Facility Condition Assessment & Space Study Project

KRS 164 / M-05468008

Final Report

Kentucky Postsecondary Education System
Statewide Summary



Submitted by:

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NCHEMS

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Kentucky Postsecondary Education System
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Note on Figure and Table Headings: Figures and Tables are numbered sequentially as if both illustrations were part of the same list. i.e. Figure 1.3 may be followed by Table 1.4, without there being a Table 1.3.

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Kentucky Postsecondary Education System Statewide Summary

Council on Postsecondary Education
Frankfort, Kentucky
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Section 1. Introduction

The Kentucky Council on Postsecondary Education (CPE) contracted with Vanderweil Facility Advisors, Inc. (VFA) to assess the condition, space adequacy and space capacity of selected facilities at Kentucky's nine public higher education institutions during the summer and fall of 2006. The studies are intended to inform both the Council and the institutions as the basis for a 15-year capital plan that would help address the following important questions:

- What is the condition of each institution's facilities? What system renewals are due for those facilities, both deferred renewals due today and future renewals due within the next 15 years?
- Is the current space (in selected buildings) fit for continued use? If not, how much would it cost to upgrade those buildings?
- Does each institution have enough space, now and to meet enrollment projections for the year 2020? If not, how much will it cost to add the needed space?
- How do Kentucky facilities compare to other postsecondary educational portfolios?
- Is there evidence to indicate why the predicted capital reinvestment is needed?
- What recommendations does the project team have as KPES creates a 15 year capital plan for facilities?

Summary of Findings Figures:

Figure 1.1: KPES 15-Year System Renewal Needs

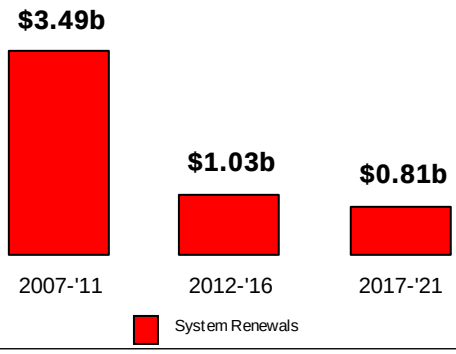


Figure 1.2: KPES 15-Year Space Adequacy + Capacity Needs

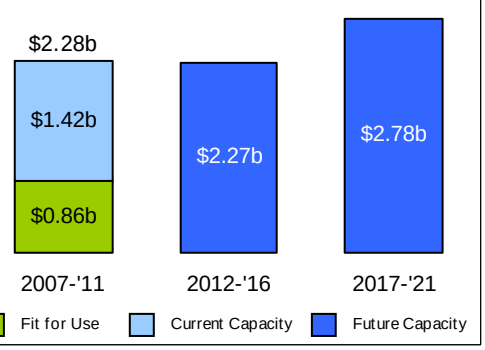
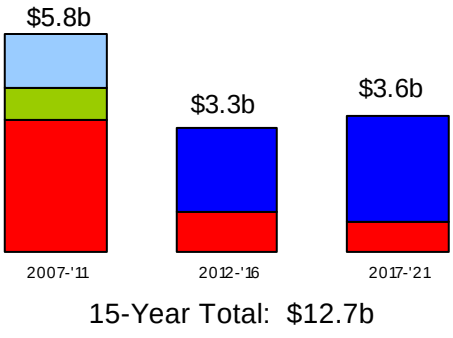


Figure 1.3: KPES 15-Year Blended Needs



LEGEND: Colors in Figure 1.3 correspond to labels in Figures 1.1 & 1.2. Figure 1.3 summarizes the annual needs presented in Figure 6.4.

Attributions:
All sections of this report are by Peter Scanlon, Thomas Bart and Joseph Maggiore of VFA, Inc., unless otherwise noted under the Section heading.

Table 1.4: Percentage of Institutional Portfolios Included in Study

Institution	Institution's Portfolio* Total # of Buildings	Institution's Portfolio* Gross SF	Condition Study by VFA** Total # of Buildings		Condition Study by VFA** Gross SF		Space Adequacy Study by Paulien Total # of Buildings		Space Adequacy Study by Paulien Gross SF	
Eastern Kentucky University	190	4,626,458	55	(29%)	2,829,774	(61%)	10	(5%)	867,593	(19%)
KCTCS	284	6,138,142	198	(70%)	5,740,720	(94%)	8	(3%)	509,813	(8%)
Kentucky State University	54	1,223,473	37	(69%)	726,963	(59%)	7	(13%)	148,841	(12%)
Morehead State University	112	2,718,050	39	(35%)	1,556,012	(57%)	11	(10%)	813,450	(30%)
Murray State University	169	3,710,171	48	(28%)	2,453,372	(66%)	3	(2%)	203,667	(5%)
Northern Kentucky University	109	2,440,541	17	(16%)	1,373,838	(56%)	5	(5%)	649,987	(27%)
University of Kentucky	908	14,884,891	167	(18%)	8,700,858	(58%)	51	(6%)	3,564,946	(24%)
University of Louisville	136	7,889,007	107	(79%)	4,513,765	(57%)	36	(26%)	2,469,961	(31%)
Western Kentucky University **	54	4,266,565	40	(74%)	1,860,621	(44%)	10	(19%)	809,809	(19%)
Total	2,016	47,897,298	708	(35%)	29,755,923	(62%)	141	(7%)	10,038,067	(21%)

*Source: Fall 2005 Building Data Base submission.
**Space assessed by VFA is Education and General Space.
***Revised to include WKU housing facilities.

Summary of Findings:

- The present study examined only a portion of the Kentucky Postsecondary Education System's (KPES) portfolio. Table 1.4 summarizes the percentage of each institution's portfolio that the condition and space studies addressed. The results of the present study most likely understate the amount of capital investment needed.
- KPES facilities included in the study require $3.49 billion in system renewals during 2007-2011, and $1.84 billion more between 2012 and 2022, totaling $5.34 billion in system renewals over 15 years. (Figure 1.1 and Section 4.)
- KPES facilities included in the space fit-for-continued use study require $862 million between 2007 and 2011 to bring them up to current educational adequacy standards. (Figure 1.2 and Section 5.)
- KPES institutions require $1.42 billion between 2007 and 2011, to meet current enrollment needs, and an additional $5 billion over the following 10 years to meet future enrollment projections. (Figure 1.2 and Section 5.)
- For facilities included in the study, the total 15-year capital investment required to address condition, adequacy and capacity is $12.7 billion. (Figure 1.3 and Section 6.)
- Kentucky postsecondary education institutions compare unfavorably (42% 5-year Facility Condition Index) to the benchmark higher education instutitution portfolio (18% 5-year FCI). University of Kentucky's and Morehead's portfolios are most unfavorable and University of Louisville's and Kentucky State University's and KCTCS' are relatively the best (but still not on par with the national benchmark). (Section 4.)
- The condition of facilities at all nine campuses is generally consistent with the age and construction methods of the facilities. There are many major system renewals due because 60% of KPES buildings were built over 30 years ago, and as would be expected, many systems are at the end (or beyond the end) of their expected useful life. (Section 4.)
- The project team recommends KPES and the institutions address all three needs (condition, adequacy and capacity) with blended investments to address them simultaneously, staged over 15 years. (Section 6.)
- Funding options for Kentucky to consider vary according to the type of facility: The "cleanest" approach to funding the backlog of deferred renewals would be a state bond issue paid from general operating revenues, together with a requirement that each institution spend an amount equal to the GASB recommended depreciation amount. New construction of auxilary facilities is most often funded with long term debt supported by student direct use charges. The predominant funders of general academic facilities—classrooms, labs, offices, and libraries—are state and local governments (direct appropriations or debt) and private donors (outright gifts). The primary funders of research facilities are state and federal governments and private donors (either individuals or philanthropic organizations). (Table 1.5 below, and Section 7.)

Table 1.5 below (a copy of Table 7.3 in Section 7) is presented as a worksheet for KPES.

Here, the subtotals of the "Strategic Funding" scenario suggested in Section 6.8 are shown in the "Amount Needed, from 2006 Study" column. (The total amount needed, $11.8b, is less than the $12.7b shown in Figure 1.3 because the recommended "strategic funding" leaves a small, usually acceptable (10%), portion of the deferred renewals undone.)

KPES policy makers can use Table 1.5 as a framework to allocate the Amounts Needed across the most likely sources of funds to create KPES' 15 Year Funding Plan.

If KPES chooses to suppliment this study with additional information, any additional capital investments identified would need to be included.

TABLE 1.5
KPES Funding Patterns Worksheet for Higher Education Facilities

USES		SOURCES					
	Amount Needed, from 2006 Study	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation							
• Condition/End of Life	$4.471m		Approp./debt				Approp./debt
• Space Adequacy	$862m		Approp./debt				Approp./debt
New Construction							
• Auxiliary	n/a						
2006 Capacity							
• Academic facilities	$902m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$515m		Approp./debt		Grants	Gifts	
2020 Capacity							
• Academic facilities	$3,415m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$1,633m		Approp./debt		Grants	Gifts	
TOTAL	$11,799m						

Figure 1.5 is a copy of Figure 7.3 in Section 7.

Section 2. Project Overview: Methodologies, Data, Outcome & Limitations

The nine institutions included in the study were:

- Eastern Kentucky University
- Kentucky Community & Technical College System
- Kentucky State University
- Morehead State University
- Murray State University
- Northern Kentucky University
- University of Kentucky
- University of Louisville
- Western Kentucky University

The study includes selected buildings identified by CPE as education and general space on each institution's campus. In total, VFA performed a Level 1 Lifecycle Condition Assessment (LCA) of 736 assets at the nine institutions, including 660 buildings and 76 site infrastructure assets. Nearly 18 million square feet (37%) of institutional space was NOT included in the condition study. Also, VFA's project partner Paulien & Associates was asked to examine the space adequacy of 141 education and general buildings selected from various campuses (only 7% of 2,016 buildings in the portfolio), and evaluate the space capacity of each institution vs. current and future student populations.

The number of buildings and amount of space not included in the present study means the results of the study most likely understate the amount of capital investment needed at Kentucky's postsecondary educational institutions.

Methodologies

In the Level 1 Lifecycle Condition Assessments, VFA facility experts profiled each asset's major building systems to assess the capital renewals required now and in the future. A renewal of a building system is defined as an investment required at the end of the system's useful life, to prolong, or renew, its service in the facility — for example, re-roofing a worn out old roof.

"Deferred Renewals" are renewals that, based on the age of the facility, were due in the past, but have not yet been completed.

Each building's system lifecycle assessment included establishing a replacement value of each system, comparing the system's expected (industry standard) useful lifespan to its observed remaining life, and estimating the cost to renew that system when replacement is due. Replacement values (adjusted to reflect local market conditions) of each asset's component systems were then added together to establish an asset's replacement value, and the cost of system renewals due within the coming five years was summed. The ratio of these 5-year renewal costs divided by the replacement value of their asset(s) establishes an index, called a Facility Condition Index, which can be used to compare the relative condition of assets. Lower FCIs indicate an asset requires little renewal investment; buildings with higher FCIs are in worse shape. Lower FCIs are better.

$$FCI = \frac{[\text{Sum of 5-year Renewals}]}{[\text{Replacement Value of Asset(s)}]}$$

The LCA process and methodology is supported by the expert opinions of facilities engineers and architects, along with VFA's web-based capital planning software application, VFA.facility. Condition data about each facility were collected during an on-site visual inspection and through a series of interviews and feedback cycles with facility managers at the institution. Detailed cost estimates for the replacement value and renewal cost of each system were developed using the VFA.facility software application, which has the widely accepted R.S. Means construction cost estimating database embedded within it. R.S. Means estimates, already localized by a city cost index by Means, were further adjusted (up) to match the historical project cost experiences represented by a cross section of Kentucky public postsecondary institutions. For consistency between campuses, the same adjustment factors were made across all institutions. Expected useful lifespans for individual building systems were based on Building Owners & Managers Association (BOMA) standards and verified though consultation with CPE and APPA (formerly the Association of Physical Plant Administrators). A detailed account of these sources and adjustment factors is presented in Appendix A2.

Selected buildings that were less than five years old were assumed in "good" condition (because of their young age). Their future system renewal needs were included in the condition study by modelling system types and renewals based on construction records and interviews with university facilility managers. This produced data compatable with the Level 1 (and Level 2) assessments. No physical walk through or visual inspection was conducted on these buildings. (As expected, due to their young age, many 5-year-old-or-less buildings had no renewals due within the coming five years, and hence an FCI = 0.)

Each asset greater than five years old was assumed to have a backlog of systems that were at or beyond their expected useful life. In determining the backlog, all capital renewals due in 2006 or previous years were defined as "deferred capital renewals." Renewals due in 2007 or beyond were treated as future capital renewals.

It is worth noting that the Level 1 Lifecycle Condition Assessment process does not include identifying "deferred maintenance" deficiencies. These facility needs, while often rising to the level of requiring capital investment to address, would each require less than replacing each deficiency's entire system. (Replacements of entire systems are called renewals, and are included in Level 1 LCAs.) Identifying and estimating the cost of deferred maintenance requirements is a service available through VFA's Level 2 Detailed Facility Condition Assessments.

In the Space Adequacy or Fit-for-Continued-Use portion of the study, buildings selected by CPE and the institution were visually inspected for compliance with 9 metrics of the facility's educational adequacy. Where gaps were identified, recommended corrective actions were developed, including cost estimates for those actions. Cost estimates were based on historical averages for similar upgrades at higher education institutions nationwide, and adjusted to coincide with the replacement values for similar building types estimated in the VFA condition study.

The Space Capacity portion of the study addresses the need for additional educational and general (E&G) space to meet the needs of the student and staff population, both now and into the future, based on enrollment data and projections provided by CPE.

Detailed methodologies explaining both the condition assessment and the space study are presented in Appendices A2 (Condition) and A4 (Space).

Data

Detailed records of each building in the study are presented in the appendices:

Appendix A3. Facility Condition Data Reports
- Asset List Report
- Asset Detail Report(s)
- System Renewal Report, by Year
- System Renewal Crosstab Report

Appendix A5. Space Study Data Reports
- Building Space Fit-for-Continued-Use Profiles
- Space Capacity Detailed Report

Complete electronic records of each asset are available for licensed users of VFA.facility, VFA's capital planning and management software system. VFA.facility software offers the flexibility to investigate, analyze and model the capital needs for each institution, and for the Kentucky postsecondary education system as a whole.

Outcomes

KPES' and each institution's goal is to gain a complete picture of Kentucky's public higher education facility capital needs over the coming 15 years.

To that end, this study presents some valuable pieces of that picture, though not yet a complete picture:

Condition:	Major system renewal needs for 736 assets, or 29 million square feet of space (63% of portfolio)
Space Adequacy:	"Fit-for-continued-use" ratings, and cost estimates for upgrades, for 141 buildings (7% of portfolio).
Space Capacity:	Capacity projections and cost estimates for the institutions'

education and general use space needs, now and to meet 2020 enrollment goals.

Funding Source Options: A summary of options for funding higher education capital needs, presented at a statewide level. Funding options are most efficiently approached across Kentucky's postsecondary education portfolio, and are not broken down by insitution within this report.

Section 6 of this report presents the 15 year capital needs outlook for each portion of the study. The 15-year plan also presents models for how KPES might want to invest in those needs, based on various spending patterns and strategic priorities. The spend alternatives are included to demonstrate how a truly complete picture of Kentucky's public higher education capital plan might be constructed.

However, as mentioned in the Limitations section below, the outcome of the present study does not present a 100% complete picture of the whole. Each portion of the study is valuable on its own, but the condition, space adequacy and space capacity needs portions each examined only a specific group of each instutition's facilities. Further, the Space Capacity projections, while updated from the Paulien 1999 model (revised by Paulien in 2001), may not be aligned with other strategic initiatives underway or planned at individual institutions.

Section 6 includes the consultants' team suggestions for further work to align goals and construct a more complete picture of Kentucky's public higher education facility capital needs.

In the condition assessment portion of the study, VFA found the amount of system renewals required by the great majority of KY public higher education instutions to be consistent with the age and use of each facility, and many buildings to be surviving (for the time being) past their expected useful lifespans. And while there are examples of major capital investment in new facilities, the amount of investment in the existing building stock has not met these buildings' aging needs.

Limitations

It is important to note a few limitations to the VFA | Paulien portions of the study:

- **Assessed only selected buildings** – 736 of Kentucky's public postsecondary education facilities (37% of the number of buildings), comprising 29 million gross square feet (63% of gross square footage), were included in the condition assessment. Further study or modeling of the remaining assets would be required to gain a 100% complete picture of the condition or capital needs of the institutions.
- **Assessed for budgeting purposes –** The survey outcomes are intended for planning and budgeting purposes; they are not intended to provide construction specification-grade information about an asset. Outcomes for condition needs, space adequacy needs and space capacity needs may be added together to ascertain a more rounded picture of an institution's needs (in fact, the project team encourages such a blended view of capital investments for each asset/campus), however because such a limited portion of most institutions' portfolio was studied, the "blended" picture is far from complete.
- **Assessed for system renewals only** – The Level 1 LCA services provided under this contract included profiling the type, condition and renewal needs of each building and its major systems. The condition assessment does NOT provide a detailed list of requirements for each building. (This service is available through VFA's Level 2 Detailed Facility Condition Assessment.) Thus, while projecting system renewals over 15 years, the forecast does not account for sub-component needs related to a system unless they collectively contribute to general system failure. These are sometimes called "deficiencies" or "requirements," are usually concentrated in the next 1-5 years, and again, are not included in this report.

  Also not included in the study is any assessment of the day-to-day facilities operations. The study specifically and intentionally focused on the level of investment needed for major system renewals only. The study collected no data and draws no conclusions about how institutions are

budgeting to address daily operations and maintenance of their facilities.

- **Space Study only for selected Education and General buildings –** The Space Study included 141 buildings across the nine institutions. This represents only 7% of the total number of buildings (and 21% of gross square footage). The space adequacy study is intended to summarize the adequacy of the study buildings only. Since the buildings surveyed were not chosen to serve as a statistical sample of the overall university's space adequacy, extrapolation of the space adequacy results to model all adequacy needs for each institution is not recommended.
- **Space capacity projections include Education & General Space only** – The Space Capacity Study accounted for the education and general space at each institution, the institution's current enrollment, and the 2020 enrollment projections. Needs for residential and related enterprise space such as agriculture were not included. As noted, further survey or advisory services are available from the VFA | Paulien team to help fill in any gaps in the information that are deemed of high importance.

Section 3: Study Overview: Project Organization & Implementation

Organization

In April, 2006, the Council on Postsecondary Education contracted with VFA, Inc. of Boston, MA, as prime contractor, to conduct the overall facility condition and space adequacy | needs study. VFA provided overall project management as well as facility condition assessment services and capital planning software for the project. VFA teamed with higher education space planning experts Paulien & Associates of Denver, CO, to provide the Space Adequacy / Fit-for-Continued-Use and Space Capacity portions of the study. And, as a subcontractor to Paulien, the National Center for Higher Education Management Systems, of Boulder, CO, provided an analysis of funding sources KPES may want to consider when deciding how to implement the 15 year capital plans.

A project organization chart is shown in Figure 3.1

Figure 3.1 Project Organizational Chart

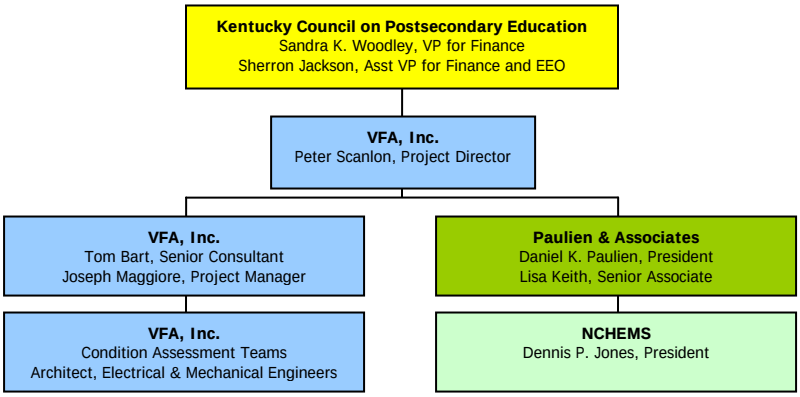
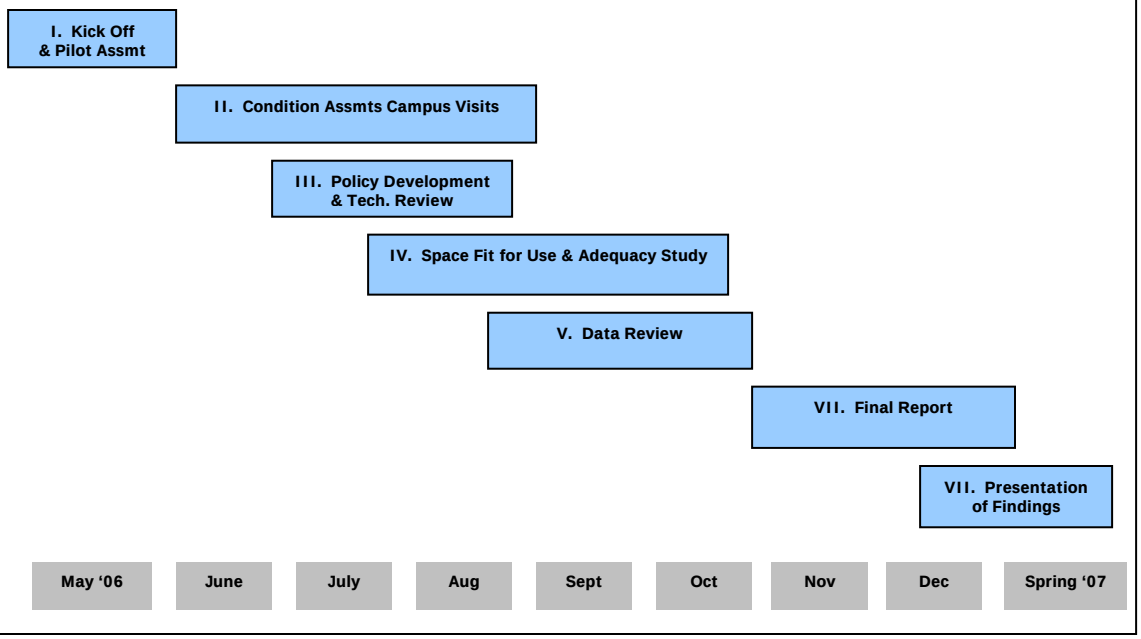


Figure 3.2: Project Schedule



Implementation

The study proceded under a fast track schedule during which 27 million square feet, and 700+ assets, were assessed statewide during five months of 2006. Figure 3.2 illustrates the major portions of the project schedule.

Phase I: Kick Off & Pilot Assessment

The project kicked off in early May 2006 at a planning meeting hosted by Kentucky State University and attended by representatives of the Council, each of the public postsecondary education institutions, and the VFA | Paulien project team. The overall project schedule and methodology were presented, and a pilot assessment was conducted.

For the pilot assessment, a team of VFA assessors conducted a Level 1 Life Cycle Assessment of 2 facilities on the KSU campus. Representatives from each institution joined the VFA team to familiarize themselves with the Level 1 LCA process. During a debriefing session at the conclusion of the visual inspections, questions about the process, standards and schedule were answered.

In the weeks following the kick-off meeting, VFA developed sample data and reports based on the KSU pilot buildings. The reports were submitted to the Council and institutional representatives, who approved the data content and format that would be used for the subsequent Level 1 LCAs on their respective campuses.

Phase II: Campus Visits

During the summer and fall of 2006, assessment teams from VFA and Paulien visited selected buildings at each institution.

Data generated in the Facility Condition Assessment portion of the study was collected by teams of VFA assessors – typically architects, electrical and mechanical engineers and/or facility managers – during a visual inspection of each asset. The detailed project assessment schedule is included in Appendix A1.

During the visual inspection, VFA assessors interviewed key facility managers at the institution, profiled the type, age, condition and renewal actions due for each major system of each building/infrastructure asset. Assessors also took digital photos, which are included in the reports and stored in the project database.

Upon completion of the field visit, the assessment teams began the data and cost estimating portion of the work, when they developed detailed cost estimates of each building system, the time

remaining in each system's useful life, and the likely cost of renewing the system at the end of its useful life.

