed condition and quality projects were identified at the 24 colleges, representing a total 10-year funding need of nearly $700 million that comprises 60 percent of the total capital requirement.

**Special Purpose Facilities**

These included a wide array of projects, such as:

- New or expanded student dining facilities, gymnasium and other athletic facilities
- Performance spaces
- Child care centers
- Maintenance and support facilities.

A limited number were program-specific new facilities, such as the facility for the Veterinary Tech and Horticulture programs at Northern Essex Community College.

**Summary**

The 24 colleges identified a total of 38 Special Purpose projects that, upon evaluation, the EKA team deemed valid needs. These projects represent a total of about $96 million, and represent about 8 percent of total capital needs.

**Infrastructure and General Campus Needs**

A preponderance of these projects provide for upgrade and expansion of the utilities infrastructure at the institutions, while other significant requirements include upgrade and expansion of pedestrian and vehicular circulation and parking, playing fields and outdoor athletic facilities, security and lighting improvements, health/safety and ADA needs, campus way-finding, and improvements to the campus landscape.

**Summary**

A total of 211 valid infrastructure and general campus projects was identified for the 24 colleges. Altogether, this broad category of requirements represents a total 10-year capital need of approximately $146 million and comprises 13 percent of the total capital requirement.

**STRATEGIC CAPITAL PROGRAMS—INDIVIDUAL COLLEGES**

For each college in the System, there is an ordered, internally prioritized Strategic Capital Program in which the categories of needs were integrated and costs estimated. For multi-campus colleges, there is a separately stated Strategic Capital Program for each campus location.

Capital needs in the Strategic Capital Program total to $1,167,363,000. This is the sum of Total Project Costs (TPC), including Estimated Construction cost (EPC) and all other related project costs, based on DCAM data.

It is important to note that, in all cases, the dollar amounts shown for TPC in the Strategic Capital Programs are estimates or allowances, not definitive project costs. These allowances do not constitute project...
All TPC costs are “allowances,” not entitlements, and are subject to revision, per DCAM planning processes.

This excludes projects pending in the current BHE 5-Year Capital Spending Plan.

It also excludes about $200 million in proposed projects that, upon review in this Study, did not meet need criteria.

budgets or entitlements. All projects in the Strategic Capital Program must go through the normal process of planning, design, and budgeting, in DCAM’s normal procedures. Actual TPCs will vary based on future detailed studies.

Not all proposed projects campuses submitted met the established criteria for inclusion in the Strategic Capital Program as needs for the planning period. In Volume 2 of the Report, in the Strategic Capital Program Summaries, a below-the-line category, entitled Projects for Consideration in Future Plan Periods, preserves and presents information about a number of projects that the consultants did not recommend for inclusion. Inclusion of these projects would have increased the total Strategic Capital Program by slightly more than $200 million.

Figure 14, following, provides a summary by institution, by phase, and by the three Strategic Priority Levels within each phase, of the Strategic Capital Programs for the 24 colleges. Please see Volume 2 for the Strategic Capital Program Summary reports for each college.
### Figure 14
**Massachusetts State and Community Colleges**

**Strategic Capital Program Summary**

*By College, Phases 1 and 2, and Strategic Priority Levels* within Phases

<table>
<thead>
<tr>
<th>COLLEGE</th>
<th>PHASE I (YEARS 1 THROUGH 5)</th>
<th>PHASE II (YEARS 6 THROUGH 10)</th>
<th>PHASE II-A TOTAL</th>
<th>STRATEGIC CAPITAL PROGRAM TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strategic Priority Level 1</td>
<td>Strategic Priority Level 2</td>
<td>Strategic Priority Level 3</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
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<td><strong>$270,000</strong></td>
<td><strong>$229,339,000</strong></td>
</tr>
</tbody>
</table>

| Specialized Colleges |                             |                                |                  |                                |                                |
| MASS COLLEGE OF ART  | $18,962,000                 | $0                             | $155,000         | $19,117,000                    | $92,000                        | $31,977,000                  | $51,094,000                  |
| MASS COLLEGE OF LIB ARTS | $15,885,000             | $0                             | $0              | $15,885,000                    | $724,000                       | $9,131,000                   | $19,666,000                  |
| Mass Maritime-Bourne  | $3,580,000                  | $6,870,000                     | $85,000          | $10,535,000                    | $86,000                        | $9,131,000                   | $19,666,000                  |
| Mass Maritime-Plymouth | $0                          | $0                             | $20,000          | $20,000                        | $86,000                        | $9,131,000                   | $20,000                      |
| MASS MARITIME TOTAL  | $3,580,000                  | $6,870,000                     | $105,000         | $10,555,000                    | $86,000                        | $9,131,000                   | $19,666,000                  |
| **Sub-Total—Specialized Colleges** | **$38,427,000** | **$6,870,000** | **$260,000** | **$45,557,000** | **$902,000** | **$60,732,000** | **$106,289,000** | **$0** |

| Community Colleges   |                             |                                |                  |                                |                                |
| BERKSHIRE CC         | $11,466,000                 | $0                             | $11,000          | $11,477,000                    | $6,891,000                     | $650,000                      | $14,000                      | $7,555,000                    | $19,032,000                  |
| BRISTOL CC           | $9,851,000                  | $15,550,000                    | $59,000          | $25,460,000                    | $17,040,000                    | $218,000                      | $23,900,000                  | $49,360,000                  |
| BUNKER HILL CC       | $9,029,000                  | $33,021,000                    | $0              | $42,050,000                    | $10,400,000                    | $210,000                      | $19,223,000                  | $61,273,000                  |
| CAPE COD CC          | $13,001,000                 | $300,000                       | $33,000          | $13,334,000                    | $9,880,000                     | $124,000                      | $15,874,000                  | $29,208,000                  |
| GREENFIELD CC        | $3,527,000                  | $2,700,000                     | $0              | $6,227,000                      | $2,800,000                     | $142,000                      | $5,102,000                   | $11,329,000                  |
| HOLYOKE CC           | $10,669,000                 | $3,460,000                     | $0              | $14,129,000                    | $8,685,000                     | $86,000                        | $20,729,000                  | $39,523,000                  |
| MASS BAY CC          | $6,694,000                  | $12,100,000                    | $0              | $18,794,000                    | $2,500,000                     | $0                            | $20,729,000                  | $39,523,000                  |
## Figure 14

**Massachusetts State and Community Colleges**

**Strategic Capital Program Summary**

**By College, Phases 1 and 2, and Strategic Priority Levels* within Phases**

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<td></td>
<td>Strategic Priority Level 1</td>
<td>Strategic Priority Level 2</td>
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<td>North Shore CC-Danvers</td>
<td>$5,780,000</td>
<td>$1,895,000</td>
<td>$7,675,000</td>
<td>$0</td>
</tr>
<tr>
<td>North Shore CC--Lynn/Beverly</td>
<td>$75,000</td>
<td>$20,280,000</td>
<td>$20,355,000</td>
<td>$1,714,000</td>
</tr>
<tr>
<td>NORTH SHORE CC TOTAL</td>
<td>$5,855,000</td>
<td>$22,175,000</td>
<td>$28,105,000</td>
<td>$1,714,000</td>
</tr>
<tr>
<td>Northern Essex CC-Haverhill</td>
<td>$12,187,000</td>
<td>$4,570,000</td>
<td>$16,849,000</td>
<td>$6,522,000</td>
</tr>
<tr>
<td>Northern Essex CC-Lawrence</td>
<td>$150,000</td>
<td>$8,450,000</td>
<td>$9,600,000</td>
<td>$8,890,000</td>
</tr>
<tr>
<td>NORTHERN ESSEX TOTAL</td>
<td>$12,337,000</td>
<td>$13,020,000</td>
<td>$25,449,000</td>
<td>$15,412,000</td>
</tr>
<tr>
<td>Quinsigamond CC</td>
<td>$6,406,000</td>
<td>$17,200,000</td>
<td>$23,656,000</td>
<td>$12,220,000</td>
</tr>
<tr>
<td>Roxbury CC</td>
<td>$5,006,000</td>
<td>$4,910,000</td>
<td>$10,227,000</td>
<td>$4,428,000</td>
</tr>
<tr>
<td>Springfield Tech CC</td>
<td>$53,300,000</td>
<td>$0</td>
<td>$53,300,000</td>
<td>$51,280,000</td>
</tr>
<tr>
<td>Sub-Total—Community Colleges</td>
<td>$168,034,000</td>
<td>$145,116,000</td>
<td>$314,181,000</td>
<td>$163,999,000</td>
</tr>
<tr>
<td>Grand Total</td>
<td>$381,630,000</td>
<td>$205,886,000</td>
<td>$589,077,000</td>
<td>$353,215,000</td>
</tr>
</tbody>
</table>