The replacement values of each system were totaled for each asset to derive a current replacement value (CRV) for that asset. CRVs presented in the data are intended to represent the construction cost of replacing the building (or system), with a similarly functioning building/system, in 2007 dollars. The CRVs do not include any "upgrades" of particular systems unless current building methods make the upgrade equal or less expensive.

Phase III: Policy Development and Technical Review

The project team worked closely with the Council to develop policies that would guide the submission, review and possible adjustment of the data. Guiding pricincipals that shaped these policies included goals of:

- Accuracy: data should reflect actual conditions for each facility, as closely as possible given methodologies used for each portion of the study, providing a reliable record of the portfolio today.
- Consistency: similar standards, reference information and adjustment factors should apply uniformly to all institutions statewide, ensuring fair and equitable treatment across the postsecondary system.
- Transparency: all data sources, cost estimating and adjustment processes should be easy to reference, understand and track, providing maximum transparency to the information underlying the study's conclusions.

The process of reviewing and refining the data (Phase V, below) followed these principals as closely as possible.

Phase IV: Evaluation of Space Adequacy & Capacity

The Space Adequacy and Capacity portion of the study was led by Paulien & Associates. A detailed explanation of Paulien's methodology is included as Appendix A4.

Space Adequacy | Fit-for-Continued-Use Study

CPE and the institutions identified a specific set of education and general facilities for evaluation in the space adequacy study. The facility selection process was developed by CPE and was the same for each campus. Selection criteria for inclusion in the space adequacy study included: (a) research facilities, (b) constructed before 1965, (c) identified by the institution as being unfit for continued use, or (d) identified as being in too deteriorated condition to support programs currently housed in the space.

The key areas evaluated include:

- *Does the building serve the program's current and future needs either by design or retrofit?*
- *How do the spaces in the building fit today's expectations and/or can the building be reasonably renovated to meet those expectations?*
- *Is the building's physical condition adequate to meet program needs and today's expectations (including life safety issues) and how major of a conversion or renovation is needed?*
- *Where applicable, are research laboratories of acceptable, flexible dimensions and up-to-date equipment to sustain on-going use as modern research facilities?*

Multiple rooms in each building were reviewed. The goal was to examine a sampling of the best, worst, and norm for the building. Classrooms, laboratories, offices, special use spaces, and bathrooms are examples of spaces reviewed. Mechanical and structural spaces were typically not included.

At the end of each day's assessments, the team discussed each building and collectively determined each building's criteria rating and recommended action.

Building Design

When evaluating the buildings in the space adequacy study, there were several conditions examined on a case-by-case basis. These conditions contributed to the recommended action for each building. Where possible these types of issues are included in the comment section of each building's evaluation. In general, it is

important for a facility to promote and serve the activities and programs it houses as well as support the mission and overall master plan of the institution. It is entirely possible that a building was designed for and adequately serves the programs it houses yet be physically located in the wrong precinct of a campus or be a smaller single story building in a prime location that would be better served by a larger, multi-story building.

Some of the buildings were specifically designed for the programs contained in them or for the functions they serve, yet the building may now be overcrowded due to the institution's/ program's growth or the physical design is antiquated for today's standards or the construction materials do not allow for an cost-effective or efficient renovation. Certain buildings are on the historical registry. Many of these older facilities are best suited for administrative offices and not instructional programs. If the building does not meet ADA requirements then the additional constraint is that the administrative function should not be one that is high profile which generates a lot of people traffic.

Space Adequacy Assessment

The consultants reviewed nine criteria and rated each building on a one to four scale as follows: 1 = Unsatisfactory; 2 = Somewhat Unsatisfactory; 3 = Somewhat Satisfactory; 4 = Very Satisfactory; 0 = Not Applicable. An average rating was calculated based upon the criteria that were applicable to the building. The nine criteria are:

1. *Room Capacities*
2. *Functionality*
3. *Suitability to Purpose*
4. *Flexibility of Space for Different Learning Styles*
5. *Gathering Space*
6. *Multi-Media Technology*
7. *Computers and Connectivity*
8. *Instructional Laboratories / Lab Equipment*
9. *Research Laboratories / Lab Equipment*

Physical Condition

Each building's physical condition was reviewed in general terms. Areas of observation included, but were not limited to: ADA accessibility, roof leakage, asbestos related materials, air quality/condition issues, electrical and lighting issues, window glazing, elevator presence and condition, type of construction, and general maintenance of the building.

Buildings were then categorized into four major groups to more easily quantify the estimated renovation costs for the adequacy study.

The four categories used ($25/sf, $50/sf, $75/sf, $150/sf) provide budgetary guidance which should fall within a plus or minus 20% range of actual costs. The dollar value selected (as part of the space study estimates) includes all costs, both soft and hard. Categories carrying $25/sf and $50/sf renovation costs were termed "minor" --- indicating they could likely be occupied during renovation (mostly finishes, slight reconfigurations). Categories carrying $75/sf and $150/sf were termed "major" renovations – indicating the need to move all occupants out during renovation. Also, when we refer to a renovation as "major" we are attaching a sense of urgency to the need.

How were the four cost ranges determined and what documentation from the construction industry was used? Until recently, all construction estimates and contracts were guided by the Construction Specifications Institute Format (CSI) and the 16 divisions therein:

Division 1 General Conditions
Division 2 Site Work
Division 3 Concrete
Division 4 Masonry
Division 5 Metals
Division 6 Wood & Plastics
Division 7 Thermal & Moisture Protection
Division 8 Doors & Windows
Division 9 Finishes
Division 10 Specialties
Division 11 Equipment
Division 12 Furnishings
Division 13 Special Construction
Division 14 Conveying Systems
Division 15 Mechanical
Division 16 Electrical

The CSI format has been in use for 75 years or so, and is well suited for use in estimating the renovation costs. CSI has revised the format recently, but this traditional version was used. Each of the Divisions above has several subheadings--- for example, Division 9 - Finishes has 14 subheadings among which are Painting, Tile, Carpet, Acoustical Treatment, etc.

Therefore, ALL pieces of a building are given in the CSI format. In a simple but lengthy process, an experienced construction estimator could assign square foot values to all the nearly 200 subheadings and have the information necessary for a reasonably accurate renovation cost. Paulien's construction consultant, Wayne Elwell, used his experience to provide values for most of the subheadings necessary for budgetary purposes. These incremental pieces, for example, $15/sf for a new HVAC system, $12/sf for an updated electrical system, $4/sf for new paint, etc., all contribute to the number that fits one of the four categories.

Space Needs Study

The Finance Unit from CPE provided a Fall 2004 facilities inventory, staff full time equivalents, and research expenditure data for each of the institutions. The Council also provided enrollment, staffing and research expenditure projections for year 2020.

The Space Model used in the current study was based on the 1999 Space Needs Model developed for CPE by Paulien & Associates, updated by Paulien in 2001, and again updated during this study per the consultant's recommendations to reflect changing use standards and the physical limitations of certain Kentucky buildings.

The existing assignable square footage (ASF) used in the model reflects educational and general (E&G) state supported space only. It does not include hospital space, farms, and locations (remote locations and service centers) off the main campus. This is important as the student and staff full-time equivalents (FTE) include all students and staff for an institution. The Kentucky postsecondary education system provided a dataset of the spaces to be included in the model. It was the consultants' understanding that the non E&G spaces were removed. As the study progressed, the consultants found parking garages, leased space, farm space, and other spaces that typically should have been excluded in the model were actually included at individual institutions. Where possible, the consultants excluded these spaces. Council staff was informed of these anomalies, and agreed that these adjustments should be made. In future applications of the space model, the consultants encourage the Council and the institutions to review the spaces carefully so that each institution is being measured appropriately against the model.

Phase V: Institutional Review of Data

As campus visits were ending during the summer of 2006, ten representatives of the Council and institutions were trained on the capital planning software, VFA.facility. These facility managers and planners then reviewed draft condition data developed by VFA. Current Replacement Values for each asset and system definitions and scopes were reviewed by representatives of each institution. Where gaps in cost or scope were identified by the institutions, and supported by historical or industry standard data, VFA adjusted the data. A list of adjustments is included as Appendix A6.

Some cost adjustments were statewide and necessitated comparison of Kentucky data to national norms, as defined by APPA, or a compilation of historical data from Kentucky insitutions. In these cases, VFA carefully compared the scope and costs, and where necessary, considered specific adjustments. The Council had final approval on which adjustment factors would be applied statewide, and which could be applied specifically to each institution's data.

Phase VI: Final Report

A draft of the Final Report was assembled and produced for the Council during December 2006. Each institution received a copy of Part I, the Council-level Executive Summary, plus the portions of Part II applicable to their insitution. Comments from the Council and the institutions on a draft of the report were incorporated in the Final Report.

Phase VII: Presentation of Findings

At the time of this writing, the consultants' team of VFA | Paulien | NCHEMS plans to present the findings of the study to the Council during the spring of 2007.

Section 4. Facility Condition Assessment

How do Kentucky postsecondary institutions compare?

Statewide, for the 736 facilities assessed (including 660 buildings plus 76 site infrastructure assets), the estimated cost of system renewals currently due (1-YR Renewal Cost) is $2.19 billion, and the estimated cost of renewals due within the next 5 years (5-YR Renewal Cost) is $3.49 billion. (Note: present 2007 dollars are used in all reported numbers. Inflation factor considered = zero.)

The facilities assessed have a current replacement value of $8.27 billion, so the Facility Condition Index (cost of renewals, divided by current replacement cost) for the portfolio is 26% for a 1-year horizon, and 42% for a 5-year horizon. Based on International Facility Managers Association standards, both the 1-year and 5-year FCIs would be considered "fair" to "poor" rankings.

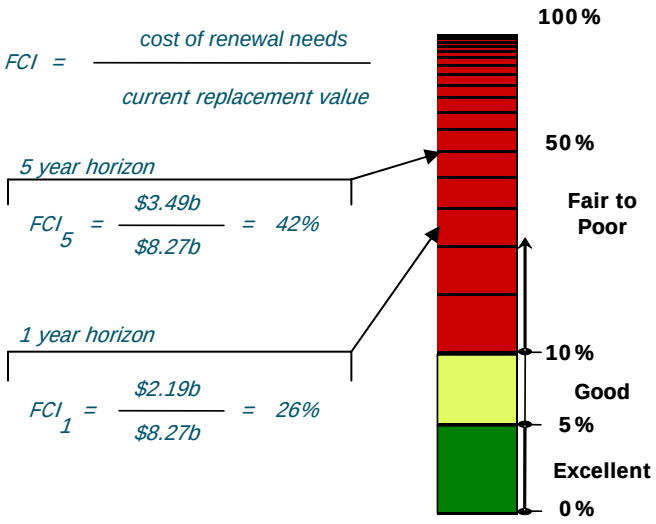
Compared to other higher education portfolios evaluated by the consultants' team over the past 5 years, Kentucky's postsecondary system is in worse condition (42% KY 5-year FCI vs. 18% benchmark 5-year FCI).

For doctoral institutions, Figure 4.2a shows University of Kentucky's 5-year FCI is much higher (49%) than the benchmark, while University of Louisville's (39%) is lower than UK's, but still not as good as the benchmark.

Figure 4.2b shows that all KY comprehensive colleges rank higher (worse) than the benchmark. In descending order (worst to best), they are: Morehead (44%), Northern (41%), Murray (39%), Western (35%), Eastern (35%), and KSU (27%).

Figure 4.2c shows that KCTCS's portfolio (30% FCI) is above (worse than) the the national benchmark.

Figure 4.1: Kentucky Postsecondary Education System Statewide Facility Condition Index



Condition ratings based on International Facilities Managers Association standards.

Figure 4.2a: KY Doctoral Institutions Facility Condition Index

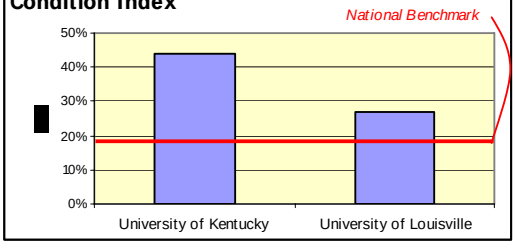


Figure 4.2b: KY Comprehensive Colleges Facility Condition Index

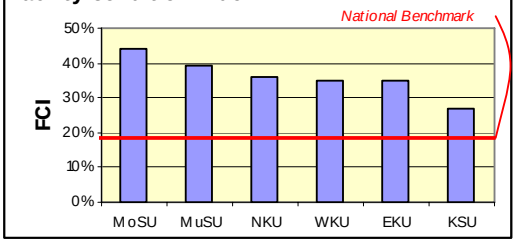


Figure 4.2c: KY Community & Technical Colleges Facility Condition Index

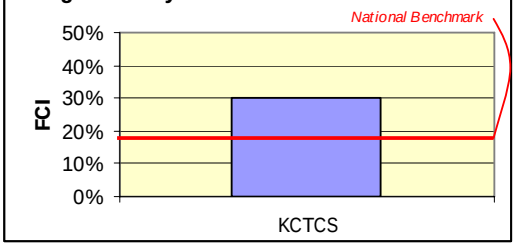


Figure 4.2d: Breakdown of KPES 5-Year Facility Condition Index by Institution

Institution	5-yr FCI Cost (in millions)	Repl Value (in millions)	5-Yr FCI
Eastern	$ 241	$ 691	35%
KCTCS	388	1,277	30%
KSU	61	221	28%
MoSU	169	387	44%
MuSU	207	533	39%
Northern	154	401	38%
UK	1,465	2,608	49%
UofL	528	1,367	39%
Western	278	784	35%
KPES TOTAL	**$ 3,491**	**$ 8,269**	**42%**

What are the most urgent facility condition needs?

This Executive Summary highlights the capital renewal needs of KPES assets. More detailed information is available in Part II. Institutional Reports, Appendix A3 or in KPES' VFA.facility database (http://kcpe.vfafacility.com).

Of the assessed assets, KPES as a whole has 107 facilities in "Satisfactory" condition, 151 requiring "Remodeling A" work, 314 requiring "Remodeling B" work, and 164 requiring "Remodeling C" work. Based on condition alone, none of the assessed assets required Demolition or Termination.

[VFA's condition assessment did not categorize any asset in 'Demolition' despite a small number of buildings having very high FCIs. (Assets with FCIs over 75% are generally considered good candidates for replacement.) The space study in Section 5 incorporated different standards for evaluating buildings, and may have reached different conclusions.]

Part II of this report summarizes the renewal needs of each institution.

Figure 4.4 ranks the the top ten (worst condition) facilities assessed at each institution (top five worst for KCTCS schools) by their 5-year Facility Condition Index.

To see which systems across the KPES portfolio require the most renewal work, Table 4.5 lists

Figure 4.3: SUMMARY OF KPES BUIDLINGS BY CONDITION CODE

APPA CONDITION CODE	MIN FCI	# Bldgs	5-YR RENEWAL COSTS
1 - Satisfactory	0%*	107	$ 2,749,000
2 - Remodeling A	0%	151	234,849,000
3 - Remodeling B	25%	314	1,714,444,000
4 - Remodeling C	50%	164	1,538,579,000
5 – Demolition		0	0
6 - Termination		0	0
		736	$ 3,490,621,000

*No single need > $40k

the 5-year facility renewal needs by major system type. HVAC Distribution Systems, Communications and Security, Electrical Service & Distribution, (Fixed) Equipment and Furnishings (non-moveable equipment installed in a facility), and Sanitary Sewer are the systems requiring the most immediate investment.

A complete list of all facilities assessed, showing renewal needs by year, is included in Appendix A3 in the System Renewal Crosstab Report.

A list detailing specific system renewals (and in which asset they are located) for years 2007 through 2022, is provided in the appendix for each Instution, as the System Renewal Report.

The tables and reports included in this document represent only a small fraction of the ways the

facility condition data can be sorted, organized, subtotaled and analyzed. More detailed (or differently organized) data is available in the VFA.facility software for data export and further detailed exploration.

Figure 4.4a. Kentucky Doctoral Institutions: Top Ten (Worst) Facilities, by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
University of Kentucky					
UK:Main	Gluck Equine Research Center Addn.	1,450,000	1,220,000	84%	4. Remodeling C
UK:Main	Central Heating Plant #2	10,675,000	8,875,000	83%	4. Remodeling C
UK:Main	Utility Services: Parking Lots	158,922,000	122,248,000	77%	4. Remodeling C
UK:Main	Utility Services: Sidewalks	110,344,000	84,880,000	77%	4. Remodeling C
UK:Main	Utility Services: Storm Sewer	71,379,000	54,907,000	77%	4. Remodeling C
UK:Main	Utility Services: Sanitary Sewer	51,694,000	39,764,000	77%	4. Remodeling C
UK:Main	Utility Services: Steam	42,615,000	32,781,000	77%	4. Remodeling C
UK:Main	Utility Services: Domestic Water	42,314,000	32,549,000	77%	4. Remodeling C
UK:Main	Utility Services: Natural Gas Distribution	33,235,000	25,565,000	77%	4. Remodeling C
UK:Main	Medical Center Heating-Cooling Plant	22,719,000	17,597,000	77%	4. Remodeling C
University of Louisville					
UL:Belknap	Site: Duct Bank Electrical Distribution 1953 thru 1969	2,562,000	3,203,000	125%	4. Remodeling C
UL:Belknap	Site: Duct Bank Electrical Distribution 1953 thru 1969	2,562,000	3,203,000	125%	4. Remodeling C
UL:Belknap	Site: Exterior Lighting	2,704,000	2,344,000	87%	4. Remodeling C
UL:Belknap	Site: Tunnel Steam Distribution - 1953 thru 1969	9,485,000	7,296,000	77%	4. Remodeling C
UL:Belknap	Site: Tunnel Steam Distribution - 1953 thru 1969	9,485,000	7,296,000	77%	4. Remodeling C
UL:Belknap	Site: Tunnel Chilled Water Distribution - 1953 thru 1969	3,091,000	2,377,000	77%	4. Remodeling C
UL:Belknap	Site: Tunnel Chilled Water Distribution - 1953 thru 1969	3,091,000	2,377,000	77%	4. Remodeling C
UL:Belknap	Hughes Hydro-Tech	1,034,000	683,000	66%	4. Remodeling C
UL:Belknap	Miller Info TEC Generator Bldg	969,000	608,000	63%	4. Remodeling C
UL:Belknap	Hughes Grounds Shop	525,000	323,000	61%	4. Remodeling C

Figure 4.4b. Kentucky Comprehensive Colleges: Top Ten (Worst) Facilities, by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
Eastern Kentucky University					
EKU:01	DONOVAN COMPLEX	30,829,000	18,770,000	61%	4. Remodeling C
EKU:02	JOHN ROWLETT BLDG	10,125,000	5,938,000	59%	4. Remodeling C
EKU:03	BREWER BLDG.	656,000	365,000	56%	4. Remodeling C
EKU:04	CARTER BLDG.	5,075,000	2,786,000	55%	4. Remodeling C
EKU:05	MATTOX HALL	9,895,000	5,334,000	54%	4. Remodeling C
EKU:06	CRABBE LIBRARY	31,851,000	16,628,000	52%	4. Remodeling C
EKU:07	RAMSEY HEAT PLANT	2,067,000	1,076,000	52%	4. Remodeling C
EKU:08	GIBSON	6,568,000	3,346,000	51%	4. Remodeling C
EKU:09	FRANK GENTRY	3,936,000	1,950,000	50%	3. Remodeling B
EKU:10	CASE BLDG. ANNEX	11,972,000	5,927,000	50%	3. Remodeling B
Kentucky State University					
KSU: Frankfort	Jordan Shop / Warehouse	14,434,000	11,477,000	80%	4. Remodeling C
KSU: Frankfort	Utility Services - Sanitary Sewer	1,903,000	1,464,000	77%	4. Remodeling C
KSU: Frankfort	Utility Services - Telecommunications	798,000	614,000	77%	4. Remodeling C
KSU: Frankfort	Utility Services - Domestic Water	793,000	610,000	77%	4. Remodeling C
KSU: Frankfort	Boiler Plant Addition	327,000	219,000	67%	4. Remodeling C
KSU: Frankfort	Alumni House	856,000	564,000	66%	4. Remodeling C
KSU: Frankfort	White Health Center	2,720,000	1,439,000	53%	4. Remodeling C
KSU: Frankfort	Business Office Addition	747,000	387,000	52%	4. Remodeling C
KSU: Frankfort	Bradford Hall	15,870,000	8,147,000	51%	4. Remodeling C
KSU: Frankfort	Academic Service Building	25,937,000	8,994,000	35%	3. Remodeling B
Morehead State University					
MoSU: Main	Power Plant	13,050,000	11,789,000	90%	4. Remodeling C
MoSU: Main	Utility Services - Sanitary Sewer	8,309,000	6,392,000	77%	4. Remodeling C
MoSU: Main	Utility Services - Storm Sewer	7,074,000	5,441,000	77%	4. Remodeling C
MoSU: Main	Evans Branch Bridge	487,000	375,000	77%	4. Remodeling C

(continued on next page)

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
MoSU: Main	Vet Tech Lab	4,047,000	3,030,000	75%	4. Remodeling C
MoSU: Main	Button Auditorium	13,366,000	9,031,000	68%	4. Remodeling C
MoSU: Main	Utility Services - Domestic Water	10,325,000	6,577,000	64%	4. Remodeling C
MoSU: Main	Lloyd Cassity Bldg	14,878,000	8,465,000	57%	4. Remodeling C
MoSU: Main	Green House Complex	1,006,000	541,000	54%	4. Remodeling C
MoSU: Main	Switchgear House	364,000	194,000	53%	4. Remodeling C
Murray State University					
MuSU:Main	CP SUBSTAT 69500 KVA	1,688,000	1,623,000	96%	4. Remodeling C
MuSU:Main	CEN STAT 18000 KVA	1,086,000	1,044,000	96%	4. Remodeling C
MuSU:Main	Utility Services - Steam	9,700,000	7,461,000	77%	4. Remodeling C
MuSU:Main	Utility Services - Storm Sewer	2,254,000	1,734,000	77%	4. Remodeling C
MuSU:Main	Utility Services - Domestic Water	806,000	620,000	77%	4. Remodeling C
MuSU:Main	BLACKBURN SCIENCE BU	35,603,000	22,787,000	64%	4. Remodeling C
MuSU:Hancock	HANCOCK BIOLOGICAL S	4,411,000	2,699,000	61%	4. Remodeling C
MuSU:Main	WATERFIELD LIBRARY	26,896,000	15,490,000	58%	4. Remodeling C
MuSU:Main	IND EDUC/VISUAL ARTS	3,981,000	2,240,000	56%	4. Remodeling C
MuSU:Main	POGUE LIBRARY	11,980,000	6,041,000	50%	3. Remodeling B
Northern Kentucky University					
NKU:02	HANKINS HALL (Covington Campus)	13,249,000	7,751,000	59%	4. Remodeling C
NKU:01	FOUNDERS HALL (Old Science Building)	35,572,000	18,122,000	51%	3. Remodeling B
NKU:01	LANDRUM ACADEMIC CENTER	30,607,000	15,170,000	50%	3. Remodeling B
NKU:01	UNIVERSITY CENTER	31,028,000	14,756,000	48%	3. Remodeling B
NKU:01	NUNN HALL	34,608,000	15,795,000	46%	3. Remodeling B
NKU:01	LUCAS ADMINISTRATIVE CENTER	34,231,000	14,402,000	42%	3. Remodeling B
NKU:01	FINE ARTS CENTER	47,561,000	19,176,000	40%	3. Remodeling B
NKU:01	REGENTS HALL	9,010,000	3,354,000	37%	3. Remodeling B
NKU:01	STEELY LIBRARY	43,159,000	15,965,000	37%	3. Remodeling B
NKU:01	CENTRAL (OLD) POWER PLANT	6,510,000	2,259,000	35%	3. Remodeling B
Western Kentucky University					
WKU: Main	Site: Sanitary Sewer Lines	14,902,000	11,463,000	77%	4. Remodeling C
WKU: Main	Site: Water Distribution	8,310,000	6,392,000	77%	4. Remodeling C
WKU: Main	Site: Natural Gas Distribution	6,057,000	4,660,000	77%	4. Remodeling C
WKU: Main	Site: Steam Distribution	5,199,000	3,999,000	77%	4. Remodeling C
WKU: Main	Site: Storm Sewer Lines	2,152,000	1,656,000	77%	4. Remodeling C
WKU: Main	Site: Retaining Walls	1,172,000	883,000	75%	4. Remodeling C
WKU: Main	OGDEN PLANETARIUM	1,707,000	1,062,000	62%	4. Remodeling C
WKU: Main	GARRETT CONF CENTER	29,783,000	17,680,000	59%	4. Remodeling C
WKU: Main	Site - Electrical	7,603,000	4,408,000	58%	4. Remodeling C
WKU: Main	JONES JAGGERS	11,757,000	6,814,000	58%	4. Remodeling C

Figure 4.4c. Kentucky Community & Technical Colleges: Top Five (Worst) Facilities, by 5-Year FCI
(If less than five buildings assessed for any campus, only those assessed are listed.)