Note: The term “Strategic Priority Level” in this presentation indicates the recommended prioritization of needs within an individual institution’s Strategic Capital Program. This is not the same as the term “System Priority Level” which is applied (in Volume 3) to indicate levels of priorities on a systemwide basis.
The emphasis of this work was to develop principles and methods for prioritization that could be applied periodically to review and refine priorities.

The scheme that was developed was applied to create a first Systemwide Strategic Capital Program.

Seven “premises” were assumptions for prioritization.

Seven prioritization principles were most important to the prioritization.

**SYSTEMWIDE STRATEGIC CAPITAL PROGRAM**

In context of limited funding expectations and prospects of a lengthy implementation period, BHE, DCAM, and EKA agreed that it was more important to articulate the basis upon which needs of all 24 colleges could be prioritized on a systemwide basis than to make a one-time prioritization.

It will be necessary to review and adjust priorities periodically. Accordingly, EKA developed and proposed a three-part system of elements for prioritization, for use on an ongoing basis. EKA also did a first sort based on this system. This first sort of the projects/needs by use of the prioritization system constitutes the Systemwide Strategic Capital Program, at the conclusion of this work in 2003.

**Premises + Principles + Secondary Factors**

**Seven Premises**

Seven background assumptions or premises for prioritization are articulated as follows:

1. Although the nature of needs varies, all 24 institutions have significant capital improvement needs.
2. The $1.17 billion Strategic Capital Program will take time to accomplish and creativity to fund.
3. Preserving existing capital assets, adapting them to serve contemporary educational purposes, and providing adequate campus infrastructure are the predominant emphases of this Strategic Capital Program.
4. Capacity should be added selectively, and only as needed to accommodate demonstrable capacity needs, based on present and future student enrollments. Existing plant capacity should be well and efficiently used before any new space is added.
5. Although common prioritization principles are applied, they must be used in a way that reflects sensitivity to genuine differences between the campuses in mission, programs, and other factors.
6. Pragmatic limitations will govern how much funding can be brought to bear; how much work can be moved through planning, design, and construction; and how much displacement of facilities can be managed in each stage of the Strategic Capital Program.
7. Estimated Total Project Costs (TPC) stated in the Strategic Capital Program are based primarily on recent DCAM experience. They are not final costs and are not to be construed as funding entitlements in any way.

**Seven Prioritization Principles**

Given the above premises as background, seven important principles guide prioritization of capital needs, to arrive at the Systemwide Strategic Capital Program:

1. Highest priority must be given to projects that are essential to conducting a college’s primary academic mission or that directly support that mission, i.e., core facilities.
2. Decisions about project priority rest on data-driven justifications developed in this Study to the extent possible.
3. The dependence of unique or mission distinctive programs on special facilities should be recognized in prioritization.
4. The capacity of certain facilities to generate revenue, and thereby self-fund the cost of needed capital improvements,
should be considered in determining project priorities. Potentially self-supporting facilities would not be priorities for state funding.

5. Intervention to arrest on-going damage to existing facilities should be accorded high priority.

6. Projects to remediate serious hazards to health and safety and those that afford necessary program access to disabled persons should be accorded high priority. (Not all health, safety, and ADA needs are of equivalent urgency.)

7. Prioritization should aim to ensure that critical infrastructure elements are in place to support campus operations. (Not all infrastructure elements are of equivalent urgency.)

Seven Secondary Factors

The Systemwide Strategic Capital Program priorities also might usefully encourage or reward shared use of facilities, regional program collaboration, pursuit of gifts and grants, regional economic development, and excellent stewardship of facilities.

Thus, seven secondary factors to be considered in periodic prioritization are:

1. Projects involving support facilities (academic or student support) intended to be shared between more than one institution
2. Projects that encourage regional academic program collaboration
3. Projects where a state funding portion is required to generate matching funding from other sources (gifts, grants, or revenues)
4. Projects that have a definable economic development impact in the region
5. Projects that are joint developments with local government for common or compatible purposes
6. Scheduling of projects to reward colleges for exceptionally good stewardship
7. Projects that can be shown to generate meaningful operating efficiencies or cost savings.