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
Kentucky Community and Technical Colleges					
Ash:Coll	ASHLAND C COLLEGE	37,979,000	18,645,000	49%	3. Remodeling B
Ash:Coll	ASHLAND ACADEMIC/LRC	8,655,000	2,464,000	28%	3. Remodeling B
Ash:Coll	GOODPASTER BLDG	8,869,000	495,000	6%	2. Remodeling A
Ash:Tech	TECHNOLOGY DR CAMPUS	9,291,000	0	0%	1. Satisfactory
Big Sandy: Betsy Ln	Betsy Lane S / Mine	1,002,000	545,000	54%	4. Remodeling C
Big Sandy: Mayo	Building B	3,172,000	1,409,000	44%	3. Remodeling B
Big Sandy: Betsy Ln	SIM MINE CLASSROOM	125,000	48,000	39%	3. Remodeling B
Big Sandy: Mayo	Building F	6,947,000	1,710,000	25%	2. Remodeling A
Big Sandy: Mayo	Building E	8,938,000	2,059,000	23%	2. Remodeling A

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
Bluegrass	SOUTH WING	5,247,000	2,507,000	48%	3. Remodeling B
Bluegrass	Building A	10,065,000	4,423,000	44%	3. Remodeling B
Bluegrass	Main	4,656,000	1,992,000	43%	3. Remodeling B
Bluegrass	NORTH WING	6,045,000	2,414,000	40%	3. Remodeling B
Bluegrass	Building B	2,570,000	973,000	38%	3. Remodeling B
Bowling Gr	Utility Services - Sanitary Sewer	737,000	522,000	71%	4. Remodeling C
Bowling Gr	Utility Services - Telecommunications	502,000	269,000	54%	4. Remodeling C
Bowling Gr	Bowling Green Building I	3,796,000	1,985,000	52%	4. Remodeling C
Bowling Gr	Utility Services - Electrical	1,720,000	882,000	51%	4. Remodeling C
Bowling Gr	Bowling Green Building F	2,933,000	1,277,000	44%	3. Remodeling B
Elizab:00	Occupational-Technical Bldg	28,127,000	8,633,000	31%	3. Remodeling B
Elizab:00	CENTRAL REG PS ED CT	16,294,000	541,000	3%	2. Remodeling A
Elizab:04	ADMINISTRATION BLDG.	7,978,000	3,990,000	50%	3. Remodeling B
Elizab:04	STUDENT CENTER	4,012,000	1,318,000	33%	3. Remodeling B
Elizab:04	ACADEMIC/TECHNICAL	11,927,000	3,522,000	30%	3. Remodeling B
Gateway:Cov	Building B	6,948,000	4,102,000	59%	4. Remodeling C
Gateway:Cov	Bldg A & C	14,213,000	7,661,000	54%	4. Remodeling C
Gateway:Edge	EDGEWOOD CAMPUS	9,016,000	3,631,000	40%	3. Remodeling B
Gateway:Highl	HIGHLAND HTS CAMPUS	10,801,000	4,647,000	43%	3. Remodeling B
Hazard:04	Lees Strong House	641,000	414,000	65%	4. Remodeling C
Hazard:04	Lees Jackson Hall	4,761,000	2,842,000	60%	4. Remodeling C
Hazard:04	Lees Van Meter Gymnasium	4,849,000	2,840,000	59%	4. Remodeling C
Hazard:01	Heavy Equipment Bldg.	4,633,000	2,368,000	51%	4. Remodeling C
Hazard:04	Lees Parker Bookstore Bldg.	330,000	166,000	50%	4. Remodeling C
Henderson:05	H S LACKEY ADM BLDG	8,026,000	4,382,000	55%	4. Remodeling C
Henderson:05	STUDENT ACTIVITIES	2,809,000	1,338,000	48%	3. Remodeling B
Henderson:05	English Arts & Science Building	4,842,000	2,266,000	47%	3. Remodeling B
Henderson:05	J.M. HARTFIELD BLDG.	4,351,000	1,647,000	38%	3. Remodeling B
Henderson:05	AUDITORIUM/FINE ARTS	11,701,000	833,000	7%	2. Remodeling A
Hopkinsville	Utility Services - Storm Sewer	3,706,000	2,851,000	77%	4. Remodeling C
Hopkinsville	Utility Services - Sanitary Sewer	2,772,000	2,087,000	75%	4. Remodeling C
Hopkinsville	Administration Building	4,779,000	2,167,000	45%	3. Remodeling B
Hopkinsville	Utility Services - Telecommunications	404,000	135,000	33%	3. Remodeling B
Hopkinsville	Learning Resource Center	4,072,000	1,250,000	31%	3. Remodeling B
Jefferson:Jeff	GreenHouse # 3	93,000	64,000	69%	4. Remodeling C
Jefferson:Jeff	GreenHouse # 2	128,000	77,000	60%	4. Remodeling C
Jefferson:SW	STUDENT CENTER	4,651,000	2,767,000	59%	4. Remodeling C
Jefferson:SW	BUSINESS BUILDING	3,966,000	2,166,000	55%	4. Remodeling C
Jefferson:Jeff	Equipment Shed	393,000	203,000	52%	4. Remodeling C
Madisonville:02	Gray Building	19,222,000	6,822,000	35%	3. Remodeling B
Madisonville:02	Glema Mahr Center	11,247,000	4,187,000	37%	3. Remodeling B
Madisonville:01	Applied Technology Building	7,459,000	3,486,000	47%	3. Remodeling B
Madisonville:03	Academic Building	5,850,000	2,943,000	50%	3. Remodeling B
Madisonville:01	Mine Occupations Bld	3,575,000	2,091,000	59%	4. Remodeling C
Maysville CTC:Rowan	Rowan Campus - Building A	5,314,000	2,127,000	40%	3. Remodeling B
Maysville CTC:Rowan	Rowan Campus - Building C	3,383,000	1,082,000	32%	3. Remodeling B
Maysville CTC:Rowan	Adminstrative Office - Building B	6,038,000	1,861,000	31%	3. Remodeling B
Maysville CTC	Administration Building	13,900,000	2,782,000	20%	2. Remodeling A
Maysville CTC	DENHAM ACADEMIC BLDG	4,725,000	913,000	19%	2. Remodeling A
Owensboro:03	Owensboro TC (Frederica Campus)	16,232,000	8,697,000	54%	4. Remodeling C
Owensboro:SE	Southeastern Campus	15,983,000	7,339,000	46%	3. Remodeling B
Owensboro:Main	LEARNING RESOURCES	8,608,000	2,611,000	30%	3. Remodeling B
Owensboro:Main	ADMINISTRATION BLDG	3,084,000	829,000	27%	3. Remodeling B
Owensboro:Main	TECHNICAL EDUCATION	7,055,000	1,858,000	26%	2. Remodeling A

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
Somerset:06	Laurel South Main Building	11,040,000	5,832,000	53%	4. Remodeling C
Somerset:06	MEECE HALL	6,674,000	3,128,000	47%	3. Remodeling B
Somerset:06	H.D. STRUNK LEARNING CENTER	3,070,000	1,270,000	41%	3. Remodeling B
Somerset:02	TRANSPORT & MFG BLDG	9,715,000	3,780,000	39%	3. Remodeling B
Somerset:06	STONER HALL	4,748,000	1,631,000	34%	3. Remodeling B
SEKy:03	MOCK MINE BLDG. HARLAN CAMPUS	869,000	592,000	68%	4. Remodeling C
SEKy:02	HEATING PLANT-S.EAST CUMBERLAND CAMPUS	795,000	517,000	65%	4. Remodeling C
SEKy:03	ADMINISTRATION BLDG	4,338,000	2,343,000	54%	4. Remodeling C
SEKy:03	MINE INDUSTRIES BLDG. HARLAN CAMPUS	4,489,000	2,230,000	50%	4. Remodeling C
SEKy:02	FALKENSTINE HALL CUMBERLAND CAMPUS	4,756,000	2,239,000	47%	3. Remodeling B
WKy:Paducah	Mechanical Room	764,000	656,000	86%	4. Remodeling C
WKy:Paducah	M & O Bldg.	212,000	132,000	62%	4. Remodeling C
WKy:Paducah	Carson Hall	3,323,000	1,726,000	52%	4. Remodeling C
WKy:Paducah	Carriage House	471,000	229,000	49%	3. Remodeling B
WKy:Paducah	Student Center / Fine Arts	9,500,000	4,335,000	46%	3. Remodeling B

Figures in $$ millions

Figure 4.5. KPES Statewide Renewal Needs, by Component System

(Ranked by 2007 backlog)

Investments > $10m

SYSTEM NAME	2007 + backlog	2008	2009	2010	2011	5-YR TOTAL	15 YR TOTAL
Distribution Systems	446.2	15.1	12.0	19.1	18.5	510.9	510.9
Electrical Service and Distribution	204.6	10.1	19.8	2.0	23.7	260.3	260.3
Communications and Security	186.3	15.9	12.7	15.7	18.3	248.9	284.3
Equipment and Furnishings	114.5	5.4	14.7	23.4	35.1	193.2	193.8
Exterior Windows	102.2	7.7	16.7	9.6	31.4	167.7	254.7
Floor Finishes	86.6	10.9	8.5	20.6	51.0	177.6	485.0
Lighting and Branch Wiring	82.5	3.0	4.9	5.1	4.6	100.1	125.6
Ceiling Finishes	70.0	6.3	9.3	6.5	21.6	113.7	129.1
Heat Generating Systems	57.8	5.2	2.5	0.4	3.6	69.5	112.7
Wall Finishes	55.2	4.7	6.8	21.4	29.8	117.9	164.1
Sanitary Sewer	54.6	-	-	11.5	-	66.1	212.4
Plumbing Fixtures	53.0	1.9	4.7	1.3	5.1	66.1	83.5
Controls and Instrumentation	52.6	2.2	2.4	7.4	1.5	66.1	69.7
Cooling Generating Systems	41.8	9.0	2.2	3.8	5.1	61.9	106.7
Exterior Doors	40.9	2.0	5.0	1.5	13.2	62.6	93.2
Water Supply	40.5	-	-	6.4	-	46.9	171.7
Domestic Water Distribution	40.1	2.0	2.1	0.9	6.7	51.8	70.1
Heating Distribution	32.8	-	-	7.5	-	40.2	40.2
Emergency Light and Power Systems	24.3	1.8	0.8	2.1	1.8	30.8	30.8
Roofing	23.9	3.4	3.1	6.3	7.9	44.5	44.6
Electrical Distribution	23.5	-	-	1.6	-	25.1	28.3
Fittings	19.6	1.4	2.1	3.3	6.2	32.6	103.2
Conveying	18.4	2.8	1.5	2.5	0.6	25.8	48.7
Plumbing	15.9	0.4	1.0	4.9	1.7	24.0	38.1
Partitions	14.8	0.8	1.6	2.6	11.3	31.1	31.2
Terminal and Package Units	12.1	0.9	1.0	0.7	1.9	16.5	16.6
Steam Supply	11.3	-	-	-	-	11.3	153.8
Other Plumbing Systems	11.2	0.0	0.3	-	0.2	11.8	11.8
Storm Sewer	9.4	-	-	57.2	-	66.6	66.6
Fire Protection	7.5	3.4	3.1	1.3	0.9	16.2	17.2
Interior Doors	6.8	0.1	0.8	0.8	7.5	15.9	16.5
Boilers	2.7	-	-	-	-	2.7	2.8
Cooling Distribution	2.4	-	-	-	-	2.4	13.0
Exterior Walls	1.3	0.0	0.2	0.1	1.1	2.7	16.3
Superstructure	1.1	-	0.0	0.1	0.8	2.0	2.0
Stairs	1.0	0.0	0.1	0.1	0.9	2.1	2.1
Roadways	0.9	-	-	-	0.6	1.6	36.9
Glazed Roof Openings	0.7	-	0.7	0.0	-	1.5	1.7
Site Communications and Security	0.6	-	0.3	1.3	-	2.2	29.4
Substructure	0.5	0.0	0.0	0.0	0.1	0.6	0.6
Parking Lots	0.4	17.3	-	-	122.3	140.0	140.0
Grounding Systems	0.3	-	0.2	0.1	0.1	0.7	0.7
Fixed Furnishings	0.3	-	0.1	-	-	0.4	3.4
Pedestrian Paving	0.2	9.5	-	-	84.9	94.7	101.9
Movable Furnishings	0.2	-	-	-	-	0.2	86.2
Special Construction	0.0	-	-	-	-	0.0	0.0
Paving and Surfacing	0.0	-	-	-	-	0.0	0.3
Exterior Soffits	0.0	-	-	-	-	0.0	5.3
Retaining Walls	-	0.9	-	-	-	0.9	39.0
Ramps	-	0.0	-	-	-	0.0	15.7
Pedestrian Bridges	-	-	0.6	-	-	0.6	0.7
Fuel Distribution	-	-	-	30.2	-	30.2	30.2
Spiral Stairs	-	-	-	0.0	0.0	0.0	0.0
Exterior Steps	-	-	-	0.0	0.0	0.0	0.0
Balcony Walls and Handrails	-	-	-	-	0.1	0.1	0.1
HVAC	-	-	-	-	0.0	0.0	2.2
Exterior Stairs and Fire Escapes	-	-	-	-	0.0	0.0	1.3
Chilled Water Distribution	-	-	-	-	-	-	5.0
Chilled Water Systems	-	-	-	-	-	-	44.1
Fixed Partitions	-	-	-	-	-	-	15.5
Flooring	-	-	-	-	-	-	-
Fuel Piping	-	-	-	-	-	-	-
Interior Balustrades and Screens	-	-	-	-	-	-	44.3
Kennels and Animal Shelters	-	-	-	-	-	-	-
Other Ceilings	-	-	-	-	-	-	0.9
Other Electrical Systems	-	-	-	-	-	-	2.6
Sanitary Waste Equipment	-	-	-	-	-	-	11.0
Special Construction and Demolition	-	-	-	-	-	-	141.5
Grand Total	1,973.6	144.0	141.7	279.6	520.3	3,059.2	4,772.2

note: 5-YR Grand total may vary from Figure 1.1 due to rounding when subtotalling by system. See each individual institution's data for most accurate list of renewals record.

Section 5. Space Study
Evaluation of Adequacy and Fit for Continued Use

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SUMMARY OF FINDINGS

A Paulien & Associates evaluation team assessed 141 buildings at the Kentucky Postsecondary campuses. This chapter explains the evaluation process and provides information about those findings in some depth. There are individual reports for each institution and for KCTCS which provide more detail about these findings. In addition, there are building evaluation forms that are contained within Appendix A5 for each institution's report that show the specific findings for each building. The table which follows summarizes the assessment findings and shows the costs for each campus by category of renovation (i.e. two categories of minor renovation and two categories of major renovation). Buildings proposed for demolition are shown with estimated demolition costs.

Summary of Fit for Continued Use Costs

Institution	No. of Buildings Assessed	Total Gross Square Feet	Total Renovation Costs	Category 1, Minor	Category 2, Minor	Category 3, Major	Category 4, Major	Demolition @$20	Demolition @$30
Doctoral Universities									
University of Kentucky	51	3,564,946	**$290,900,140**	$15,015,575	$4,434,950	$73,227,975	$190,950,150	$6,419,640	$851,850
University of Louisville	36	2,469,961	**$242,308,870**	$3,080,800		$35,895,150	$202,423,350		$909,570
Doctoral Universities Total	***87***	***6,034,907***	***$533,209,010***	*$18,096,375*	*$4,434,950*	*$109,123,125*	*$393,373,500*	*$6,419,640*	*$1,761,420*
Comprehensive Universities									
Eastern Kentucky University	10	867,593	**$48,661,565**		$17,350,650	$9,269,625	$19,646,250	$2,395,040	
Kentucky State University	7	148,841	**$7,013,060**			$2,178,150	$3,243,750	$1,591,160	
Morehead State University	11	813,450	**$66,291,650**	$5,111,950	$14,381,050		$46,582,650	$216,000	
Murray State University	3	203,667	**$22,557,550**				$20,882,550	$517,000	$1,158,000
Northern Kentucky University	5	649,987	**$61,956,375**	$3,207,075		$19,506,300	$39,243,000		
Western Kentucky University	10	809,809	**$79,402,850**		$21,034,250		$58,368,600		
Comprehensive Universities Total	***46***	***3,493,347***	***$285,883,050***	*$8,319,025*	*$52,765,950*	*$30,954,075*	*$187,966,800*	*$4,719,200*	*$1,158,000*
Community & Technical Colleges									
Elizabethtown Community College	2	144,009	**$7,200,450**		$7,200,450				
Hazard Community and Technical College	3	113,498	**$12,842,800**		$2,090,950		$10,751,850		
Jefferson Community and Technical College	3	252,306	**$23,032,000**		$7,406,950		$15,625,050		
Community & Technical Colleges Total	***8***	***509,813***	***$43,075,250***	*$0*	*$16,698,350*	*$0*	*$26,376,900*	*$0*	*$0*
TOTAL	**141**	**10,038,067**	**$862,167,310**	$26,415,400	$73,899,250	$140,077,200	$607,717,200	$11,138,840	$2,919,420

EVALUATION PROCESS

Paulien & Associates, Inc., sent a team of three people to each university and select KCTCS campuses to evaluate specific buildings as to their adequacy and fit for continued use. Dan Paulien, President, Lisa Keith, Senior Associate, and Wayne Elwell, Consulting Associate, were the core team members. Dan Paulien founded Paulien & Associates, Inc., in 1979, and has conducted planning studies involving over 375 campuses in 40 states. Their specialization relates to the evaluation of utilization and facilities needs. Paulien had previous experience as Director of Planning in the development of the Auraria Higher Education Complex in Denver and as Coordinator of Facilities Planning and Research for the Colorado Commission on Higher Education. Lisa Keith has specialized in educational planning since 1990, when she first joined Paulien & Associates. She has developed expertise in space needs modeling and the analysis of classrooms and classroom needs. Wayne Elwell's expertise in construction management made him an important contributor to the recommended actions for each building. He served as in-house construction manager in development of the Auraria Higher Education Complex in Denver which is shared by the University of Colorado at Denver, Metropolitan State College of Denver, and the Community College of Denver. He has extensive project management experience for complex construction projects and has consulted with Paulien & Associates on specific projects since the 1980s. Additionally, for the University of Kentucky and the

University of Louisville, a fourth person was added to the team to evaluated research space — Richard Heinz, a principal with Research Facilities Design (RFD) who specializes in laboratory design. All four visited each research building and provided a team evaluation.

At each institution a set of buildings was selected by CPE and the institution for evaluation. The reasons the buildings were chosen varied from location to location. One of the reasons a building was placed on the evaluation list was that it had space classified as research. Other reasons included the fact that a building is subpar to today's standards or conversely that it is a state-of-the-art facility – the aspiration for future facilities. Another reason could be that the building is on a demolition list.

The key areas evaluated include:

- *Does the building serve the program's current and future needs either by design or retrofit?*
- *How do the spaces in the building fit today's expectations and/or can the building be reasonably renovated to meet those expectations?*
- *Is the building's physical condition adequate to meet program needs and today's expectations (including life safety issues) and how major of a conversion or renovation is needed?*
- *Where applicable, are research laboratories of acceptable, flexible dimensions and up-to-date equipment to sustain on-going use as modern research facilities?*

Multiple rooms in each building were reviewed. The goal was to examine a sampling of the best, worst, and norm for the building. Classrooms, laboratories, offices, special use spaces, and bathrooms are examples of spaces reviewed. Mechanical and structural spaces were typically not included.

At the end of each day's assessments, the team discussed each building and collectively determined each building's criteria rating and recommended action.

Building Design

When evaluating the buildings, there were several conditions examined on a case-by-case basis. These conditions contributed to the recommended action for each building. Where possible these types of issues are included in the comment section of each building's evaluation. In general, it is important for a facility to promote and serve the activities and programs it houses as well as support the mission and overall master plan of the institution. It is entirely possible that a building was designed for and adequately serves the programs it houses yet be physically located in the wrong precinct of a campus or be a smaller single story building in a prime location that would be better served by a larger, multi-story building.

Some of the buildings were specifically designed for the programs contained in them or for the functions they serve, yet the building may now be overcrowded due to the institution's/program's growth or the physical design is antiquated for today's standards or the construction materials do not allow for an cost-effective or efficient renovation. Certain buildings are on the historical registry. Many of these older facilities are best suited for administrative offices and not instructional programs. If the building does not meet ADA requirements then the additional constraint is that the administrative function should not be one that is high profile which generates a lot of people traffic.

Space Assessment

The consultants reviewed nine criteria and rated each one on a one to four scale as follows: 1 = Unsatisfactory; 2 = Somewhat Unsatisfactory; 3 = Somewhat Satisfactory; 4 = Very Satisfactory; 0 = Not Applicable. An average rating was calculated based upon the criteria that were applicable to the building. The nine criteria are discussed below.

1. *Room Capacities*
   Is there enough square footage per person in the room? For offices, is the office a comfortable size (i.e., not less than 110 assignable square feet for faculty) and are there too many people housed in the space? For classrooms, are there too few or too many student stations in the room? Is there adequate space between aisles and rows? Does the room comfortably accommodate

persons in wheelchairs? For laboratories, is there adequate amount of space for faculty, students and equipment?

2. *Functionality*
   Is the room functional for the users? Are the room's dimensions appropriate for its intended purpose? If appropriate, are the sightlines such that no individual's view is obstructed?

3. *Suitability to Purpose*
   Is the facility designed for is current purpose or can it be efficiently and effectively adapted for current/future intended purposes at expected standards? Is the space aesthetically pleasing?

4. *Flexibility of Space for Different Learning Styles*
   Does the space allow for different learning styles and furniture arrangements? If the room is overcrowded, rearranging the furniture may be out of the question. Is the furniture light enough to change the seating arrangement?

5. *Gathering Space*
   Are there common spaces throughout the building that are clearly spaces for students and faculty to gather for social and intellectual stimulation? Are the corridors wide enough and well-lit to accommodate a gathering area? Is there comfortable seating? Is a white board available for discussions? Is there an adequate number of electrical outlets for computer connectivity?

6. *Multi-Media Technology*
   Is there an adequate amount of computerized technology available for instructional spaces? Does the location of the equipment provide faculty ease of accessibility? Is the equipment functioning? Is there appropriate audio and acoustics in the room?

7. *Computers and Connectivity*
   Is there adequate internet access for students, faculty, and staff in the facility? Does the building provide wireless access for both students and faculty? Can the building's electrical system support all the computers required in the building or does the electrical circuitry consistently fail under the load?

8. *Instructional Laboratories / Lab Equipment*
   Is the equipment up-to-date? Does the furniture/casework promote today's instructional methods? Are safety codes and standards met? Is the space large enough to handle the section size? Is the space functional, efficient, and flexible? Is there adequate exhibition/display space for the academic program? Is there an adequate amount of support space and storage space?

9. *Research Laboratories / Lab Equipment*
   Is the lab module supportive of today's modern research expectations? Is the space large enough to accommodate the research team? Is there adequate floor to ceiling heights and mechanical areas to support the required amount of equipment? Are safety codes and standards met? Is there an adequate amount of support space and storage areas? Is the equipment up-to-date? Please see the discussion on research laboratories which follows.

Physical Condition

Each building's physical condition was reviewed in general terms. Areas of observation include but were not limited to: ADA accessibility, roof leakage, asbestos related materials, air quality/condition issues, electrical and lighting issues, window glazing, elevator presence and condition, type of construction, and general maintenance of the building.

Wayne Elwell provided the following description of the process used to categorize and quantify the estimated renovation costs for the adequacy study.

The subdivision of renovation costs into four categories was done to eliminate the necessity of calculating a new (and specific) cost per square foot for each building evaluated. The four categories used ($25, $50, $75, and $150) provide budgetary guidance which will fall within a plus or minus 20% range of actual costs. The dollar value selected includes all costs, both soft and hard, and are today's dollars.