Prioritization Process

BHE, DCAM, and EKA felt it useful to test the usefulness of the above formulations as potential policy. To that end, the 21 premises, prioritization principles, and secondary factors were used in a first-order prioritization, to create the Systemwide Strategic Capital Program. The process EKA devised and implemented was as follows:

First, projects were sorted by a two-dimensional Facility Essentiality and Project Urgency matrix, to yield 5 System Priority Levels for each of the two phases of the Systemwide Strategic Capital Program. (An 11th System Priority Level is assigned to one capacity project for Holyoke Community College, listed as Phase 2-A.). Volume 3 describes the matrix analysis. Additional information is provided in Appendix 7-B.

Then, this initial sort was reviewed and adjusted, project by project, college by college—in light of the 21 premises, principles, and secondary factors.
Results

Distribution of Systemwide Capital Projects

The results of this prioritization process are shown below in tabular and graphic forms:

△ Figures 15-A and 15-B provide the distribution on the basis of the 11 System Priority Levels, reflecting most urgent to least urgent group of projects over a nominal ten-year period.

△ Figures 16-A and 16-B provide the distribution on the basis of the four capital need categories, including facility condition and quality, capacity, special purpose needs, and infrastructure/general campus.

△ Figures 17-A and 17-B provide the distribution on the basis of facility use types, including academic, student services/campus life, campus support, and health/safety/ADA.
Sorted by System Priority Levels, there is a group of projects totaling $193 million that, collectively, are the highest priority needs, representing 16% of the $1.17 billion total.

<table>
<thead>
<tr>
<th>SYSTEM PRIORITY LEVEL</th>
<th>$ PHASE 1</th>
<th>$ PHASE 2 + 2A</th>
<th>$ GRAND TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>193,079,000</td>
<td>193,079,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>147,809,000</td>
<td>147,809,000</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>88,257,000</td>
<td>88,257,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>91,513,000</td>
<td>91,513,000</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>58,990,000</td>
<td>58,990,000</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>156,359,000</td>
<td>156,359,000</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>143,086,000</td>
<td>143,086,000</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>117,794,000</td>
<td>117,794,000</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>104,107,000</td>
<td>104,107,000</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>47,439,000</td>
<td>47,439,000</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>18,930,000</td>
<td>18,930,000</td>
<td></td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>$579,648,000</td>
<td>$587,715,000</td>
<td>$1,167,363,000</td>
</tr>
</tbody>
</table>

Note: System Priority Levels 1-5 are for Phase 1 needs and System Priority Levels 6-10 are for Phase 2 needs. Phase 2-A and System Priority Level 11 are a special category for the potential library/office space capacity need at Holyoke Community College.
When sorted by the four categories of capital needs, $700 million, or 60% of the total $1.17 billion, represents needs for major modernization or other renovations to existing capital assets.

### FIGURE 16-A
**SYSTEM-WIDE PRIORITIZATION: SUMMAR Y RESULTS**
**DISTRIBUTION OF $ BY CAPITAL NEED CATEGORY**

<table>
<thead>
<tr>
<th>CAPITAL NEED CATEGORY</th>
<th>$ TOTAL NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCQA Facility Condition &amp; Quality Assessment</td>
<td>699,990,000</td>
</tr>
<tr>
<td>(Modernization and Renovations)—247 projects</td>
<td></td>
</tr>
<tr>
<td>CAP Capacity Analysis</td>
<td>225,816,000</td>
</tr>
<tr>
<td>(New Capacity Needs to Meet Present or Future Enrollments)—18 projects</td>
<td></td>
</tr>
<tr>
<td>SP Special Purpose Facilities—38 projects</td>
<td>95,615,000</td>
</tr>
<tr>
<td>I/GC Infrastructure and General Campus Features—211 projects</td>
<td>145,942,000</td>
</tr>
<tr>
<td>GRAND TOTAL ALL CAPITAL NEED CATEGORIES—514 PROJECTS</td>
<td>$1,167,363,000</td>
</tr>
</tbody>
</table>

When two of the four categories, the FCQA (modernization) needs and the Infrastructure/General Campus needs, are added together, they represent 73% of total needs in the Program. This is consistent with philosophical premises of the Study—to focus attention on existing assets and campus functionality—not on new space.

Figure 16-B
Systemwide Prioritization: Summary Results
Distribution of $ by Capital Need Category

- Condition/Quality: 60%
- Capacity: 19%
- Infrastructure/General Campus: 13%
- Special Purpose: 8%
When sorted by use type, $767 million of needs, representing 66% of the total $1.17 billion, are for academic facilities.

Very importantly, Campus Support uses, which are essential to functionality and safety, represent another 18% or $216 million.

<table>
<thead>
<tr>
<th>USE TYPE</th>
<th>$ TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td>767,035,000</td>
</tr>
<tr>
<td>Student Services/Campus Life</td>
<td>177,514,000</td>
</tr>
<tr>
<td>Campus Support</td>
<td>215,595,000</td>
</tr>
<tr>
<td>Health/Safety/ADA*</td>
<td>7,219,000</td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>$1,167,363,000</strong></td>
</tr>
</tbody>
</table>

*Note: The vast majority of ADA needs that are within buildings are included in projects for whole building modernizations. This figure is “residual”—only including certain non-building campus ADA improvements.

This distribution also is consistent with Study philosophy.

Review of this analysis and the underlying projects indicates that there is a wide variation among the 24 colleges in facility needs, project categories, and relative priorities. Therefore, no single type of project can be said to be a highest priority need for the System overall.

Renovation and modernization projects to correct condition deficiencies, meet basic quality criteria, and correct technological obsolescence clearly are the largest overall need and represent a high priority need at most, but not all, of the 24 colleges. There are relatively few projects required to meet capacity needs; however, for some
colleges that have been growing rapidly, these represent a high priority need.

Consequently, the prioritization strategy for the System provides funding at all System Priority Levels for all four categories of capital investment studied.

**System Priority Level 1—An Illustration**

To illustrate the mix of projects in the prioritization results, Figures 18-A and 18-B show the mix of projects that were deemed by EKA to be the highest priority, and thus listed in the Systemwide Strategic Capital Program as System Priority Level 1.

**Figure 18-A**

Priorities for Capital Investment
System Priority Level 1 Only
(Most Urgent Needs)

<table>
<thead>
<tr>
<th>Category</th>
<th>$ Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preservation, Renovation and Modernization of Existing Facilities</td>
<td>118,283,000</td>
</tr>
<tr>
<td>New Facilities Required to Meet Capacity Needs</td>
<td>47,956,000</td>
</tr>
<tr>
<td>Special Purpose Facilities</td>
<td>4,310,000</td>
</tr>
<tr>
<td>Campus Infrastructure and General Campus Features</td>
<td>22,530,000</td>
</tr>
<tr>
<td><strong>Grand Total—Priority Level 1</strong></td>
<td><strong>$193,079,000</strong></td>
</tr>
</tbody>
</table>

**Figure 18-B**

Priorities for Capital Investment for System Priority Level 1 Only

- **Special Purpose**: 2%
- **Capacity**: 25%
- **Condition/Quality**: 61%
- **Infrastructure/General Campus**: 12%

Please refer to Volume 3 of the Report for lists of all projects, as prioritized into System Priority Levels 1 to 11.
For Information:

Board of Higher Education
The Commonwealth of Massachusetts
Attention: Mr. Joseph Egan, Director of Fiscal Policy
One Ashburton Place, 14th Floor
Boston, MA 02108
V: 617-994-6986
F: 617-727-6397
E: jegan@bhe.mass.edu

Division of Capital Asset Management
The Commonwealth of Massachusetts
Attention: Mr. Michael B. Williams, Director of Programming
One Ashburton Place, 15th Floor
Boston, MA 02108
V: 617-727-4015
F: 617-727-6060
E: michael.williams@dcp.state.ma.us

Eva Klein & Associates, Ltd.
Strategies for the Global Knowledge Economy
Attention: Ms. Eva Klein, President
503 Seneca Road
Great Falls, Virginia 22066 USA
V: 703 406 6100
F: 703 406 6101
E: eva klein@evakleinassociates.com
WEB: www.evakleinassociates.com