Why did we elect to refer to $25 and $50 renovation costs as minor --- and, $75 and $150 costs as major? The best way to explain this is to think of renovation activities that allow the building to function as intended during the work, and renovation that requires the building to be vacated. In other words, most aesthetic renovation work would allow the building to function, while demolition of walls would not allow normal use of the building. There are any number of renovation activities that could cause the building to be vacated during the work. This decision must be made on a case by case basis. For our purposes it is simply a matter of semantics, or a way to provide cost separation in our discussions. When we refer to a renovation as 'major' we are attaching a sense of urgency to the need.

How were the four cost ranges determined and what documentation from the construction industry was used? Until recently, all construction estimates and contracts were guided by the Construction Specifications Institute Format (CSI) and the 16 divisions therein;

Division 1	General Conditions
Division 2	Site Work
Division 3	Concrete
Division 4	Masonry
Division 5	Metals
Division 6	Wood & Plastics
Division 7	Thermal & Moisture Protection
Division 8	Doors & Windows
Division 9	Finishes
Division 10	Specialties
Division 11	Equipment
Division 12	Furnishings
Division 13	Special Construction
Division 14	Conveying Systems
Division 15	Mechanical
Division 16	Electrical

The CSI format has been in use for 75 years or so, and is perfect for our use in estimating the renovation costs. CSI has revised the format recently, but this traditional version was used. Each of the Divisions above has several subheadings--- for example, Division 9 - Finishes has 14 subheadings among which are Painting, Tile, Carpet, Acoustical Treatment, etc. Division 15 - Mechanical has 12 subheadings among which are Plumbing, Fire Protection, Air Distribution, etc. Therefore, ALL pieces of a building are given in the CSI format. In a simple but lengthy process, an experienced construction estimator could assign square foot values to all the nearly 200 subheadings and have the information necessary for a reasonably accurate renovation cost. Wayne Elwell used his experience to provide values for most of the subheadings necessary for budgetary purposes. These incremental pieces, for example, $15 for a new HVAC system, $12 for an updated electrical system, $4 for new paint, $7 for new glazing, $6 for a new roof, etc., all go toward the number that fits one of the four categories.

BEST PRACTICES FOR CLASSROOMS AND LABORATORIES

This section of the report discusses best practices for classrooms, research laboratories and undergraduate science laboratories. A common thread is that there is much more emphasis on active learning, including group activities than used to be the case.

Trends in Classroom Design

Until the last fifteen years it was traditional for tablet arm chairs to be used for almost all classrooms. Exceptions were case rooms used in business and law and tables and chairs used in accounting and certain science classes. Buildings from the 1950's often had tablet arm chairs which were bolted to the floor.

A trend to much more participatory expectations from students during class time resulted in a desire across the arts and sciences curriculum for more flexibility in instructional spaces. These can include asking two students to edit and critique each other's papers, having groups of students work on a problem during class time and having a group of students present to the class. This results in the desire to move chairs to most effectively allow that. This has resulted in a strong desire for lightweight tables and chairs because these will accommodate those activities quite well.

Another significant impact has been the introduction of technology. Greater use of laptop computers in classes also favors table and chair arrangements. The technology adds wiring issues for power even when there is wireless network access.

The almost universal introduction of projection capability to allow computer images to be shown to the class has set some limitations on sight lines from the corners of rooms for appropriate viewing of the materials.

These changes have resulted in a need for more space. The tablet arm chair was very efficient. The new more active learning environments often require between 20 and 25 square feet per student, whereas tablet arm chairs often had 15 square feet or less.

Research Laboratories

As mentioned earlier Rick Heinz of RFD accompanied the team on their assessments for UK and UofL. Details of his assessment are discussed below. The outcome of this assessment was included as a rating in number 9, Research Laboratories / Lab Equipment above.

During the Paulien team's assessment review of the existing science facilities, several elements common to modern science facilities were considered as part of the evaluation criteria. These elements include:

- *Floor-to-Floor Height*
  Contemporary science buildings generally have a floor-to-floor height of 14' to 16' in order to provide adequate vertical clearance for the distribution of mechanical, plumbing and electrical systems with a deep enough structure to provide good vibration resistance while allowing for a reasonable finished ceiling height. Many newer science facilities are using pendant hung direct/indirect lighting fixtures for better light distribution which tend to require ceiling heights of 9'-6" or higher.

  It is worth noting that the newest science building on the University of Kentucky campus, the BBSRB Building, has a floor-to-floor height of 15'-4", while many of the older facilities have much tighter floor-to-floor dimensions.

  At the University of Louisville, the newest science building on main campus, the Belknap Research Building, has a floor-to-floor height of 16'-0", while many of the older facilities have much tighter floor-to-floor dimensions. The newest science buildings at the University of Louisville Health Sciences Center, the Delia Baxter Research Building and the Donald Baxter Research Building, each have a floor-to-floor height of 14'-8".

- *Modular Planning*
  One of the fundamental planning methodologies to accommodate flexibility in science facilities is the concept of 'modular planning'. Laboratories should be organized around modular planning principles so that they are developed with standardized units or dimensions for adaptability and a variety of uses. Modular planning is used as an organizational tool to

allocate space within a building. The module establishes a grid by which building structure, architectural partitions, laboratory casework, and primary utility routings are located. As modifications are required because of changes in laboratory use, instrumentation, or departmental organization, partitions can be relocated, doors moved, and laboratories expanded into larger laboratory units or contracted into smaller laboratory units without requiring modification of building structural elements or major reconstruction of building electrical and mechanical elements.

The module is based on the bench space (width and length) required for work stations, instruments, and procedures. The space required between benches or tables is designed to allow people to work back-to-back at adjacent benches, to allow for accessibility for disabled and still allow for movement of people and laboratory carts in the aisle.

Common planning module dimensions in modern science facilities are 10'-6" to 11'-0" in width by 28'-0" to 32'-0" in depth. This module will generally provide adequate bench space plus space for floor standing equipment and fume hoods, and can be divided for smaller support spaces such as equipment and instrument rooms.

For purposes of our assessment review, it was important to keep in mind that research laboratories are much more adaptable to alternative room proportions and column locations than teaching laboratories, where optimal proportions are more critical for sightlines to instructional media such as chalk or white boards, projections screens and demonstration tables while maintaining a column-free space.

Many of the older science facilities on both the University of Kentucky and University of Louisville campuses have module dimensions that are too narrow and/or too shallow to properly accommodate 21st century science in a safe, functional and efficient manner. (See the Laboratory Building Assessment Summaries tables listing the approximate key module dimensions or structural column spacing for the buildings included in this assessment review.)

UNIVERSITY OF KENTUCKY

Laboratory Building Assessment Summary

Building Number	Building Name	Floor to Floor Height	Floor to Floor Rating	Module Size/ Column Spacing	Module Size Rating
24	Lafferty Hall	12'-0"	Poor	Varies	Poor
38	Engineering Annex Building	9'-10"	Poor	8' x 17'-3"	Poor
43	SJ Sam Whalen Building	14'-0"	Good	27'-4" deep	Fair
44	Kastle Hall	Varies from 12'-0" to 14'-8"	Poor to Good	Varies/Shallow	Poor
45	McVey Hall	Varies from 12'-5" to 14'-0"	Poor to Good	Varies	Poor
46	F. Paul Anderson Engineering Tower	13'-4"	Fair	10' x Varies	Fair
50	Erikson Hall	12'-0"	Poor	Varies	Poor
52	Civil Engineering Building	N/A, but tight	Poor	Varies	Poor
53	Slone Research Building	12'-0"	Poor	8' x 29'	Poor
54	Funkhouser Building	12'-3"	Poor	Varies/Shallow	Poor
55	Chemistry-Physics Building	13'-4"	Fair	11' x 32'	Excellent
56	Breckinridge Hall	N/A	Poor	15' deep	Poor
59	Bowman Hall	10'	Poor	Varies/Shallow	Poor
61	Tobacco Research Lab	N/A	Poor	Varies	Poor
62	Insectrary Conservatory	N/A	Poor	Varies	Poor
64	Scovell Hall	11'-6"	Poor	Varies/Shallow	Poor
65	Small Animal Lab	N/A	Poor	Varies/Shallow	Poor
66	Agronomy Headhouse	N/A	Poor	N/A	Poor
70	Wenner-Gren Research Building	N/A	Poor	15' deep	Poor
73	Thomas Poe Cooper Building	N/A	Poor	Varies/Shallow	Poor
76	Dimmock Animal Pathology Building	N/A, but tight	Poor	14' x 17'	Poor
82	College of Pharmacy Building	14'-0"	Good	10' x 25'	Fair
91	Ag Science North	13'-6"	Fair	12' x 28'	Good
92	Seed House	N/A, but tight	Poor	15' x Varies	Poor
96	Combs Cancer Research Building	13'-0"	Fair	11' x 27'	Good
97	Dental Science Building	11'-5 1/2"	Poor	17' x 17'	Poor
98	Davis Mills MRISC Building	13'-0"	Fair	Varies x 30' deep	Good
99a	Gluck Equine Research Center	11'-8" 1st/2nd flrs	Poor	10' x 32'	Good
99b		17'-6" 3rd/4th flrs	Excellent	10' x 32'	Good
108	Robotics Facility	15'-4"	Excellent	12' x 30'	Excellent
209	Centirfuge Building	N/A	Poor	Varies	???
215	Garrigus Building	18' w/ interstitial	Excellent	10' x 30'	Fair
216	Multi-Disciplinary Research Building	12'-4"	Poor	10'-3" x 30'	Good
225	T.H. Morgan Builidng	13'-1 1/2"	Fair	10'-6" x 32'	Very Good
230	Sanders-Brown Building	12'-0"	Poor	11' x Varies	Poor
236	KTRDC Building	13'-5"	Fair	11' x 22'	Fair
237	Wenner-Gren Addition	11'-3"	Poor	Varies/Shallow	Poor
276	Ag Engineering Building	16'-8" (lab wing)	Good	11' x 29'	Excellent
298	Medical Science Building	11'-5 1/2"	Poor	18' x 24'	Poor
509	BBSRB	15'-4"	Excellent	Approx 10' x 40'	Good

Note: Floor to floor height and module dimensions are approximate, based on review of drawings and observation of field conditions. This data should not be relied upon for accuracy, but is provided for general indication of appropriateness of the facilities for continued use for laboratory functions in comparison with contemporary industry standards.

Prepared by: **Research Facilities Design**

UNIVERSITY OF LOUISVILLE

Laboratory Building Assessment Summary

Building Number	Building Name	Floor to Floor Height	Floor to Floor Rating	Module Size/ Column Spacing	Module Size Rating
4	Belknap Research Building	16'-0"	Excellent	21' x 28'-10"	Very Good
		22' @ 1st floor	Excellent		
18	Life Sciences Building	13'-0 3/4"	Fair	22' x 35'	Very Good
20	Schneider Hall	9'-5 1/4" Lower flr	Poor	Varies/Shallow	Poor
		12'-0" Main flr	Poor		
23	Paul C. Lutz Hall	12'-0" 1st/2nd flrs	Poor	10'-6" x 30'	Very Good
		16'-0" Bmt/3rd flrs	Excellent		
28	Kersey Library	N/A	Poor	No drawings provided	Poor
30	J.B. Speed Hall	12'-3"	Poor	Varies/Shallow	Poor
31	Sackett Hall	13'-1 1/2"	Fair	Varies/Shallow	Poor
32	W.S. Speed Hall	N/A	Poor	Varies/Shallow	Poor
33	Ernst Hall	14'-0" 1st flr	Good	Inconsistent	Poor
		12'-0" 2nd/3rd flrs	Poor		
34	Natural Science Builidng	11'-6"	Poor	Varies/Shallow	Poor
36	Chemistry Building	14'-0"	Good	30' deep	Good
37	Engineering Graphics	N/A	Poor	N/A	Poor
43	Urban Research	N/A	Poor	Varies/Shallow	Poor
50B	K-Wing	Varies 13'-1" to 14'-6"	Fair/Good	Varies	Poor/Fair
51	MDR Building	12'-0"	Poor	Very Shallow	Poor
55A	School of Medicine	13'-0"	Fair	10' x 22'	Poor
55B	Health Sciences Building	14'-0"	Good	Varies	Fair
55C	School of Dentistry	14'-0	Good	Varies	Fair
55E	Donald Baxter Research Building	14'-8"	Good	10'-6" x 29'-0"	Very Good
55F	Delia Baxter Research Building	14'-8"	Good	10'-6" x 29'-0"	Very Good
56	KY Lions Eye Research Institute	12'-0" B/1st flrs	Poor	Very Shallow-old bldg	Poor
		15'-0" 2nd/3rd flrs	Excellent	10' x 24' - new bldg	Fair
57	Research Resources Center	Interstitial flr above	Good	N/A	N/A
58	Myers Hall	N/A	Poor	Varies/Shallow	Poor
87	Davidson	15'-0"	Excellent	35' x 35'	Fair
99	Vogt Building	20'-0" 1st flr	Excellent	20' x 28'	Fair/Good
		15'-4" 2nd flr	Excellent		

Note: Floor to floor height and module dimensions are approximate, based on review of drawings and observation of field conditions. This data should not be relied upon for accuracy, but is provided for general indication of appropriateness of the facilities for continued use for laboratory functions in comparison with contemporary industry standards.

Prepared by: **Research Facilities Design**

Trends in Undergraduate Science Facilities

Over the past two decades, significant changes have evolved in undergraduate science programs throughout the country. One of the major catalysts for reform has been the organization known as Project Kaleidoscope (PKAL) in Washington, DC. In 1989, PKAL was founded with grant funding from the National Science Foundation (NSF) to study 'what works' in science education. PKAL discovered that 'what works' in science education is a hands on, laboratory rich environment in which students learn science by doing science. Thus, a trend has evolved in which there has been an increased emphasis on laboratory experience and collaborative work where students are more active participants in the learning process.

Another trend has been the integration of technology to support and enhance the laboratory experience. Computers and other electronic instruments have proliferated in the laboratories and support spaces, requiring more bench space and access to IT systems. Multi-media audiovisual equipment is becoming commonplace not only in classrooms, but in the teaching laboratories as well. This is related to another trend of greater integration of laboratory and lecture activities within the same space. Although lecture sections comprised of multiple laboratory sections are still the norm, particularly at larger institutions, the integration of lecture/discussion activities within the teaching laboratory is becoming increasingly common. This requires proper room proportions and clear sightlines to allow visibility to the 'teaching wall' including chalk or marker boards, projection screens and other educational technology.

Scientific collaboration is another important trend observed in recent years. This can take many forms, including provision of adequate Faculty/Student Research Laboratories and spaces for interaction among faculty and students outside of the laboratories. There has been an increased recognition of the importance of these interaction spaces for student study and as places to 'hang out' waiting for a class or to meet a faculty member. They can also provide a safe haven for consumption of food and drink outside of the laboratory environment. Another form of collaboration is how the building 'engages' the occupants and visitors in the 'Celebration of Science' with places for display of student posters, incorporation of scientific art, displays of collections or scientific artifacts, and the use of interior windows to put 'science on display'. A key to the development of an effective undergraduate science facility is creating an environment where students and faculty want to be, resulting in an 'active' building.

These and other relevant evaluation criteria were used as a 'benchmark' against which the Paulien team assessed the suitability of the University of Kentucky science and engineering laboratory buildings for continued use in support of laboratory related functions.

UNIVERSITY OF KENTUCKY

There was a substantial difference in quality between the Health Sciences area of the campus and the rest of the campus. There clearly has been more capital investment on the Health Sciences side recently which would reflect the significant research activity of those units and the clinical services. On the rest of the campus the consultants saw a relatively significant number of smaller buildings which seem to have expended their useful life, that have not had appropriate renovation either for the needs of the users or to keep up with new code requirements. We believe there are about a dozen buildings out of the 51 we looked at that should be seriously considered for demolition. This would allow better land use in those areas. In one instance, a current site project has been routed around small buildings which are in very poor condition, because the University of Kentucky views itself as been very tight on space and is reluctant to remove any space from its inventory. At the other extreme, in the Health Sciences, there are some buildings that are approximately 20 years old that the consultants believe have significant additional useful life that are at least five stories in height that the Health Sciences Center may seriously consider demolishing to construct buildings with greater floor area ratios as the research program continues to grow as part of the Medical Campus of the Future plan. The consultants believe that those buildings still have a significant useful life and could be renovated to serve a revised use but understand that more intensive land use may be deemed necessary. The contrast between the two parts of the campus was very striking.

Note Regarding Demolition:
The criteria that would cause a recommendation of demolition is different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

The consultants were surprised at the large number of classrooms which are not ADA accessible. These are on upper floors of older buildings that do not have elevators and, in some cases, on below grade levels of buildings that do not have elevator access. There was a striking contrast with what the consultants observed at other campuses. This situation at the University of Kentucky was much more prevalent. UK seems not to be as far along toward ADA compliance as we observed at other campuses. UK has provided a graph which shows the vast majority of UK classrooms pre-date the ADA law and most were built in the 1970's or earlier.

The University of Kentucky did a very good job of defining issues they had with each building and why they wanted it assessed. This allowed the consultants to focus on issues such as possible future uses of a particular building. Each of the 51 buildings assessed has its own evaluation form with written comments, the numerical scores question-by-question, and a table showing the mix of existing space by space type. The facilities inventory data as currently gathered by CPE does not include school and college or department information, so that could not be included. The UK representatives filled out information on major occupants and primary uses and those are on the individual forms.

Issues that the consultants noted regarding fitness for continued use:

Many of the classrooms have not been refurnished to reflect the current desire for group activities in many classes. Group activities tend to be fostered most by a table and chair environment where the chairs are movable and the tables are also light and re-arrangeable. There remains a great deal of tablet armchair usage at UK. The consultants note that the current trends have resulted in the need for substantially more space per student station than traditional tablet armchairs. In jurisdictions where tablet armchairs were considered the norm, a usual square feet per student station average figure for classrooms is 15 square feet. The consultants now normally recommend 20 square feet per station and in specific applications with the full use of computers and with large work surface environments the figure can be as much as 25 square feet per student station.

Regarding science and engineering laboratories, there is now a desire also for more group activities in the laboratory setting and access to computer technology. The write-up by Research Facilities Design (RFD), which was part of the assessment team, will illustrate what they see as state-of-the-art teaching laboratories for the sciences. There were a number of buildings from the 50's, 60's, and early 70's that clearly need a major and complete overhaul to provide the quality of space that would be expected in those disciplines. This not only applied in certain science and engineering disciplines but in the arts as well.

For research, there has recently been a strong trend in the life sciences toward modular concepts with multiple lab benches in one large room. In most cases, several principal investigators are working within those spaces. A recent trend has been to put work stations against the windows for laboratory-based staff and students. There is usually a corridor and then support space serving the principal investigators housed on that floor. There is a strong trend to providing group spaces outside the laboratory to address the OSHA prohibitions against food or drink in the laboratories. These are often now clustered at the ends of hallways with vending machines and in some cases additional break amenities such as microwaves, refrigerators, etc. A key issue regarding research space is floor-to-floor height. Generally a minimum of 13' 6" is viewed as necessary. In a number of the older buildings this feature was not achieved suggesting that as those buildings need major renovation it may be desirable to convert them to non-wet lab uses. There is additionally a need for adequate depth so that a proper bench setup can be provided. In most instances this would be a minimum of 28 feet. The University of Kentucky also had us look at some recent buildings such as the BBSRB, which has just been occupied and is clearly a state-of-the-art research building. It could well serve as a model for other University of Kentucky life sciences research buildings. The robotics facility, while it is now over 15 years old, has been well cared for and struck the consultants as a high-quality building that did not seem to have any significant needs for programmatic renovation.

The University of Kentucky had the consultants look at multiple animal quarters facilities. They hope over time to consolidate more of the animal facilities into newer facilities. This seems a very wise step. A number of the older facilities would not meet current AALAC accrediting requirements and it would be a difficult retrofit. One of the problems is the need to provide cage washing and rack washing facilities, which can more effectively be handled on a bulk basis in a larger facility. The consultants saw the mix of perception and other similar psychology experiments that are conducted with animals without invasive procedures in the same facility with the life sciences research where invasive procedures are done. These appear to work effectively in one larger facility.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
University of Kentucky					
Ag Science Center • 0091	99,275	42	2.0	Major Renovation	166,194
Agron H House-G Hous • 0066	6,048	56	1.0	Demolition	6,982
Barker Hall • 0028	32,956	104	1.5	Major Renovation	41,006
Barnhart Building • 0276	71,412	17	3.2	Minor Renovation	107,650
BBSRB • 0509	96,558	1	4.0	None	204,450
Bowman Hall • 0059	24,743	59	1.0	Major Renovation and Assign to a New Use	41,448
Breckinridge Hall • 0056	14,499	77	1.4	Major Renovation	23,825
Business Econ Bldg • 0034	77,479	41	3.0	Minor Renovation or Minor Renovation and Assign to a New Use	135,363
C. W. Mathews Bldg. • 0047	11,379	98	2.2	Major Renovation or Major Renovation and Assign to a New Use	18,040
Centrifuge Bldg • 0209	5,936	38	1.2	Demolition	7,550
Chemistry-Physics • 0055	154,981	43	1.9	Major Renovation and Assign to a New Use	245,347
Civil Engineering • 0052	6,690	65	1.2	Demolition	10,283
College Of Pharmacy • 0082	53,137	21	2.4	Major Renovation and Assign to a New Use	94,634
Combs Cancer Researc • 0096	28,366	19	3.5	Minor Renovation	75,826
Dental • 0297	40,532	44	1.9	Major Renovation and Assign to a New Use or Demolition	120,000
Dimmock Animal Path. • 0076	24,916	58	1.0	Demolition	39,888
Engineering Annex • 0038	6,985	99	1.3	Major Renovation or Demolition	11,172
Erikson Hall • 0050	25,374	66	1.9	Major Renovation	39,880
F. Paul Anderson Twr • 0046	61,139	40	1.8	Major Renovation	106,703
Fine Arts Guignol • 0022	67,663	57	1.8	Major Renovation	101,181
Funkhouser • 0054	72,851	66	2.1	Major Renovation	109,860
Garrigus Building • 0215	67,476	33	1.7	Major Renovation	109,794
Gluck Equine Bldg • 0099	43,375	20	3.4	Minor Renovation	80,151
Grehan Journalism • 0042	22,270	55	3.0	Minor Renovation	35,090
Insectary Consvatory • 0062	5,093	91	1.0	Demolition	7,692
Kastle Hall • 0044	41,230	96	1.9	Major Renovation	51,122
King Library • 0039	114,969	76	1.4	Major Renovation	155,447
KTRDC • 0236	26,548	29	2.8	Minor Renovation	53,609
Lafferty Hall • 0024	12,624	67	2.0	Major Renovation	17,719
Law Building • 0048	65,191	41	2.6	Major Renovation and Assign to a New Use	100,279
M.R.I.S.C. Bldg • 0098	25,317	15	2.7	Major Renovation	68,000
McVey Hall • 0045	36,408	78	2.4	Major Renovation and Assign to a New Use	51,866
Medical Science • 0298	176,296	44	1.6	Major Renovation and Assign to a New Use	310,000
Miller Hall • 0035	16,806	108	2.2	Minor Renovation	28,476
Multi-Disp Res Facil • 0216	36,107	34	1.5	Demolition	51,776
Pence Hall • 0041	30,021	97	2.8	Major Renovation	41,472
Research Facility #1 • 0003	19,080	37	2.5	Major Renovation or Demolition	25,678
Reynolds Whse #1 • 0101	108,593	44	2.6	Major Renovation or Major Renovation and Assign to a New Use or Demolition	144,081
Robotics Facility • 0108	37,929	17	3.5	None	72,423
S.J. Sam Whalen Bldg • 0043	15,875	38	2.5	Minor Renovation	25,748
Sanders-Brown • 0230	33,963	27	2.5	Major Renovation	68,237
Scovell Hall • 0064	44,403	99	2.8	Major Renovation	68,916

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Seed House • 0092	10,506	42	2.8	Demolition	19,987
Slone Research Bldg • 0053	20,366	49	1.6	Major Renovation and Assign to a New Use or Demolition	30,536
Small Animal Lab • 0065	2,066	71	1.0	Demolition	3,600
T H Morgan Bio-Sci • 0225	52,428	31	2.1	Major Renovation	92,450
Taylor Education • 0001	41,067	77	1.9	Major Renovation	77,797
Thos Poe Cooper Bldg • 0073	22,566	76	1.6	Major Renovation and Assign to a New Use or Demolition	33,858
Tobacco Research Lab • 0061	9,660	70	1.2	Demolition	11,015
Wenner-Gren Res Add. • 0237	3,864	29	1.2	Demolition	7,168
Wenner-Gren Res Lab • 0070	8,666	65	1.2	Demolition	13,677
Total ASF	**2,133,682**	**Total ASF in Space Model:** 4,326,941			**3,564,946**
No. of Buildings Assessed: 51		***Total ASF as a Percent of Total ASF in Space Model:*** *49%*			
Average		**54**	**2.1**	***Most Recommended Action:*** *Major Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

UNIVERSITY OF LOUISVILLE

The University of Louisville had the consultants assess buildings on the Belknap campus where their arts and sciences, engineering, education, and business programs are located and the Health Sciences Center, which is just on the edge of downtown Louisville. The Shelby campus, which is primarily being developed as a research park, had no buildings that the University of Louisville decided to have assessed for this study. Of the 37 buildings the consultants assessed, there are only two that seem logical candidates for demolition. These include the Engineering Graphics building, which is a former restaurant located in the middle of a parking lot that has some engineering computer labs and a few offices. It just does not seem a desirable building for additional investment. It is 40 years old and should be demolished at the earliest practical date. The other building is Myers Hall, which is the original School of Dentistry. It is at an edge of the Health Sciences campus and directly adjacent to the elevated Interstate 65. This building is multiple stories, has no elevator access, and the top floor has debris on the floor in most of the rooms, in some cases a dropped ceiling is hanging down. That floor has not been viewed as occupiable for some period of time. The other three floors (including basement) are being used primarily by speech pathology and audiology. While Myers contains institutional history, the current uses have nothing to do with that history and the building does not seem to be an asset to the campus. There may be an option of selling the building. Jefferson Community and Technical College is located directly across the freeway from Myers Hall. University of Louisville should demolish or dispose of this building.

Note Regarding Demolition:
The criteria that would cause a recommendation of demolition is different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

One other building that either needs major renovation or could be a candidate for demolition is Urban Research, which is off the Belknap campus by a couple of blocks. It was a former corporate office building. The suite on the third floor which is occupied by a social work entity does not have elevator access. The other floors are served by an elevator and are in different states of adequacy. There are major problems with the building that should be addressed if it is retained. The building is almost 100 years old.

The University of Louisville asked the consultants to see all research buildings including new ones and there are several that appeared to the consultant to be in very good condition. These include Delia Baxter Research, Donald Baxter Research, and Belknap Research. The University of Louisville Health Sciences Center has stayed with a 650 square foot module for its research labs although the consultants understanding is the next building will utilize a

more open concept. It should be noted that there are major health sciences centers that are staying with the individual lab module approach. The consultants felt that the work that has been done in recent buildings is quite impressive and what one would expect to see in state-of-the-art research facilities. The Research Resources building consists of animal quarters, meets AALAC accreditation requirements, appears to be well maintained and is currently being expanded.

The University of Louisville has made a strong effort to provide ADA accessibility to many of the older buildings. The consultants were particularly impressed with the elevator tower in Patterson Hall that provided a very nice elevator lobby and matches the 120-year-old building façade quite well. The University of Louisville has a cluster of academic buildings that are all 120 or more years old. They are in different states of educational adequacy. A number of them need major renovation. They all seem assets to the campus, especially because they form a cluster. The consultants recommend that the classroom uses on the upper floors of these buildings be carefully evaluated and when possible removed as these buildings seem to lend themselves better to office space uses. While there are elevators in the buildings they have a small capacity load and are slow. Occupants indicate to the consultants that students tend to use the stairs even when their classes are on an upper floor of one of these buildings.

Another issue at the University of Louisville is that large buildings that were built in the 1970's on the Belknap campus usually only have one elevator. At the time this was adequate. It was assumed that students would use the stairs and the elevators were there for a mix of service use and handicapped accessibility. Now in some cases it is very inconvenient to get from the elevator to certain parts of the building adding additional elevators over time would be highly desirable.

Hallway lighting is very dark in several of the buildings. Davidson is the darkest the consultant saw on this entire project. Bingham Humanities is a very strong architectural statement from the early 1970's. The architects intended there to be a significant reliance on natural light in the hallways. The day the consultants evaluated the building was a cloudy, rainy day and the hallways were very dark during the morning hours. There is a fairly extensive use of incandescent lights in hallways, which would be a desirable changeover to non-incandescent fixtures for better energy use and a better lighting result.

The College of Education building which is 25 years old does not serve the education program well. It does not have the specialized facilities one would normally expect to see at a college of education at a Metropolitan Research I university and there is a glaring code problem with the open stairwell in the main lobby which has a concrete element at approximately six feet off the ground which can result in persons hitting their heads on this. Code requires a seven foot clearance.

The Business building is approximately 20 years old. It is a strong architectural statement of its era. It has a multi-story atrium and substantial natural light into the atrium. From a fairly thorough tour of the building it appears that the School of Business is in need of additional space, but from the key evaluation points, the building appeared to be in relatively good educational adequacy.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
University of Louisville					
Baxter Research • 055E	66,267	7	3.9	None	113,577
Belknap Researc • 0004	50,092	1	4.0	None	103,621
Bingham Humanit • 0017	49,821	33	1.8	Major Renovation	109,554
Brigman Hall • 0002	10,058	119	2.0	Major Renovation	21,030
Chemistry Build • 0036	68,095	25	2.1	Major Renovation	110,578
College Of Educ • 0084	55,007	25	1.5	Major Renovation	95,479
Davidson Hall • 0087	49,195	32	2.4	Major Renovation	90,731
Delia Baxter Re • 055F	70,353	3	3.9	None	125,841
Dougherty Hall • 0029	17,014	61	2.0	Major Renovation	30,697
Engineering Gra • 0037	2,005	41	1.6	Demolition	3,043
Ernst Hall • 0033	26,185	39	1.9	Major Renovation	48,231
Ford Hall • 0007	6,800	131	2.4	Minor Renovation	12,345
Gardiner Hall • 0008	13,398	134	1.6	Major Renovation	24,766
Gottschalk Hall • 0010	5,847	119	1.1	Major Renovation and Assign to a New Use	10,842
Health Sciences • 055B	64,543	36	2.8	Major Renovation	108,405
J.B. Speed Hall • 0030	23,571	64	2.2	Major Renovation and Assign to a New Use	40,974
Jouett Hall • 0006	5,242	120	2.0	Major Renovation	9,591
Kersey Library • 0028	26,293	60	3.4	Major Renovation and Assign to a New Use	33,482
K-Wing • 059B	49,787	16	2.8	Minor Renovation	108,211
KY Lions Eye Re • 0056	34,426	37	1.3	Major Renovation	80,660
Life Sciences • 0018	66,392	37	2.3	Major Renovation	117,772
MDR Building • 0051	61,865	44	1.7	Major Renovation and Assign to a New Use	113,293
Myers Hall • 0058	8,610	106	1.4	Demolition	27,276
Natural Science • 0034	52,642	53	1.8	Major Renovation and Assign to a New Use	87,410
Oppenheimer Hal • 0005	5,026	121	2.6	Major Renovation	10,979
Patterson Hall • 0003	5,098	119	2.1	Minor Renovation	9,370
Paul C. Lutz Ha • 0023	47,241	11	2.9	Minor Renovation	89,746
Research Resour • 0057	9,570	16	3.4	None	37,069
Sackett Hall • 0031	16,189	58	2.0	Major Renovation and Assign to a New Use	24,119
Schneider Hall • 0020	51,580	49	2.1	Major Renovation or Major Renovation and Assign to a New Use	65,765
School Of Busin • 0090	60,718	21	3.4	Major Renovation	121,253
School Of Denti • 055C	80,535	36	2.6	Major Renovation	197,351
School Of Medic • 055A	74,542	36	2.7	Major Renovation	174,956
Urban Research • 0043	18,390	94	2.3	Major Renovation or Demolition	38,927
Vogt Building • 0099	18,155	19	3.7	Minor Renovation	33,486
W.S. Speed Hall • 0032	27,451	49	1.8	Major Renovation	39,531
Total ASF	**1,298,003**	**Total ASF in Space Model:** 2,476,144			**2,469,961**
No. of Buildings Assessed: 36		***Total ASF as a Percent of Total ASF in Space Model:*** *52%*			
Average		**55**	**2.4**	***Most Recommended Action:*** *Major Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

EASTERN KENTUCKY UNIVERSITY

The Donovan model school is now 45 years old. It consists of single story wings and two story wings which provide a complete elementary, middle and secondary school experience. Most lab schools have stopped functioning but this school seems to continue to serve Eastern Kentucky University and the clientele of the school well. The building will be difficult to convert to other uses effectively. The sizes of rooms do not allow modern teaching methods, particularly strongly in the middle school area where the rooms seem too small. This building takes up a lot of valuable land at a low floor area ratio. There is a possibility of a new lab school building incorporating some College of Education functions. The building would need major renovation and still might not serve as a model school for the next 50 years. Demolition and replacement seems an appropriate course.

Note Regarding Demolition:
The criteria that would cause a recommendation of demolition is different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

The consultants saw a number of other buildings which averaged 50 years in age. They were in four categories: 1) Wallace and Cammack had recent renovations and appeared not to need any significant renovation; 2) Burrier, Combs Classroom, and Crabbe Library need minor renovations; 3) Memorial Science and Moore, which will be converted from the historic science uses, each need a major adaptive restoration. They are hard science buildings with finishes designed to minimize damage from science activity and they need a major aesthetic and educational renovation to serve effectively for social science uses. John Rowlett Building also needs major renovation. The classrooms seem crowded and not adequate for current group activity expectations. The laboratory beds for nursing could stand replacement to reflect more of the qualities of current clinical room amenities. The metal panel system used for partitions makes alterations difficult. It is especially difficult to alter existing electrical in the walls. Replacement of this system should be seriously considered. HVAC and glazing need to be brought to currently acceptable conditions. 4) Music would likely best be served by a new building. Foster is not a good building for music. The band room needs significantly more volume of space. It appears to be a dangerous room because of the amount of sound that can be generated by the band instruments in an undersized room.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Burrier • 0115	34,413	38	2.8	Minor Renovation	56,894
Cammack • 0104	12,876	88	3.1	None	28,247
Combs Classroom • 0112	66,560	42	3.0	Minor Renovation	132,004
Crabbe Library • 0113	97,185	78	4.0	Minor Renovation	158,115
Donovan • 0109	92,585	45	1.9	Demolition	119,752
Foster • 0108	20,073	49	1.5	Major Renovation and Assign to a New Use	36,983
John Rowlett Bldg • 0122	25,365	30	2.1	Major Renovation	53,566
Memorial Science • 0107	26,886	54	1.5	Major Renovation and Assign to a New Use	40,426
Moore Bldg • 0114	67,714	38	1.4	Major Renovation and Assign to a New Use	123,595
Wallace • 0118	57,729	35	3.6	None	118,011
Total ASF	**501,386**	**Total ASF in Space Model:** 1,634,906			**867,593**
No. of Buildings Assessed: 10		***Total ASF as a Percent of Total ASF in Space Model:*** *31%*			
Average		**50**	**2.5**	***Most Recommended Action:*** *Major Renovation and Assign to a New Use*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

KENTUCKY STATE UNIVERSITY

Kentucky State University had the consultants assess a variety of buildings. These included Jackson Hall, which is the oldest building on campus. It had a fairly substantial renovation 30 years ago and there is a two-story gallery space that seems to work quite effectively. The other uses are the offices of the Center of Excellence for the Study of Kentucky African-Americans and Art Department spaces. The Art spaces will be moving to Shauntee Hall during the next year. The interior of the building has a second floor which is not accessible and there currently are classroom and laboratory activities taking place on that floor. Adding access to the second floor through an elevator is critical to the long term use of this building. The Center of Excellence has a significant amount of African art that is currently in storage in the building. Additional display space might be a good use of the building. Jackson Hall is easily recognized since its façade is used by Kentucky State University as one of its main images. Enhancing the public use of the building seems desirable. Another significant upgrade would seem desirable for this facility.

The campus also had the consultants assess Shauntee Hall which is currently being renovated for the Art Department. The consultants observed new duct work being installed. It appeared that the renovation should address all outstanding issues for Art. The building is a good location for the three dimensional art programs as it previously had an industrial technology component. The south campus location will have the Art programs somewhat remote from the rest of campus and this will need to be assessed over time to see if that is a satisfactory solution. The facility, now at a midpoint of renovation, should provide good space for Art. The consultants were surprised to see computers in IT labs on the upper floor, which were unprotected from construction dust and likely will be negatively affected if steps are not taken to protect them. (The consultants note that since the time of the assessment this situation was remedied.)

The consultants were asked to look at the Jordan Shop/Warehouse facility which is from 1939 and contains a very substandard warehouse on the upper floor and an electrical shop on the lower level. The Warehouse is not well organized and it cannot be fully utilized because the building was not designed with appropriate floor loads for warehouse storage. The electrical shop suffers from water incursion. This building is substandard and a new facility would be desirable. The Jordan Maintenance Building consists of other maintenance shops and a supply warehouse for facilities management. It has inadequate loading dock access and facilities management currently does not use the loading dock for major deliveries. This building is quite substandard and a new facility at a more accessible location on campus would seem desirable. A key issue will be whether the adjoining power plant also should be moved with such a facility. It would have significant relocation costs. One of the best new plant facilities the consultants have seen is at Southern Connecticut State University in New Haven. They moved from very substandard facilities to a new facility with excellent front office spaces and quality shop facilities. The new facilities are at the other end of campus from the old facilities.

The consultants also assessed at the Atwood Agricultural Research facility which is a 1935 building which was renovated in 1986. The building has low floor-to-floor heights and therefore is not a good candidate for further renovation for modern lab requirements. There may, however, be some additional useful life in the 1986 renovation. This building is at a fairly central spot on the campus and at one time was the student cafeteria before it was renovated to become the cooperative extension research facility. The consultants believe with additional renovation the building could have additional use as classroom and office space. There is a low level of animal research at KSU. The facility in the basement of this building seemed adequate to the two projects currently using animals in that facility. HVAC systems need fairly major attention in this facility. This is a fairly small footprint in the central campus. If enrollment doubles as is the goal, a case could be made for a larger footprint facility in this location.

Bradford Hall has very substandard space for the Business program and smaller than expected music practice venues. The band room in particular does not have adequate height and the amount of sound generated can be dangerous in such a situation. There do not seem to be adequate ensemble spaces and the choral room seemed small. The stage and backstage amenities at the performance space seemed substandard. The seating needs replacement. The business program does not have the types of facilities that promote the image typical of a business program (i.e., case rooms with high technology and higher end furniture, inviting faculty offices, spaces used to court the local business community and business executives, etc.). Business and Music/Theatre would be better served with new facilities. There were visible signs of building settlement seen in cracks that have been filled in several locations throughout the building. For these reasons, it is recommended that Bradford Hall be substantially renovated or demolished.

The White Health Center was built in 1971 as an infirmary. It contains the current campus Health Center, a substantially reduced facility, and also houses the Nursing program. The space does not appear to meet the current demand for the Nursing program. The Nursing labs do not have up-to-date bed units and mannequins. There are two beds per room and this seems inefficient for today's instructional methods as this is the old infirmary ward setup. Newer facilities would not be configured in this manner. The Nursing program currently has a student waiting list and, if the program is to grow, better laboratory spaces will be needed. The student health space, while small, seemed adequate. There has been talk of co-locating it with other student service functions and this should be considered. The Nursing program would be better off with a new building or a completely renovated facility.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Atwood Ag Research • 0018	19,854	71	2.0	Major Renovation or Major Renovation and Assign to a New Use	29,042
Bradford Hall • 0090	38,862	41	1.8	Major Renovation and Assign to a New Use or Demolition	63,888
Jackson Hall • 0021	6,416	119	1.6	Major Renovation and Partially Assign to a New Use	11,225
Jordan Maint Bldg • 0106	4,769	37	1.4	Demolition	10,570
Jordan Shop/Warehous • 0039	0	67	1.0	Demolition	5,100
Shauntee Hall • 0108	12,270	35	2.7	None	18,616
White Health Center • 0112	4,066	35	1.6	Major Renovation and Partially Assign to a New Use	10,400
Total ASF	**86,237**	**Total ASF in Space Model:** 482,227			**148,841**
No. of Buildings Assessed: 7		***Total ASF as a Percent of Total ASF in Space Model:*** *18%*			
Average		**58**	**1.7**	***Most Recommended Action:*** *Major Renovation and Partially Assign to a New Use*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

Note Regarding Demolition:
The criteria that would cause a recommendation of demolition is different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

MOREHEAD STATE UNIVERSITY

All of the buildings the consultants reviewed at Morehead State University needed minor or major renovations. Baird Music Hall needs to be mentioned. The building is 50 years old and not what one would expect for a music program at a comprehensive university. An addition was built in 1967. Baird is substandard for what one would expect for a music program facility. The consultants think music may be best served in a new facility. There is not a large concert hall. The practice rooms appear to be substandard. The keyboard lab is very tight and substandard. There are ADA accessibility problems. The acoustics in many of the facilities seem inadequate. The 360-seat recital hall is a good quality facility.

Note Regarding Recommended Actions:
The criteria on which the recommended actions are based are different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

The average age of the buildings reviewed at Morehead were 57 years old, which makes them the second oldest. The situation at Button Auditorium is especially curious. The 1,100-seat auditorium has been updated and reupholstered. However, there are only two restrooms serving the facility. These are not men's and women's. These are two one-person restrooms. This is totally inadequate for that size of facility where the intermission needs for restrooms will be significant. The backstage area of Button Auditorium looks more like a physical education locker room from the pre-WWII era than what one would normally expect for auditorium makeup and dressing rooms. The rifle range has major water incursion. There is also a need for outside air to remove products of combustion from the gun range. There is a need for a groundwater study and a design in this area. There is a major need for renovation of the building systems. There is not ADA access to the different levels of this building, including the ROTC offices and classrooms and the rifle range.

There are significant conditions of mold and mildew and other HVAC issues which need attention in Allie Young. The Health Clinic seems tightly fit in. The academic outreach and support appear to have more adequate space.

The individual findings for each building are included in its institutional profile.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Allie Young • 5001	21,459	80	1.6	Major Renovation	47,500
Baird Music Hall • 2004	38,073	52	2.1	Major Renovation and Assign to a New Use	63,375
Bert Combs Bldg • 2008	54,352	45	2.8	Minor Renovation	87,480
Button Auditorium • 5003	33,646	77	2.7	Major Renovation	47,589
Cam-Carroll Library • 5004	77,078	76	2.5	Major Renovation	112,457
Ginger Hall • 2007	57,762	37	2.8	Minor Renovation	102,160
Lappin Hall • 2005	81,072	69	2.9	Minor Renovation	150,004
Lloyd Cassity Bldg. • 2006	39,897	44	2.6	Minor Renovation	54,474
Rader Hall • 2002	23,365	81	2.4	Major Renovation	39,630
Reed Hall • 2011	51,488	33	2.6	Minor Renovation	97,981
Vet Tech Lab • 4013	0	31	1.5	Demolition	10,800
Total ASF	**478,192**	**Total ASF in Space Model:** 861,551			**813,450**
No. of Buildings Assessed: 11		***Total ASF as a Percent of Total ASF in Space Model:*** *56%*			
Average		**57**	**2.4**	***Most Recommended Action:*** *Minor Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

MURRAY STATE UNIVERSITY

Murray State University only asked the consultants to review three buildings, all of which are in bad condition. The Industrial Education/Visual Arts building is a WWII era building. It is very poor condition. The consultants believe it is not good land use, a one story building in a central spot in the campus. The lab school across the parking lot from this building is coming down, which creates an opportunity for more intense land use. The consultants suggest that Murray State might also look at the Applied Science one-story wing which attaches to Industrial Education. It is also not good land use.

The consultants were also asked to assess Ordway Hall. It has a number of student support uses. It is a former dormitory over 75 years old. It is a very prime location on the campus with major buildings close by. The use by archaeology on the top floor in a floor that essentially has the 1931 room partitions is space that should not be occupied. It is a serious fire hazard and is not ADA accessible. The student services functions in the building are a fairly central campus location, however, a one-stop could be possible in the current library building and that would be a better solution.

The third building the consultants were asked to assess, the Blackburn Science building, is over 50 years old. It has not had significant renovation in 40 years when an addition was built. It will not be continued for science use after new science buildings are built at Murray. The consultants believe that with major renovation, this building could have an additional life. There is some sentiment on the Murray State campus to demolish building so that a totally new facility could be built in its place. The consultants see that as an option but this building could also be converted to another use effectively.

Note Regarding Demolition:
The criteria that would cause a recommendation of demolition is different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Blackburn Science Bu • 0031	81,288	56	1.7	Major Renovation and Assign to a New Use	139,217
Ind Educ/Visual Arts • 0033	13,057	59	1.5	Demolition	25,850
Ordway Hall • 0030	20,622	75	1.4	Demolition	38,600
Total ASF	**114,967**	**Total ASF in Space Model:** 1,209,822			**203,667**
No. of Buildings Assessed: 3		***Total ASF as a Percent of Total ASF in Space Model:*** *10%*			
Average		**63**	**1.5**	***Most Recommended Action:*** *Demolition*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

NORTHERN KENTUCKY UNIVERSITY

This campus was developed in the early 1970s, therefore it does not have the old facilities seen at the other comprehensive campuses. However, since many of its facilities were built during the early years of development of the campus, they have now reached a point where they need significant work. In addition, the campus enrollment has grown and the amount of space has not kept up. When compared to the other comprehensives, Northern Kentucky University has much less space per student. While they would not need all the spaces at the other campuses, it appears that in many of their buildings they are tight compared to modern academic expectations. The consultants note that NKU has done an extensive job of providing furniture in public parts of buildings for socializing. NKU representatives point out that in many cases this is because rooms originally designed as lounges had to be converted to instructional or office spaces.

Among the buildings reviewed, the Business-Education-Psychology building does not provide the type of identity that business schools currently want (i.e., case rooms with high technology and higher end furniture, spaces used to court the local business community and business executives, etc.). The College of Education, College of Business, and the Psychology program have all grown. It would be best if one of the major users (such as the College of Business) moved into new, better suited facilities, and allow the remaining units to expand into vacated spaces after their renovation.

Similarly in the Fine Arts Center the art studios and the music practice rooms are tight. The art gallery and the performance areas appear to be of quite good quality. There are primarily space quantity issues in this building but there are also HVAC and upkeep issues.

In the Landrum Academic Center the building seems very heavily utilized and many of the informal gathering areas are right outside the elevators and are heavily utilized. The language lab facility is not up-to-date and the infrastructure should have major upgrading.

Founders Hall will be more easily adaptable to non-science uses than older science buildings which the consultants assessed at other comprehensive universities. There is however a very noisy HVAC system that needs attention and the programmatic/system renovation that has been requested is needed to adequately convert this facility to alternate uses.

The Albright Health Center has very tight spaces for the nursing program. It is isolated from the rest of the academic facilities. The nursing labs do not have modern equipment and mannequins that are now expected as part of nursing school instruction. The auto-tutorial lab is also not up to current quality. The swimming and fitness areas seem undersized. There is a need for an exercise science instructional laboratory and the locker rooms are inadequate. The consultants wonder why diving equipment is still in place at a four foot end of the pool even if it is covered with a canvas that says "Do Not Dive." Recreation buildings now are often signature buildings. This facility does not provide that type of advantage to Northern Kentucky University.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
A. D. Albright Healt • 0145	93,314	22	1.9	Minor Renovation and Partially Assign to a New Use	136,324
Business-Education-P • 0350	72,074	26	2.3	Minor Renovation and Partially Assign to a New Use	128,283
Charles O. Landrum A • 0300	61,272	30	2.5	Major Renovation	100,500
Fine Arts Center • 0320	85,879	29	2.8	Major Renovation	159,584
Founders Hall • 0150	45,636	32	2.1	Major Renovation and Partially Assign to a New Use	125,296
Total ASF	**358,175**	**Total ASF in Space Model:** 917,163			**649,987**
No. of Buildings Assessed: 5		***Total ASF as a Percent of Total ASF in Space Model:*** *39%*			
Average		**28**	**2.3**	***Most Recommended Action:*** *Major Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

WESTERN KENTUCKY UNIVERSITY

All of the buildings which Western Kentucky University had the consultants assess are in need of significant updating. In a number of cases such as the Planetarium there is a need for new equipment to reflect current state-of-the-art in projection technology. The Planetarium will need to determine whether they continue with a sky projector concept or go to digital projection.

Van Meter Hall which contains the landmark auditorium needs ADA requirements to be met. The issues at Western Kentucky University are exacerbated by the very significant grade changes on the campus which make access to the public spaces for those with mobility issues difficult. The public restrooms need significant expansion. The green room and dressing rooms are inadequate. There are also inadequate pre-function and intermission areas for audiences to gather. This building needs a major renovation.

Grise Hall is not adequate for current business educational functions. The classrooms are not providing a case room setting. There are inadequate breakout areas. The auditorium is not ADA acceptable. Its acoustics and sight lines are very poor. Business schools often have office suites for their units and this building does not provide that adequately. There is a water problem in the building. There needs to be better insulation of pipes. If Business is able to get a new building, Grise can function for other academic or office uses but it does need major renovation.

The Helm Library spaces are dated. There are no adequate group study rooms. Compact shelving can only be used in the basement level. The amount of user seating is less than most accepted targets would suggest. There would be a desirability of having both library buildings redesigned together.

The Kentucky Building needs fire code renovations. The storage rooms do not comply with current fire safety requirements. The Kentucky Museum is relatively large. There is currently storage in spaces that would make good gallery spaces. The museum could demonstrate added value through a programmatic concept study showing how they could make use of additional exhibit spaces. There are mechanical and glazing issues.

Gordon Wilson Hall has extensive problems in its use for theatre and dance. The laboratory theatre needs a more appropriate floor. Its size and shape, however, seem appropriate. There is a problem with acoustic separation between the dance above and the lab theatre and there is a need for side-by-side acoustical separation between the two dance studios. There is no elevator and no wheelchair access to the upper levels. The handicapped exit hallway goes behind the theatre in an area that is not generally lit and a dimmer panel for the theatre seriously constricts the exit. The path is currently too narrow.

The other buildings are each discussed in the report and their findings can be seen in the summary.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Academic Complex • 0047	63,597	37	2.4	Minor Renovation	125,966
Cherry Hall • 0008	56,807	69	2.1	Minor Renovation	105,268
Cravens Grad Center • 0052	76,761	35	2.0	Major Renovation	96,887
Environmental Science & Technology Building • 0056	72,226	30	2.8	Minor Renovation	104,258
Gordon Wilson Hall • 0009	15,969	79	2.9	Major Renovation	33,333
Grise Hall • 0020	73,937	40	2.3	Major Renovation	133,067
Helm Library • 0017	64,884	75	2.0	Minor Renovation	85,193
Kentucky Building • 0037	0	67	2.7	Major Renovation	80,866
Ogden Planetarium • 0043b	4,029	39	2.4	Minor Renovation	4,754
Van Meter Hall • 0010	22,059	95	1.5	Major Renovation	40,217
Total ASF	**450,269**	**Total ASF in Space Model:** 1,272,008			**809,809**
No. of Buildings Assessed: 10		***Total ASF as a Percent of Total ASF in Space Model:*** *35%*			
Average		**57**	**2.3**	***Most Recommended Action:*** *Major Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM

The KCTCS administration decided to base the evaluation of adequacy and fit for continued use on a selection of campuses that would show the consultants what they viewed as a typical Eastern Kentucky campus, a typical Western Kentucky campus and an urban campus. Two of these have separate locations for the former community college and the former technical college and one, Elizabethtown, had the two adjoining each other on what can now be viewed as one campus.

The KCTCS administration asked the consultants to meet with the Presidential Leadership Team during one of their meetings at KCTCS headquarters. This allowed the consultants to hear comments and solicit input from other presidents. It appears that the issues identified at the sample institutions apply across the system relating to buildings that are in need of major updating, additional consolidation between separated sites, and the re-use of spaces vacated through the development of a single set of facilities for those programs that had been offered at both community colleges and technical colleges.

The consultants saw examples where KCTCS institutions are making significant effort to continue to upgrade their laboratory equipment through specialized federal funds and other operating side revenues. This seems an important challenge for KCTCS to assure that their laboratories continue to reflect the type of equipment that students will be expected to operate in the work force.

Elizabethtown Community College

The Elizabethtown campus had good quality facilities, certainly the best the consultants saw within KCTCS. The Science building in many ways is a model for lower division science, having adopted many of the currently espoused principles in planning such buildings. It is a building built almost 40 years ago but which had a major renovation within the last five years. The Technical College facility is well maintained and the campus has made an effective effort to update equipment and machinery in most of the labs. This is an ongoing issue for all the KCTCS campuses and the use of a mix of federal dollars and operating funds is critical to maintaining this. There are stairs from the main hallway to the shop floor in some of the shops. The work-around for handicapped persons is to go around the outside of the building and enter through the wall which has the big double doors which is at grade from the service yard, which is not in full ADA compliance. The hallways are well lit in this building. The building is

very large and relatively confusing for a first-time visitor there is a logic to the way the building is divided and the rooms numbered that becomes clear once a person has some familiarity with it.

Hazard Community and Technical College

This campus is split with significant distance between the former Community College and the former Technical College. The consultants assessed the Jolly Classroom Center-East, which is 35 years old but has had fairly significant renovations. A major issue is determining who will take some space that has been vacated recently. It appears that space would work well for any office-based function and for dry classrooms or small computer labs. The classrooms do not have the multi-media technology that we would expect to see in current classroom settings. The science labs appear to be in need of significant educational renovation. The Jolly Classroom Center-East is connected to other portions of the Jolly Center which include additional administrative offices, library and other elements. The mechanical and electrical seem to be in good condition. Some plumbing restoration with fixture updates would be desirable. Re-glazing would be desirable. There are a few ADA requirements that need fine-tuning.

The facilities on the Technical College campus were in poorer condition. The Business and Office Building no longer serves the academic programs in those areas. It does have some campus offices, Health Professions labs and a student services/dining area in the basement. This building needs a major renovation. All of the systems, glazing and ADA requirements need to be addressed. The only ADA access to the building is to the lower level. This seems far from ideal. The Health labs have not had adequate retrofits and are in need of better designed space and up to date equipment. Building case work is generally in poor condition. There have been some attempts to upgrade some areas including a stucco area with a water feature near one of the office areas. The Hazard Industrial Education building needs significant programmatic updates. The technology areas reflect the time period when the building was constructed 45 years ago. They are in need of significant upgrades. There appeared to be a ventilation problem in the welding area. While the ventilation system was renovated in the mid 1990's and a recent evaluation by a mechanical engineer noted some deficiencies, the consultants call some attention to it because any excess gas in the space could be a life safety issue. The Cosmetology area has had some attention but appears to need an electrical upgrade. Many of the academic programs in this building have facilities that would not seem to meet current employer expectations. The building appears to be structurally sound and there is not a technical reason to recommend its demolition and replacement. The consultants, however, noted that the quality of buildings on the Technical campus site is significantly inferior to what was seen on the community college site and raised the point as to whether the Hazard community might be better served by these two functions becoming physically co-located in the future.

The consultants also suggest that when functions for which the building was named no longer exist in a building, it would appear desirable to either rename the building after current functions or to honor someone whether a donor (which is the new norm) or a person who contributed significantly to the institution (which is the old norm).

Jefferson Community and Technical College

Jefferson Community College started with a former seminary building that was not put on the assessment list. It is a building that is a very strong castle-like architectural statement but has problems that need attention in several parts of the building. The building that the consultants were asked to assess was the Hartford building which has 12 stories plus basement and was the first building constructed by JCC. It is directly adjacent to the elevated freeway as is the former seminary building. The Hartford building was designed to turn its back to the freeway with all fenestration facing away from the freeway. The Hartford building has significant problems. The footprint is such that the space per floor averages under 5,000 assignable square feet per floor, minimizing flexibility. There is a serious safety issue in that the glass in the upper floors breathes quite extensively. There is a concern that panes might fall. The campus should do an intermediate fix of putting some cross rails that would prevent individuals from leaning against the glass and possibly being part of a serious accident. The consultants saw examples of such cross bracing at the University of Kentucky Robotics Building. [Subsequent to the on-site evaluation, KCTCS officials noted that rails had been installed and were there at the time of the assessment. The consultants did not see the rails on the floors assessed.] The high ceiling lobby of the Hartford Building is now being used as a study area. This appears to be a good use for that space and could benefit from some additional decorating elements. There are some issues with the wiring. JCTC has replaced aluminum wiring in most of the floor-to-floor feeds but the main feed is still aluminum and needs to be replaced. Laboratory spaces in this building generally did not seem up to

date. A major upgrade would be desirable. The campus is building a business and allied health facility that will be relatively close to the Hartford building. Following its occupancy (those programs are coming primarily from the Technical College buildings) JCTC should look at attempting a significant floor-by-floor renovation of the Hartford building. Some very low to the ground classroom chairs are used in fifth floor classrooms. These appear to be chairs that were intended not for college age students but for elementary or middle school students. There is a half circle auditorium in the basement. They cannot close the wall that was originally intended to divide it into pie-shaped pieces. The total seating area is over 180 degrees making site lines impossible. This room needs a major re-working and if it is to be continued to be used as a large classroom needs significant technology that would allow multiple screens to provide adequate viewing angles for all of the individuals.

Technology Building A – Some of this building will be vacated when Licensed Practical Nursing, Surgical Technology, Medical Billling, and Medical Assisting moves to the new building on what had been the Community College site. The Culinary Arts program also closed down creating additional unused space. This leaves the building with a lower activity sense that is far from ideal. The campus has leased out space to organizations such as YouthBuild Louisville which if that is viewed as an ongoing use should be designated as a non-institutional agency. The YouthBuild space appears to be part of the current inventory which results in space being shown with no need generated since individuals employed by YouthBuild Louisville will not be institutional employees. This could be an issue that should be checked throughout the KCTCS inventory.

Technology Campus Building B – There is a small library room which is quite nice. The Student Services area is very tight. The consultants observed a rather heated financial aid discussion with a student in the narrow hallway talker through a counter opening to a staff member who was explaining why the student had not received a check. Since significant space is being vacated it would highly desirable to rework the Student Services so they are not so cramped and that these functions can take place in a less public environment. The consultants saw a mix of new and older equipment in the technology labs. Ford Motor Company recently pulled their specialty tools with their removal of the Ford Asset Program as part of Ford's retrenchment activities. Since Louisville had always been a major Ford assembly location, this has been viewed as a significant blow. The Cosmetology lab is open to the public on Thursday nights. Access for the public is not ideal. It is confusing to find the Cosmetology area. This lab could also stand some upgrades. There were a number of other issues in the Graphic Arts area there were some new printers but the chalktalk area was on a mezzanine level that would not have access for a handicapped person. The round utility sinks in the shops are leaking and they are quite expensive to replace but need to be replaced.

The move of the Health Professions will create some opportunities for making adjustments. Parts of these buildings are overcrowded while other areas seem under utilized. The Jefferson consolidation of programs illustrates an issue happening throughout the consolidated KCTCS institutions where areas of overlap are being brought into a single location resulting in the need for enhanced facilities at that location and the vacating of facilities at the location no longer offering that service. This will have an impact on capital costs needed by KCTCS.

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
Elizabethtown Community College					
E-Town TC • 0651	88,058	40	3.1	Minor Renovation	110,309
Science Building • 0605	18,813	37	3.4	Minor Renovation	33,700
Total ASF	**106,871**	**Total ASF in Space Model:** 240,066			**144,009**
No. of Buildings Assessed: 2		***Total ASF as a Percent of Total ASF in Space Model:*** *45%*			
Average		39	3.3	***Most Recommended Action:*** *Minor Renovation*	
Hazard Community and Technical College					
Business & Office • 0772	10,912	35	2.1	Major Renovation	18,308
Hazard Ind Ed • 0771	34,203	45	1.9	Major Renovation	53,371
Jolly Clrm Ctr-East • 0700	26,240	36	2.4	Minor Renovation	41,819
Total ASF	**71,355**	**Total ASF in Space Model:** 316,686			**113,498**
No. of Buildings Assessed: 3		***Total ASF as a Percent of Total ASF in Space Model:*** *23%*			
Average		39	2.1	***Most Recommended Action:*** *Major Renovation*	
Jefferson Community and Technical College					
Hartford Building • 1002	49,151	35	1.5	Major Renovation	104,167
Jeff TC Bldg A • 1071	30,745	30	2.5	Minor Renovation	56,263
Jeff TC Bldg B • 1072	69,185	30	2.9	Minor Renovation	91,876
Total ASF	**149,081**	**Total ASF in Space Model:** 451,330			**252,306**
No. of Buildings Assessed: 3		***Total ASF as a Percent of Total ASF in Space Model:*** *33%*			
Average		32	2.3	***Most Recommended Action:*** *Minor Renovation*	
Total ASF	**327,307**	**Total ASF in Space Model:** 1,008,082			**509,813**
No. of Buildings Assessed: 8		***Total ASF as a Percent of Total ASF in Space Model:*** *32%*			
Average		**36**	**2.5**	***Most Recommended Action:*** *Minor Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

Space Needs Modeling

Introduction

The Financial Unit and Institutional Planning from CPE provided Fall 2004 facilities inventory, staff full-time equivalents, and research expenditure data for each of the institutions. The Council also provided enrollment, staffing and research expenditure projections for year 2020. This section provides an overview of the space model, the results of its application for both the base year and the projected year, and recommendations on how the model should be updated to reflect the unique qualities of Kentucky's institutions, current trends in instructional delivery methods and spaces of the future.

Paulien & Associates, Inc. was contracted in 1999 to develop a space needs model for CPE. At that time, the Kentucky Community and Technical College System had just been organized and the community colleges and technical colleges were being reorganized under one system. The technical colleges did not have a comprehensive dataset that could be analyzed with a high degree of confidence. Therefore, the consultants relied on their knowledge of community and technical colleges to inform the process. The model developed intended to reflect the unique needs of the different missions under the newly formed community and technical college system. Since then, the Council has updated and changed the model to exhibit a unified system with consolidated community and technical colleges.

The existing assignable square footage (ASF) used in the model reflects educational and general (E&G) state supported space only. It does not include hospital space, farms, and locations (remote locations and service centers) off the main campus. This is important as the student and staff full-time equivalents (FTE) include all students and staff for an institution. CPE provided a dataset of the spaces to be included in the model. It was the consultants' understanding that the non E&G spaces were removed. As the study progressed, the consultants found parking garages, leased space, farm space, and other spaces that typically should have been excluded in the model actually included at individual institutions. Where possible, the consultants excluded these spaces. Council staff was informed of these anomalies, and agreed that these adjustments should be made. In future applications of the space model, the consultants encourage the Council and the institutions to review the spaces carefully so that each institution is being measured appropriately against the model.

How does the use of technology offset space needs?

The introduction of technology in instructional settings and as a way to offset the need for additional space is a tough question to answer. In instructional settings, the use of computers and their peripheral devices can be viewed as an additional tool in the instructional process or they can be the focus of the instructional process. In either case, it demands more space to accommodate the equipment. While flat panel monitors and smaller footprint CPUs (central processing units) require less space, the space required for collaborative learning efforts and adequate sight lines makes up for the space savings.

The use of technology to decrease the amount of classroom and computer laboratory space needs is often met with the need for space to support the faculty and their training, curriculum development, web development and support, and finally, student testing. Some courses are offered as web-based learning only, while others are hybrid courses in which the student attends class one or two times a week and the other meeting is web-based. Some community and technical colleges find that while the course is an internet course, the student must come to an open lab on campus to take the course because they do not own a computer. While hybrid courses allow classrooms and computer instructional labs to be scheduled for more course sections, the campus must develop additional technical support spaces in order for this to happen. Some of the support spaces include model classrooms for training, studios for recording (including iPod casting) of the course material, work spaces for the coordination of student material, faculty computer labs for curriculum development, and additional web developers.

There are reports that suggest that the amount of faculty effort it takes to instruct a web-based or internet course is greater than the amount of effort it takes to teach the students in an instructional space. In fact, some institutions lower the number of students per section for an internet course over a course that meet in a physical space. The time it takes to develop curriculum and for faculty to train in this new environment depends upon the vision and motivation for each individual institution to move in this direction.

At residential campuses, it is not uncommon for students to sign up for internet courses and sit in their dorm rooms and take the course. For some institutions, the number of web-based courses a student takes is monitored to make sure that the student is getting the face-to-face time with instructors and the socialization time many feel is necessary for the educational experience. The more courses a student takes on-line, and the more students that are doing so, effects the campus environment as a whole.

All of these variables make it very difficult to develop a space model that shows how technology offsets the need for space. Without a set vision for each institution or each type of institution (university vs. community and technical college) and the support that the council will provide to the institutions, the space model, as revised in this analysis, does not reflect use of technology to offset space needs.

The Office of Facilities and institutional Planning from CPE provided Fall 2004 facilities inventory, staff full time equivalents, and research expenditure data for each of the institutions. The Council also provided enrollment, staffing and research expenditure projections for year 2020. This section provides an overview of the space model, the results of its application for both the base year and the projected year, and recommendations on how the model should be updated to reflect the unique qualities of Kentucky's institutions, current trends in instructional delivery methods and spaces of the future.

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The existing assignable square footage (ASF) used in the model reflects educational and general (E&G) state supported space only. It does not include hospital space, farms, and locations (remote locations and service centers) off the main campus. This is important as the student and staff full-time equivalents (FTE) include all students and staff for an institution. CPE provided a dataset of the spaces to be included in the model. It was the consultants' understanding that the non E&G spaces were removed. As the study progressed, the consultants found parking garages, leased space, farm space, and other spaces that typically should have been excluded in the model actually included at individual institutions. Where possible, the consultants excluded these spaces. Council staff was informed of these anomalies, and agreed that these adjustments should be made. In future applications of the space model, the consultants encourage the Council and the institutions to review the spaces carefully so that each institution is being measured appropriately against the model.

Summary of Findings

Changes to the Space Needs Model

Paulien & Associates was asked to review the model to make sure that it was reflective of today's instructional delivery methods, provided adequate space for facilities in the 21st Century, and promoted the level of education the State of Kentucky wanted to provide its constituents. The Council requires a tool with which to measure facilities needs at each of its institutions. After careful consideration, the consultants recommend changes to the space standards in three areas. The changes are as follows:

- *increase the classroom space factor for the comprehensive universities and the community and technical colleges:*
  - *comprehensive universities increase to 12 assignable square feet (ASF) per student full-time equivalent (FTE) from 10 ASF per student FTE*
  - *community and technical colleges increase to 15 ASF per student FTE from 10 ASF per student FTE*
- *increase the office space factor for the comprehensive universities and the community and technical colleges*
  - *comprehensive universities increase to 195 ASF per staff full- equivalent (FTE) from 170 ASF per staff FTE*
  - *community and technical colleges increase to 170 ASF per staff FTE from 150 ASF per staff FTE*
- *provide an additional 4 ASF per student FTE in support space for those institutions with a land grant mission (University of Kentucky and Kentucky State University)*

The changes in classroom space reflect the need for more space per student station required by today's instructional methods (collaborative learning), furniture styles, and sight-lines needed for the use of multi-media. Most of the comprehensive universities and community and technical colleges have not reached an economy of scale in student size to allow a variety of classroom styles and seating arrangements.

Increasing the office space factor in the comprehensive universities and community colleges is more of a reflection of the constraints in existing facilities than the need for more space per faculty and staff. Older buildings tend to have larger office sizes and without significant renovation dollars, retrofitting these spaces is very difficult.

The University of Kentucky and Kentucky State University both have land grant missions which typically require additional support space. The consultants felt that consideration needed to be given to both of these institutions due to their unique missions; therefore, an additional four ASF per student FTE was provided in support space bringing the total allocation to 12 ASF per student FTE from eight ASF per student FTE for both of these institutions.

Space Needs Model Outcomes

The Fall 2004 application of the model shows a deficit of approximately 728,000 ASF systemwide. The major space deficit is in research space (778,500 ASF) and in special use and general use space (361,000 ASF). Shortages also exist in open laboratories, physical education and recreation space, and teaching laboratories. The institutions with the most need include the University of Louisville with a 645,000 ASF space shortage, Western Kentucky University with a 285,000 ASF shortage, Bluegrass Community & Technical College with a 265,000 ASF space deficit, Jefferson Community & Technical College with a 225,000 ASF shortage, and Northern Kentucky University with a 202,000 ASF space need.

Space Needs Model

Space Category	Existing ASF	Fall 2004 Guideline ASF	Fall 2004 Surplus/ (Deficit)	Fall 2004 Percent Surplus/ (Deficit)	2020 Guideline ASF	2020 Surplus/ (Deficit)	2020 Percent Surplus/ (Deficit)
		Student FTE = 147,006			*Student FTE = 232,582*		
		Staffing FTE = 23,051			*Staffing FTE = 38,128*		
		Research Expenditures = $334,074,855			*Research Expenditures = $1,041,225,963*		
Classrooms & Service	2,089,321	1,836,599	252,722	12%	2,879,109	(828,839)	(40%)
Teaching Laboratories	2,290,520	2,400,186	(109,666)	(5%)	3,625,654	(1,371,738)	(61%)
Open Laboratories	926,457	1,125,601	(199,144)	(21%)	1,789,379	(882,334)	(97%)
Research Laboratories	1,279,609	2,057,969	(778,360)	(61%)	4,598,599	(3,330,400)	(263%)
Office Suites	4,826,247	4,376,970	449,277	9%	7,268,260	(2,475,543)	(52%)
Library	1,513,342	1,513,342	0	0%	1,509,218	0	0%
Physical Education & Recreation	958,774	1,136,112	(177,338)	(18%)	1,832,872	(874,098)	(91%)
Special Use & General Use Space	2,100,778	2,461,647	(360,869)	(17%)	3,947,373	(1,850,826)	(88%)
Support Space	1,267,565	1,072,424	195,141	15%	1,747,172	(482,184)	(38%)
TOTAL	**17,252,613**	**17,980,850**	**(728,237)**	**(4%)**	**29,197,636**	**(12,095,962)**	**(71%)**

ASF = Assignable Square Feet

Applying the 2020 projections to the model shows a 71% deficit or a need for 12.1 million ASF with significant shortages in every space category. Again, research laboratories show a 3.3 million ASF shortage followed by a 2.5 million ASF shortage in office space. The doctoral universities represent 47% of the shortage followed by the comprehensive universities at 34% and KCTCS at 18% of the total postsecondary system space shortage. Every institution except Bowling Green Technical College shows a space deficit.

Space Needs Model Summary by institution

Institution	Existing ASF	Fall 2004 Guideline ASF	Fall 2004 Surplus/ (Deficit)	Fall 2004 Percent Surplus/ (Deficit)	2020 Guideline ASF	2020 Surplus/ (Deficit)	2020 Percent Surplus/ (Deficit)
Doctoral Universities							
University of Kentucky	4,326,941	4,238,754	88,187	2%	7,556,381	(3,229,440)	(75%)
University of Louisville	2,476,144	3,120,784	(644,640)	(26%)	5,025,852	(2,549,708)	(103%)
Subtotal	*6,803,085*	*7,359,538*	*(556,453)*	*(8%)*	*12,582,234*	*(5,779,149)*	*(85%)*
Comprehensive Universities							
Eastern Kentucky University	1,634,906	1,411,177	223,729	14%	2,305,186	(670,280)	(41%)
Kentucky State University	482,227	379,125	103,102	21%	656,840	(174,613)	(36%)
Morehead State University	861,551	782,006	79,545	9%	1,196,076	(334,525)	(39%)
Murray State University	1,209,822	882,619	327,203	27%	1,440,950	(231,128)	(19%)
Northern Kentucky University	917,163	1,119,296	(202,133)	(22%)	2,067,303	(1,150,140)	(125%)
Western Kentucky University	1,272,008	1,556,789	(284,781)	(22%)	2,710,977	(1,589,908)	(142%)
Subtotal	*6,377,677*	*6,131,012*	*246,665*	*4%*	*10,377,332*	*(4,150,594)*	*(67%)*
Community & Technical Colleges							
Ashland Community and Technical College	250,594	225,617	24,977	10%	311,059	(60,465)	(24%)
Big Sandy Community and Technical College	332,669	269,508	63,161	19%	373,446	(40,777)	(12%)
Bluegrass Community and Technical College	451,201	716,548	(265,347)	(59%)	1,004,460	(553,259)	(123%)
Bowling Green Technical College	178,683	111,866	66,817	37%	156,304	22,379	13%
Elizabethtown Community College	240,066	278,833	(38,767)	(16%)	389,333	(149,267)	(62%)
Gateway Community and Technical College	143,145	123,459	19,686	14%	173,677	(30,532)	(21%)
Hazard Community and Technical College	316,686	252,367	64,319	20%	344,983	(28,297)	(9%)
Henderson Community College	97,924	106,543	(8,619)	(9%)	145,643	(47,719)	(49%)
Hopkinsville Community College	120,568	177,342	(56,774)	(47%)	244,798	(124,230)	(103%)
Jefferson Community and Technical College	451,330	677,078	(225,748)	(50%)	942,108	(490,778)	(109%)
Madisonville Community College	203,712	212,574	(8,862)	(4%)	295,466	(91,754)	(45%)
Maysville Community College	161,016	149,464	11,552	7%	208,352	(47,336)	(29%)
Owensboro Community and Technical College	212,660	259,499	(46,839)	(22%)	358,371	(145,711)	(69%)
Somerset Community College	355,698	341,717	13,981	4%	475,371	(119,673)	(34%)
Southeast Kentucky Community and Technical Colleg	261,096	253,011	8,085	3%	351,169	(90,073)	(34%)
West Kentucky Community and Technical College	294,803	334,874	(40,071)	(14%)	463,530	(168,727)	(57%)
Subtotal	*4,071,851*	*4,490,300*	*(418,449)*	*(10%)*	*6,238,070*	*(2,166,219)*	*(53%)*
TOTAL	17,252,613	17,980,850	(728,237)	(4%)	29,197,636	(12,095,962)	(71%)

ASF = Assignable Square Feet

Capital Needs

In order to determine the capital needs for the Kentucky Postsecondary Education System, the consultants converted assignable square footage (net) to gross square footage. KPES' current net to gross average is approximately 66%. With the current trend to make sure buildings have enough staff and student collaborative learning spaces outside the classroom, the consultants felt it was reasonable to lower the conversion factor from the current average. The net to gross conversion factor used for this analysis was 62%.

In order to determine the capital needed to construct the necessary facilities, the consultants reviewed the deficits by space category for each institution. For this analysis teaching laboratories and open laboratories were combined into one category – Instructional Laboratories. The space categories that showed existing deficits were converted to gross square footage (GSF) for a total GSF need. While this method for determining needs may be slightly overstated, without a detailed master plan, it is uncertain as to whether space categories that show surpluses can be converted to other uses or whether the surplus is an economy of scale issue (i.e., one would not build a partial gymnasium). The table below shows the total GSF needed by campus for both the 2004 and 2020 space model applications. The detailed tables of the conversion are attached to this report.

Space Model GSF Needs Findings

Institution	2004 Total Gross Square Feet Needed	2020 Total Gross Square Feet Needed
Doctoral Universities		
University of Kentucky	749,295	5,295,180
University of Louisville	1,063,766	4,112,434
Doctoral Universities Total	***1,813,061***	***9,407,614***
Comprehensive Universities		
Eastern Kentucky University	16,761	1,081,866
Kentucky State University	74,864	340,574
Morehead State University	22,118	553,787
Murray State University	3,147	373,278
Northern Kentucky University	332,614	1,855,064
Western Kentucky University	624,261	2,564,368
Comprehensive Universities Total	***1,073,765***	***6,768,937***
Community & Technical Colleges		
Ashland Community and Technical College	21,105	114,443
Big Sandy Community and Technical College	25,011	88,218
Bluegrass Community and Technical College	456,980	892,353
Bowling Green Technical College	14,144	24,131
Elizabethtown Community College	62,527	240,753
Gateway Community and Technical College	42,600	82,748
Hazard Community and Technical College	0	101,189
Henderson Community College	40,330	91,251
Hopkinsville Community College	92,922	200,371
Jefferson Community and Technical College	364,111	791,576
Madisonville Community College	42,391	147,990
Maysville Community College	14,442	76,348
Owensboro Community and Technical College	81,897	235,018
Somerset Community College	41,840	195,242
Southeast Kentucky Community and Technical College	11,271	145,278
West Kentucky Community and Technical College	87,419	272,141
Community & Technical Colleges Total	***1,398,990***	***3,699,050***
TOTAL	**4,285,816**	**19,875,601**

Note: Assumes a 62% net to gross ratio.

Once the gross square footage was determined it was converted to capital dollars. The construction costs were determined by space category as follows:

- *$280 per GSF for Classrooms, Offices, Physical Education & Recreation, Special Use & General Use Space, and Support Space*
- *$350 per GSF for Instructional Laboratories which include teaching and open laboratories*
- *$400 per GSF for Research Laboratories*

The table below shows the summary by institution for 2004 and 2020. All capital dollars are today's costs, thus the 2020 dollars are not adjusted for inflation. The detailed tables showing calculations by space category are attached to this report.

Space Model Capital Needs Findings

Institution	2004 Total Capital Needed	2020 Total Capital Needed
Doctoral Universities		
University of Kentucky	$274,921,100	$1,840,861,360
University of Louisville	375,280,750	1,444,510,340
Doctoral Universities Total	***$650,201,850***	***$3,285,371,700***
Comprehensive Universities		
Eastern Kentucky University	$4,693,080	$317,159,920
Kentucky State University	29,945,600	117,137,980
Morehead State University	8,106,470	166,350,540
Murray State University	881,160	109,632,110
Northern Kentucky University	98,095,230	544,590,170
Western Kentucky University	187,713,630	769,409,960
Comprehensive Universities Total	***$329,435,170***	***$2,024,280,680***
Community & Technical Colleges		
Ashland Community and Technical College	$5,909,400	$35,886,690
Big Sandy Community and Technical College	7,003,080	26,344,150
Bluegrass Community and Technical College	145,151,930	282,049,110
Bowling Green Technical College	3,960,320	6,756,680
Elizabethtown Community College	18,054,680	73,451,280
Gateway Community and Technical College	11,928,000	23,574,320
Hazard Community and Technical College	0	32,138,890
Henderson Community College	13,248,760	29,386,490
Hopkinsville Community College	31,270,050	64,768,760
Jefferson Community and Technical College	116,815,930	249,748,520
Madisonville Community College	14,109,130	47,662,090
Maysville Community College	4,043,760	22,663,970
Owensboro Community and Technical College	23,827,370	71,417,570
Somerset Community College	11,715,200	59,319,680
Southeast Kentucky Community and Technical College	3,155,880	45,058,790
West Kentucky Community and Technical College	28,218,470	86,486,680
Community & Technical Colleges Total	***$438,411,960***	***$1,156,713,670***
TOTAL	**$1,418,048,980**	**$6,466,366,050**

Existing Space Model

The existing space model is shown below. The majority of the space categories are calculated against student FTE (recommended ASF/Student FTE times Student FTE). Office space is calculated based upon staff FTE requiring office space. Research space is based upon research expenditures.

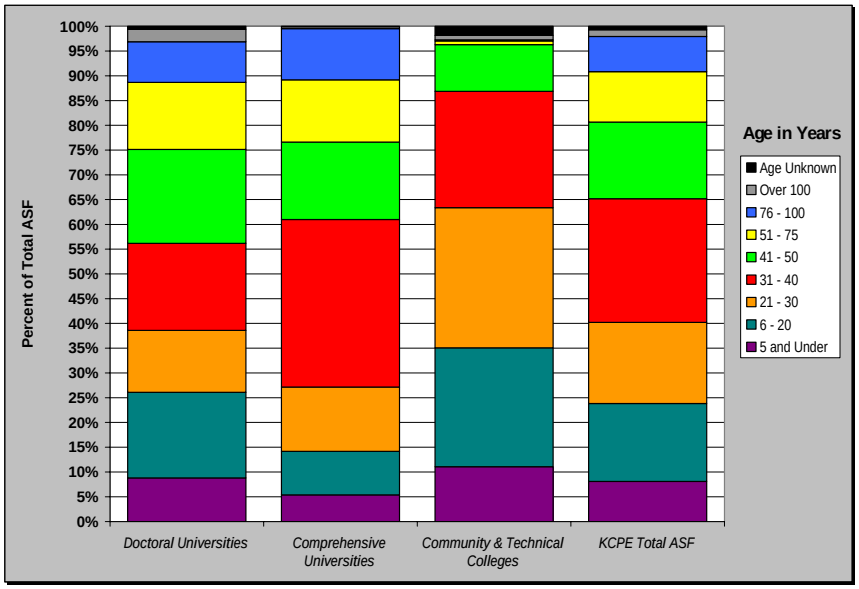
Space Modeling Factors

Space Category	Doctoral Universities	Comprehensive Universities	Community & Technical Colleges
Classrooms & Service	10 ASF/Student FTE	10 ASF/Student FTE	10 ASF/Student FTE
Teaching Laboratories	8 ASF/Student FTE	10 ASF/Student FTE	30 ASF/Student FTE
Open Laboratories	8 ASF/Student FTE	8 ASF/Student FTE	7 ASF/Student FTE
Research Laboratories	900 ASF/$100,000 for the first $50M in R&D Expenditures; 600 ASF/$100,000 for the second $50M in R&D Expenditures; 350 ASF/$100,000 over $100M in R&D Expenditures	700 ASF/$100,000 R&D Expenditures (IPEDS)	No Standard
Office	195 ASF/Staff FTE	170 ASF/Staff FTE	150 ASF/Staff FTE
Library	No Standard	No Standard	No Standard
Physical Education & Recreation	12.1 ASF for 100% Undergraduate FTE, 25% of Graduate FTE, and 15% of Staffing FTE (75,000 ASF minimum)	12.1 ASF for 100% Undergraduate FTE, 25% of Graduate FTE, and 15% of Staffing FTE (75,000 ASF minimum)	If existing space, then existing space is guideline
Special Use & General Use Space	21 ASF/Student FTE	18 ASF/Student FTE	12 ASF/Student FTE
Support Space	8 ASF/Student FTE	8 ASF/Student FTE	4 ASF/Student FTE

Existing Space Distribution

Age of Existing Facilities

Approximately 35% of all E&G Kentucky postsecondary education system space is over 40 years old. The comprehensive universities have the least proportionate amount of new space with less than five percent (5%) of its space younger than five years old. Less than 15% of its space is 20 years or less compared to the doctorial universities which have slightly more than 25% of their space 20 years or less. Both the doctoral universities and the comprehensive universities have about 25% of their space in facilities 50 years and older. Less than five percent (5%) of the community and technical college space is over 50 years old.

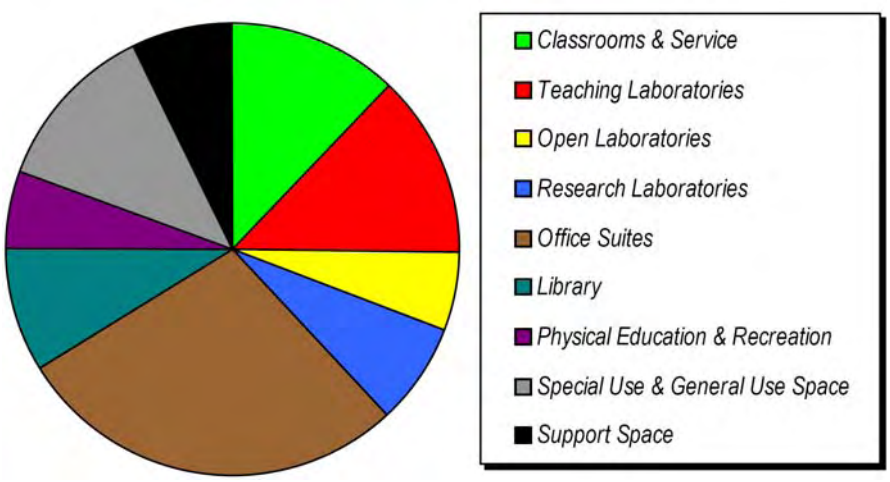


Space Distribution and Average Assignable Square Footage per Student FTE

Currently KPES has 117 ASF per student FTE (total E&G space divided by 147,006 student FTE) which is an institutional average of 108 ASF per student FTE. The range of space in each of the nine space categories widely varies depending on mission and the type of institution. Bluegrass Community & Technical College has the least amount of space at 52 ASF per student FTE and Kentucky State University has the most at 255 ASF per student FTE. The doctoral universities average 169 ASF per student FTE while the comprehensive universities average 134 ASF per student FTE. The community and technical colleges average 91 ASF per Student FTE.

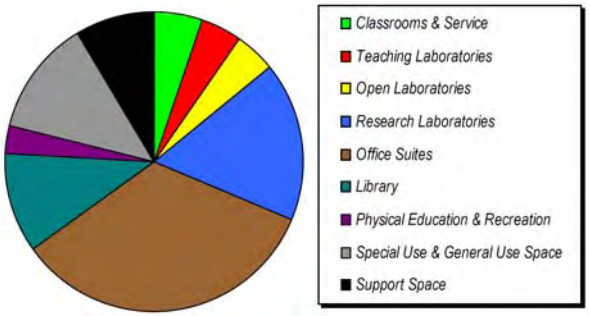
	Existing Facilities		Institution Averages	
Space Category	ASF per Student FTE	% of Total	Average ASF per Student FTE	Range of ASF
Classrooms & Service	14	12%	17	*8 - 37*
Teaching Laboratories	16	13%	26	*5 - 66*
Open Laboratories	6	5%	5	*.48 - 15*
Research Laboratories	9	7%	5	*.04 - 36*
Office Suites	33	28%	25	*13 - 63*
Library	10	9%	8	*1 - 20*
Physical Education & Recreation	7	6%	10	*.24 - 59*
Special Use & General Use Space	14	12%	12	*.41 - 32*
Support Space	9	7%	7	*2 - 23*
TOTAL	**117**	**100%**	**108**	**52 - 255**

Twenty-eight (28%) of all space is in the office category. Instructional space accounts of 30% of the total, which included classrooms, teaching laboratories and open laboratories. Special use and general use space accounts for 12% of the total. Profiles for each institution type are attached to this report.



NOTE: The percentages are found in the "Percent of Total" column in the table above.

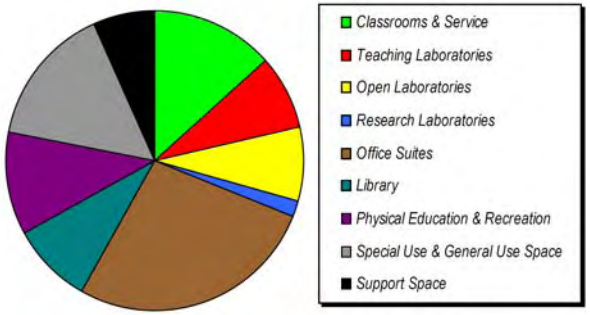
Doctoral Universities



ASF = Assignable Square Feet

Space Category	Existing Facilities: ASF per Student FTE	Existing Facilities: % of Total	Institution Averages: Average ASF per Student FTE	Institution Averages: Range of ASF
Classrooms & Service	9	5%	9	*8 - 10*
Teaching Laboratories	8	4%	7	*5 - 9*
Open Laboratories	8	4%	8	*6 - 10*
Research Laboratories	30	17%	29	*22 - 36*
Office Suites	58	34%	57	*52 - 63*
Library	19	11%	19	*18 - 20*
Physical Education & Recreation	5	3%	6	*5 - 6*
Special Use & General Use Space	22	12%	22	*21 - 22*
Support Space	15	9%	14	*4 - 23*
TOTAL	**173**	**100%**	**169**	**148 - 191**

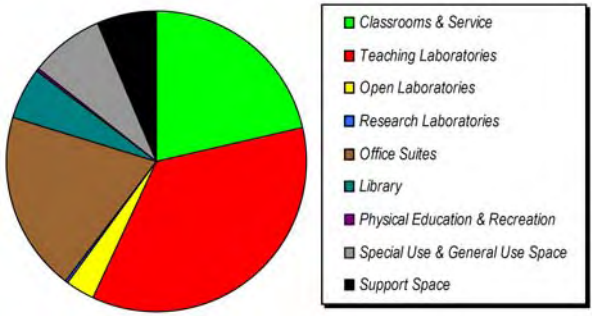
Comprehensive Universities



ASF = Assignable Square Feet

Space Category	Existing Facilities: ASF per Student FTE	Existing Facilities: % of Total	Institution Averages: Average ASF per Student FTE	Institution Averages: Range of ASF
Classrooms & Service	15	13%	16	*10 - 21*
Teaching Laboratories	9	8%	12	*6 - 25*
Open Laboratories	9	8%	9	*4 - 15*
Research Laboratories	2	1%	3	*.29 - 8*
Office Suites	31	27%	35	*23 - 61*
Library	10	9%	11	*7 - 20*
Physical Education & Recreation	13	11%	20	*4 - 59*
Special Use & General Use Space	16	15%	19	*7 - 32*
Support Space	7	7%	10	*3 - 18*
TOTAL	**112**	**100%**	**134**	**83 - 255**

Community & Technical Colleges



ASF = Assignable Square Feet

Space Category	Existing Facilities: ASF per Student FTE	Existing Facilities: % of Total	Institution Averages: Average ASF per Student FTE	Institution Averages: Range of ASF
Classrooms & Service	17	21%	19	*9 - 37*
Teaching Laboratories	29	36%	33	*13 - 66*
Open Laboratories	2	3%	3	*.48 - 8*
Research Laboratories	0	0%	1	*.04 - 2*
Office Suites	16	19%	17	*13 - 26*
Library	5	6%	5	*1 - 10*
Physical Education & Recreation	0	0%	1	*.24 - 3*
Special Use & General Use Space	6	8%	8	*.41 - 25*
Support Space	5	7%	6	*2 - 19*
TOTAL	**81**	**100%**	**91**	**52 - 143**

Space Comparison by Institution Type

On the previous page is the space distribution by institution type. One of the most noticeable differences among the institution types is the amount of instructional laboratory space (teaching laboratories and open laboratories). At the doctoral universities these space types are about eight percent (8%) of the total space whereas at the community and technical colleges it is about 39% of the space total. The comprehensive universities have about 16% of their space in instructional laboratories. At the doctoral universities research space accounts for about 17% of its space were as at the comprehensive universities it is about one percent (1%).

Space Needs Model

The report content below contains updated information from the 1999 study conducted by Paulien & Associates, Inc.

Classroom Space (100's)

Kentucky postsecondary education system officials provided the consultants with Fall 2005 utilization statistics. The utilization of Kentucky postsecondary education system classrooms is less than the proposed utilization targets from the 1999 study of 36 hours per week at 67% student station occupancy. The current utilization rates for the four-year institutions are 23.5 hours per week at 66% student station occupancy. While the student station occupancy is close to the targets the average hours per week are lower than one would expect to see which may suggest that the average weekly room hours may be set too high or that rooms are being identified as classrooms that should be counted in other space categories.

It should be noted that there has been a significant change in the way classrooms are utilized (see the article, 'The Changing College Classroom,' by Daniel K. Paulien, Facilities Manager, November 1998, APPA: The Higher Education Facilities Association, Alexandria, VA). As campuses have been teaching more and more adult students, there has been a desire to get away from the awkward tablet armchairs and into a more comfortable seating method. As more instructors want to involve students in collaborative learning activities, often asking two or more students to work together on class projects, the need for more space per person has been apparent. In addition, the use of technology adds space in selected situations in assuring appropriate sight lines and additional space for computers where those are involved. The Americans With Disabilities Act has resulted in additional space in some instances, to assure access for the disabled.

After analyzing the utilization factors and the existing space per FTE, the consultants recommend the following changes to the space needs model for classroom space:

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation (ASF per Student FTE)*
Doctoral Universities	364,648	9	8 – 10	9	10 ASF, No Change
Comprehensive Universities	849,439	15	10–21	16	12 ASF
Community & Technical Colleges	875,234	17	9 – 37	19	15 ASF

Laboratory Space (200's)

Teaching Laboratory Space (210's)

The amount of space in this category varies greatly depending on the program mix. As background, here is what some other states have done in their space models. Utah used a factor of 10 ASF per FTE for teaching labs, with an additional 8 ASF per FTE for those institutions with vocational/technical programs. The Texas Coordinating Board uses a core allocation of 8 ASF per FTE (plus, it is reasonable to allocate two gsf per FTE of the service space they provide, resulting in 10 ASF per FTE). They provide additional space for 4-year institutions based on specific degree programs, so that university programs in agriculture, sciences, visual and performing arts would get additional space, either 15 or 30 square feet per FTE

depending on the specific program. The Texas Coordinating Board goes further for the technical colleges. There are factors as high as an additional 75 ASF per FTE for the heavy technology programs including auto machinery, construction, fire, and cosmetology, with smaller amounts for other programs, for example 45 ASF per FTE for vocational nursing, allied health, and printing and graphics.

While it would be ideal to create a model more sensitive to program offerings, this approach is more complex and requires more detailed base data. The consultants recommended that Kentucky postsecondary education system consider this type of approach in the future. After reviewing the existing the Fall 2005 utilization rates provided by the Council, the consultants do not recommend any changes in this category.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation (ASF per Student FTE)*
Doctoral Universities	298,502	8	5 – 9	7	8 ASF, No Change
Comprehensive Universities	532,047	9	6 – 25	12	10 ASF, No Change
Community & Technical Colleges	1,459,971	29	13–66	33	30 ASF, No Change

Open Laboratories (220's)

Open Laboratories are irregularly scheduled or unscheduled. This includes labs that are used exclusively for one semester, open access labs, and self-paced labs. It includes labs that have a limited amount of regularly scheduled courses held in it and are used as open labs the rest of the time. A good example of this would be a skills lab for a nursing program. In other labs, students may work on a self-paced basis. They may schedule themselves in at specific hours of each day, but a class does not meet in a formal setting with a given start time and stop time. Some labs could be in this category because they are dedicated to a particular course which may have a specific meeting time, but students also come into the lab at other hours and utilize the lab in a way that prevents it being used by other courses.

Other states that have used this method have allocated seven or eight square feet per full-time equivalent student. Utah allocated seven ASF. Texas technically allocates six ASF, but a reasonable interpretation of its service space category would provide two ASF for the open labs, for a total of eight ASF per FTE. In other modeling studies conducted by the consultants, a low of five (5) ASF per student FTE and as much as eight (8) ASF per student FTE have been implemented. The consultants do not recommend any changes to the model in this category.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation (ASF per Student FTE)*
Doctoral Universities	287,811	8	6 – 10	8	8 ASF, No Change
Comprehensive Universities	505,536	9	4 – 15	9	8 ASF, No Change
Community & Technical Colleges	123,110	2	.48 – 8	3	7 ASF, No Change

Research Laboratories (250's)

The space coded as research/non-class lab space, which used to have the federal coding title Non-Class Lab space, includes small amounts of space at community colleges and at technical colleges. After Paulien & Associates created the space needs model in 1999, the Kentucky postsecondary education system wanted a more extensive review of the research laboratory guideline. While there was no change in the guideline for the comprehensive universities, the modeling factor for the doctoral universities was modified to reflect a sliding scale based upon the total amount of research expenditures. At this time the consultants have no further changes to this modeling factor.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Research Expenditures*	*Range of ASF per $100,000*	*institution Average ASF per $100,000*	*Space Model Recommendation (ASF per $100,000 in Research Expenditures*
Doctoral Universities	1,174,040	$311,592,010	360 - 385	372	900 ASF/$100,000 for first $50M in R&D Expenditures, 600 ASF/$100,000 for second $50M up to $100M, and 350 ASF/$100,000 over $100M, No Change
Comprehensive Universities	95,552	$22,482,845	162 – 1,239	603	700 ASF/$100,000, No Change
Community & Technical Colleges	10,017	n/a	n/a	n/a	This space should be added to the Open Laboratory category

Office Space (300's)

Office space usually consists of at least three types of space: offices and workstations; conference rooms; and office service space. Office service space includes work rooms, supply rooms, reception areas, and other rooms usually found in an office suite. The most appropriate way to evaluate office space needs is on a space per FTE employee basis for employees who require offices.

In looking at how other states approach this category, those that do space on a square foot per full-time equivalent employee basis include New Jersey which provides 160 ASF per FTE, and Utah which provides 195 ASF per FTE for the research universities, 170 ASF per FTE for the state universities and for rural community colleges (true junior colleges), and 150 ASF per FTE for urban community colleges (comprehensive, including vocational/technical two-year programs). The Texas Coordinating Board uses 190 ASF per FTE for faculty and 170 ASF per FTE for non-faculty individuals.

The existing amount of space per staff FTE is high at the comprehensive universities (227 ASF per staff FTE) and community and technical colleges (168 ASF per staff FTE). Based on observation from the Educational Adequacy and Fit for Continued Use study, the consultants felt that this high square footage is because of older buildings that were built with larger offices. Keeping the space factor low results in a false "surplus of space" finding. To determine the real need for office space for this level of analysis, the consultants felt that increasing the modeling factor to 195 ASF for the comprehensive universities and 170 ASF for the community and technical colleges would provide the Kentucky postsecondary education system with a better take on the need for office space at its institutions.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Staff FTE*	*Range of ASF*	*institution Average ASF per Staff FTE*	*Space Model Recommendation (ASF per Staff FTE)*
Doctoral Universities	2,286,588	215	179 – 245	212	195 ASF, No Change
Comprehensive Universities	1,747,624	227	198 – 324	235	195 ASF
Community & Technical Colleges	792,035	168	105 – 250	171	170 ASF

Library Space (400's)

Library space is included in the model. It was determined not to apply a traditional library space needs guideline in Kentucky because, with the development of the Kentucky Virtual Library, it is assumed that the need for additional library space will have been substantially met. Administrators of the Kentucky Virtual Library note that the Virtual Library may in some cases increase the need for reader station space. For the Kentucky space needs model, the recommendation is that existing library space be utilized as the guideline in the model and that any additional needs for library would have to be separately and specifically justified by the institution. No changes are recommended in this space category.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation*
Doctoral Universities	730,193	19	18–20	19	Existing Space carried Forward
Comprehensive Universities	554,742	10	7 – 20	11	Existing Space carried Forward
Community & Technical Colleges	228,407	5	1 – 10	5	Existing Space carried Forward

Physical Education and Recreation Space (520's)

A decision was made early in the planning process to exclude athletics from this category. The consultants have found that the most reliable physical education/recreation model is one developed at the University of Illinois in the 1960s by Harlan Bareither and Jerry Schillinger, and published in their book University Space Planning. This model said that for all active physical education users, a total of 12.1 square feet should be provided for both activity space and support space such as locker rooms. They proposed that this model amount be applied to all undergraduates, to 25% of the graduate students, and to 15% of the employees at the institution.

A 75,000 ASF minimum was utilized for the doctoral universities and the comprehensive universities. The minimum was the amount utilized at Kentucky State University and Morehead State University. All others generated more than the minimum.

Less than half the community and technical colleges showed space in this category, and in most places it was just one or two rooms all under 2,500 ASF, with the exception of West Kentucky Community and Technical College which has a full gymnasium. All existing space was carried forward. If any community and technical college proposes additional space in this category, they will need to justify it specifically.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation (ASF per User FTE)*
Doctoral Universities	214,143	5	5 – 6	6	12.1 ASF for 100% Undergraduate Student FTE, 25% of Graduate FTE, and 15% of Staffing FTE (75,000 ASF minimum), No Change
Comprehensive Universities	725,381	13	4 – 59	20	12.1 ASF for 100% Undergraduate Student FTE, 25% of Graduate FTE, and 15% of Staffing FTE (75,000 ASF minimum), No Change
Community & Technical Colleges	19,250	0	.24 – 3	1	No Standard, No Change

Special Use (500's) and General Use (600's) Facilities

This space grouping includes a wide variety of space. It includes the following room use codes:

SPECIAL USE FACILITIES
510 Armory
530 Media Production
540 Clinic
550 Demonstration
560 Field Building
570 Animal Quarters
580 Greenhouse
590 General Purpose

GENERAL USE FACILITIES
610 Assembly
620 Exhibition
630 Food Facilities
640 Day Care
650 Lounges
660 Merchandising
670 Recreation Space
680 Meeting Rooms (not auxiliary funded)

The consultants have found that the results in this category vary widely from campus to campus, and from space type to space type when these are compared across state lines. Therefore, the recommendations for these types of facilities are based primarily on analysis of the existing amounts of space for the Kentucky institutions. There are no changes to the space factor in this category.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation (ASF per Student FTE)*
Doctoral Universities	848,268	22	21–22	22	21 ASF, No Change
Comprehensive Universities	940,390	16	7 – 32	19	18 ASF, No Change
Community & Technical Colleges	251,707	6	.41–25	8	12 ASF, No Change

Support Space (700's)

This category consists of central computer and telecommunications facilities, central storage facilities, indoor vehicle storage, central services, and hazardous materials facilities. This space is often looked at as a percentage of other campus space, so that as the campus space inventory increases, the need for support space would also increase. The need for such space can vary depending on whether there are power plants on the campus or whether utility services are purchased from public utilities. Indoor vehicle storage has been removed from the analysis. The amounts of space tend to be greater at more complex institutions. The amounts of space in this category for the Kentucky types of institutions are as follows.

While the base space factor has not changed for any institution type, the consultants felt it necessary to include a factor for those institutions with land grant missions – University of Kentucky and Kentucky State University. Institutions with land grant missions tend to have more support space than at other institutions. It is recommended that an additional 4 ASF per student FTE be added for UK and KSU.

FINDING:

institution Type	*Assignable Square Feet (ASF)*	*Existing ASF per Student FTE*	*Range of ASF*	*institution Average ASF per Student FTE*	*Space Model Recommendation (ASF per Student FTE)*
Doctoral Universities	588,892	15	4 – 23	14	8 ASF per Student FTE plus 4 ASF per Student FTE if land grant mission
Comprehensive Universities	426,966	7	3 – 18	10	8 ASF per Student FTE plus 4 ASF per Student FTE if land grant mission
Community & Technical Colleges	251,707	5	2 – 19	6	4 ASF, No Change

Section 6:
15 Year Capital Plan

Table 6.1: KPES 15-year Actual Capital Needs

Data supports Figures 6.2 through 6.4. Note: In 2007 dollars, Inflation factor set to 0%.

Funding Year	Condition Needs	Space - Adequacy	Space - Current Capacity	Space - Future Capacity	Total Funding
2007	$ 2,188,960,199	$ 862,168,000	$ 1,418,049,000	$ -	$ 4,545,400,000
2008	143,995,120	-	-	-	151,962,000
2009	142,432,341	-	-	-	127,866,000
2010	254,622,254	-	-	-	253,754,000
2011	760,614,601	-	-	-	728,347,000
2012	265,002,324	-	-	412,108,000	675,900,000
2013	90,045,332	-	-	432,714,000	533,223,000
2014	139,648,626	-	-	453,318,000	578,132,000
2015	118,017,105	-	-	473,924,000	588,890,000
2016	421,807,305	-	-	494,527,000	935,573,000
2017	104,667,635	-	-	515,134,000	616,868,000
2018	101,752,433	-	-	535,739,000	644,175,000
2019	132,990,754	-	-	556,345,000	684,250,000
2020	135,560,264	-	-	576,952,000	711,154,000
2021	335,448,868	-	-	597,556,000	944,674,000
Total	$ 5,335,561,649	$ 862,168,000	$ 1,418,049,000	$ 5,048,317,000	$ 12,720,168,000

ENDING FCI = 0%

The 15-year Capital Plan presented in this section incorporates all three portions of the study – condition, space adequacy & space capacity. Condition and space funding needs are presented separately first, and then aggregated together to show the total funding needed for the university facilities included in the study. In addition, two views of the spending pattern are shown:

- **Actual** – with spending assumed to vary to meet the annual dollar amount predicted by the forecasts each year;
- **Strategic** – with spending aligned to meet strategic goals recommended by the consultants for each five year period of the 15-year plan. The strategic goals and timeframes can be adjusted to match priorities set by the Council and the institutions.

Actual Needs

The "actual needs" summarized here depict the amount of capital investment estimated to be needed in each of the next fifteen years based on the consultant team's professional opinion of when each need would come due. The needs are broken out by three reasons that investment might be required: (a) to address system renewals that are driven by poor physical condition (orange for first year, red in later years), (b) to address space adequacy issues preventing a facility from being utilized in its highest and best use by current educational standards (green), and (c) to grow space capacity to meet current (light blue) and future (dark blue) enrollment projections.

Based on condition alone, the Lifecycle Condition Assessments across all nine Kentucky institutions identified $2.19 billion in deferred capital renewals due in or before 2007, and $3.49 billion by 2011, creating a starting FCI of 42% (next 5-year renewal needs / current replacement value).

Spending that amount would reduce the FCI to zero and bring all assessed facilities into excellent condition. Maintaining an FCI level = 0% forecasts needing an additional $1.84 billion in capital renewals over the following 10 years, for a 15-year total capital renewal need of $5.34 billion. (Note: All in 2007 dollars; Inflation factor = 0%.)

If KPES funded the capital renewals in the exact years each renewal is forecast to be due, the investment pattern would look like Figure 6.2.

In addition, the Space Study identified $862 million needed to make selected buidlings fit-for-continued-use, plus $1.42 billion needed for E&G buildings to meet current enrollment capacity, and another $5.05 billion needed for E&G buildings to meet the 2020 enrollment projections. Figure 6.3 shows capital investments based on space needs, including investment in future capacity starting in the second 5-year period, and growing modestly over the following 10 years until all space capacity needs are met by 2021.

KPES and each institution will likely invest in facilities for all three reasons (condition, adequacy and capacity), and when aggregated together (yellow column in Figure 6.1), the condition + space needs of KPES' portfolio look like the spend pattern shown in Figure 6.4, totalling $12.7 billion (in 2007 dollars, inflation = 0%).

Figure 6.2: Kentucky Postsecondary Education System
15 Year Facilities Capital Plan
Actual Condition Renewal Costs for Assessed Facilities

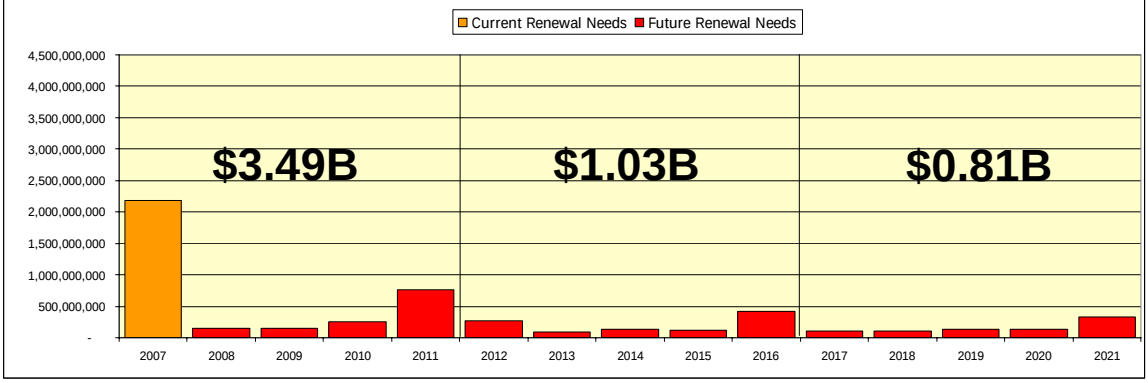


Figure 6.3: Kentucky Postsecondary Education System
15 Year Facilities Capital Plan
Actual Space Adequacy + Space Capacity Needs

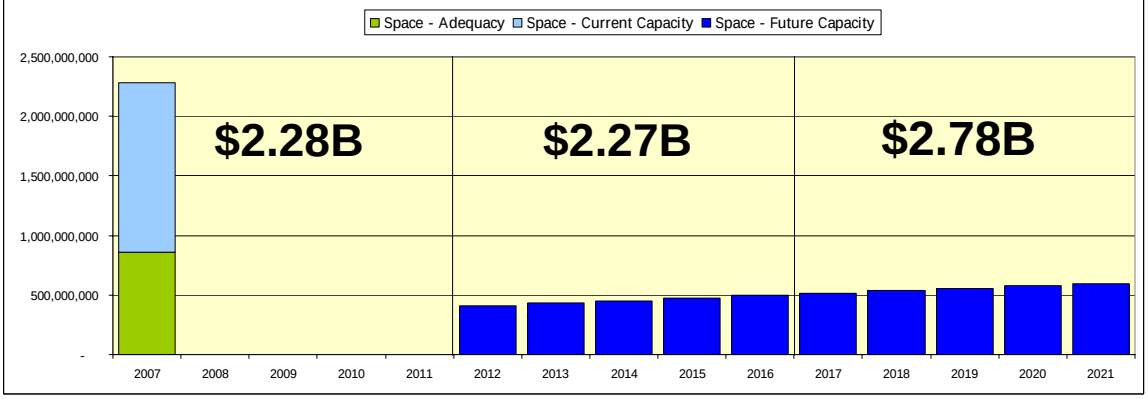
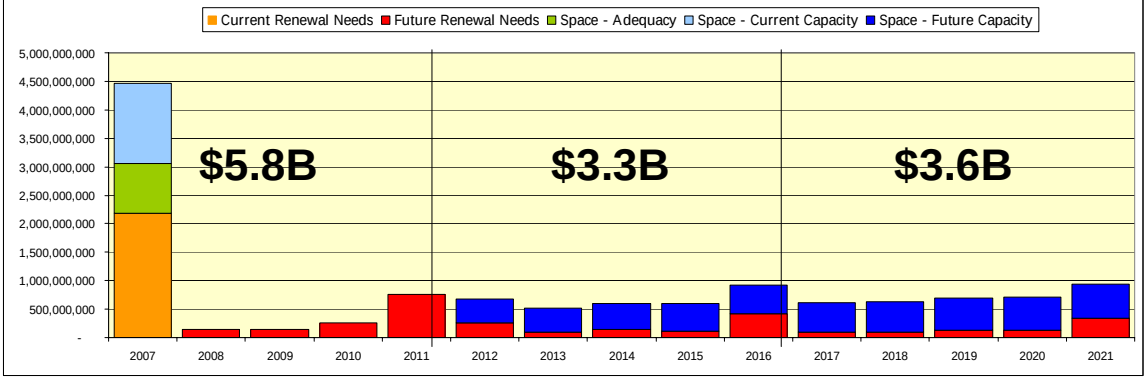


Figure 6.4: Kentucky Postsecondary Education System
15 Year Facilities Capital Plan
Blended Condition Renewal + Space Adequacy + Space Capacity Costs



Funding to Meet Strategic Goals

The consultants' team believes the spending pattern depicted in Figure 6.4 to be difficult to achieve – it is unlikely KPES and the institutions could mobilize the financial, facility planning and project management resources necessary to make such a high level of investment in year 1 of a 15 year plan.

Table 6.5: 15-year Strategic Capital Investments

Data supports Figures 6.6 through 6.8. Note: In 2007 dollars, Inflation factor set to 0%.

Funding Year	Condition Needs	Space - Adequacy	Space - Current Capacity	Space - Future Capacity	Total Funding
2007	$ 504,096,000	$ 172,434,000	$ -	$ -	$ 676,530,000
2008	190,049,000	172,434,000	329,778,000	-	692,261,000
2009	189,293,000	172,434,000	346,266,000	-	707,993,000
2010	188,539,000	172,434,000	362,758,000	-	723,731,000
2011	187,783,000	172,434,000	379,246,000	-	739,463,000
2012	343,086,000	-	-	412,108,000	755,194,000
2013	338,216,000	-	-	432,714,000	770,930,000
2014	333,342,000	-	-	453,318,000	786,660,000
2015	328,470,000	-	-	473,924,000	802,394,000
2016	323,599,000	-	-	494,527,000	818,126,000
2017	318,727,000	-	-	515,134,000	833,861,000
2018	313,854,000	-	-	535,739,000	849,593,000
2019	308,982,000	-	-	556,345,000	865,327,000
2020	304,109,000	-	-	576,952,000	881,061,000
2021	299,239,000	-	-	597,556,000	896,795,000
	$ 4,471,384,000	$ 862,170,000	$ 1,418,048,000	$ 5,048,317,000	$ 11,799,919,000

ENDING 1-Year FCI = 10%

Further, while the 2007 backlog of deferred capital renewals, space adequacy and space capacity needs are real today, the dates for future renewals and capacity investments are only forecasts – the exact year each is required can be adjusted if aligned with careful maintenance practices and space use assignments. Thus, spreading the investment out is a reasonable, and practical, goal.

To best manage the capital investment, KPES should establish some high level programmatic goals for capital investments. The goals should represent a 'blended' approach to address all three causes for facilities investments: condition, adequacy and capacity. The consultants propose the following strategic capital funding goals:

1. **Fit-for-Use in 5 Years:**
   Bring all facilities up to Fit-for-Continued-Use standards within the first 5 years. (Table 6.5, green column, with spending averaged over 5 years.)

2. **All "Good" Condition within 10 Years:**
   Reduce the backlog of deferred capital renewals to 10% (all buildings in "good" condition) over the first 10 years, and maintain a 10% FCI thereafter. (Table 6.5 red column. Note this is less than "Actual Needs" shown in Table 6.1 because the investment is spread out over more years (rather than invest immediately when predicted the need with come due), and maintaining 10% FCI is a reasonable goal. (Maintaining 0% FCI is not reasonable.)

3. **Invest Regularly to Build Capacity:**
   Invest regularly to build space capacity, addressing current capacity needs over first 5 years (light blue) then, starting in year 6 (dark blue) growing with enrollment through year 15.

Table 6.8 summarizes the investment pattern required to meet the proposed strategic goals. (Note that the total spent for Condition is less than in Table 6.4, because Goal 2 allows for carrying forward 10% of the current replacement value in renewals.)

To meet the proposed strategic goals, the System's 15-year capital investment would be $11.8 billion (in 2007 dollars, inflation = 0%).

Establishing funding needs that align with priorities this way will enable KPES to better access various funding sources, which are frequently targetted at specific intiatives or available at more favorable terms when pooled with similarly grouped needs from multiple Kentucky public postsecondary education institutions. Section 7 includes a more detailed discussion of funding sources potentially available to KPES and the institutions.

Figure 6.6: Kentucky Postsecondary Education System
15 Year Facilities Capital Plan
Strategic Investment in Condition Renewal Costs

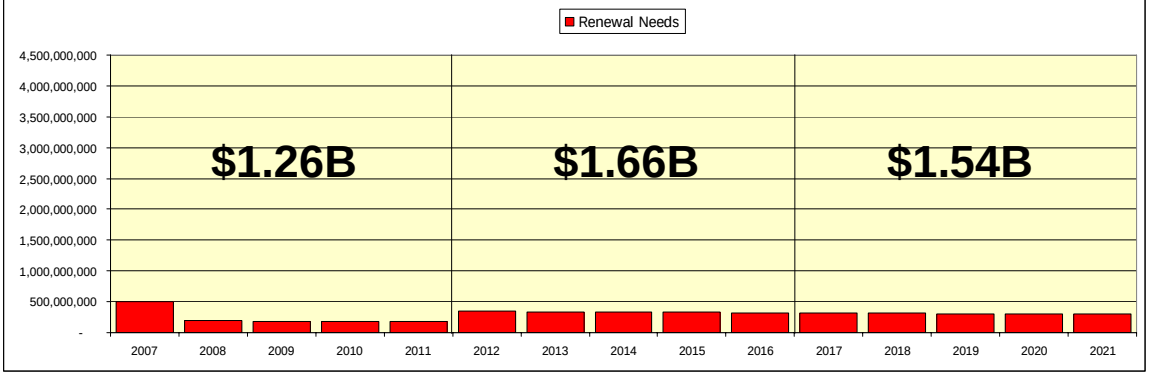


Figure 6.7: Kentucky Postsecondary Education System
15 Year Facilities Capital Plan
Strategic Investment in Space Adequacy + Space Capacity Needs

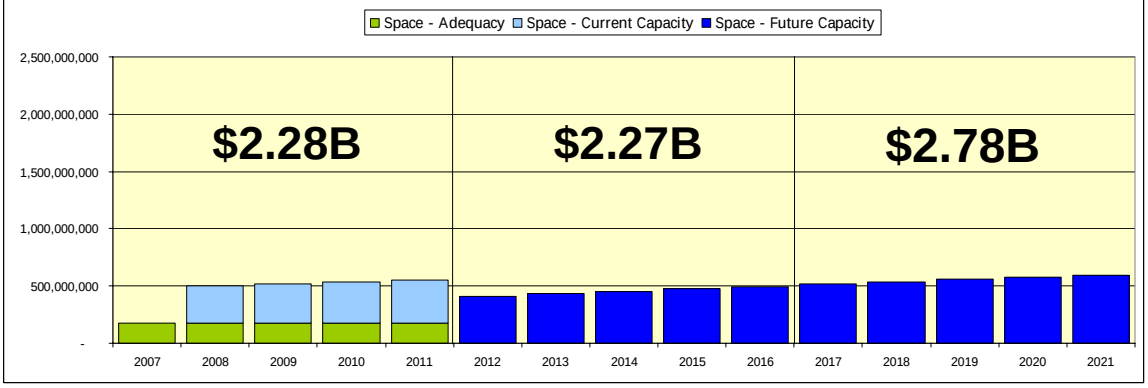
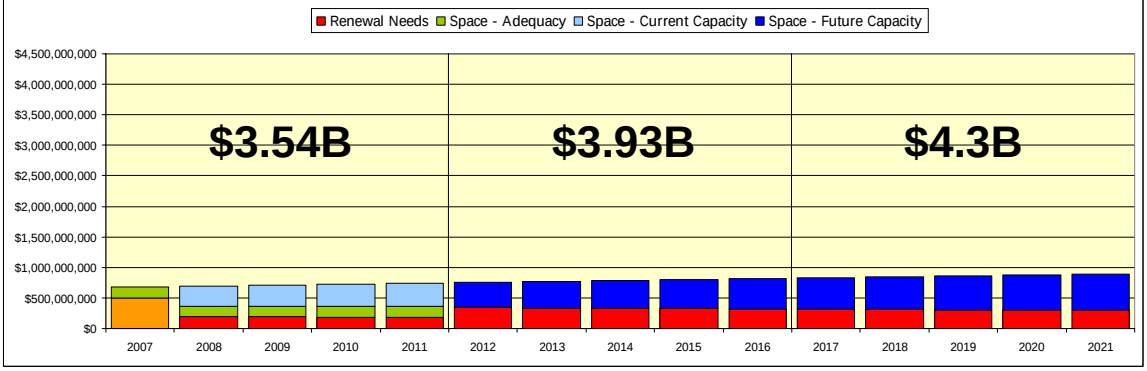


Figure 6.8: Kentucky Postsecondary Education System
15 Year Facilities Capital Plan
Strategic Investment in Condition Renewal + Space Adequacy + Space Capacity



Section 7:
Financing of Physical Facilities

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INTRODUCTION

Physical plant represents the primary asset of most institutions of higher education. Many facilities were built in response to the enrollment growth of the baby-boom generation. These buildings are now of an age where they need either replacement or considerable renovation if they are to meet current needs. In addition, programmatic additions and mission changes (such as increased emphasis on research) create needs for additional facilities even under conditions of enrollment stability. These factors, and likely others, create ongoing requirements for financial resources that can be devoted to either replacement, renewal, or expansion of an institution's stock of physical assets.

This need for resources comes at a time when state governments, the primary source of capital funding for public institutions, are under considerable pressure to reduce tax burdens and/or to fund competing programs. This requires institutions to look further afield for sources of funds for capital projects. This brief white paper explores the array of alternatives and some of the financing mechanisms that are commonly employed. The paper employs a simple conceptual schema with three components:

- Potential Sources of Revenue
- Uses of Revenues
- Financing Mechanisms

The schema is shown diagrammatically in Table 7.1.

This schema reflects the realities that:

- Institutions have multiple sources that can be tapped for capital projects.
- Different sources are often aligned with different uses (the specifics in this regard will be explored later in the paper).
- There are different kinds of uses (renewal vs. new, auxiliary facilities versus general academics). Different finance mechanisms are often used with the financing of these different kinds of facilities.

Each of these dimensions will be explored in more detail in subsequent sections of this paper.

TABLE 7.1
The Dimensions of Financing Alternatives

USES	SOURCES					
	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation New Construction • Auxiliaries • General Academic • Research	MECHANISMS					

THE ALTERNATIVE SOURCES OF FINANCING AND THE ASSOCIATED MECHANISMS

Colleges and universities obtain financing for facilities from a variety of sources. Chief among them are the following:

A. Students

Students have traditionally been a source of funding for certain college and university facilities, particularly those where there is a direct relationship between a funding stream and a provided service. The classic example is funding for dormitories and dining halls. In this case, room and board charges are almost always established in a way that allows the institution to repay bonds issued to pay for construction and/or to accumulate a reserve fund sufficient to pay the necessary costs of renewal and renovation.

Closely related are fees levied on all students for purposes of paying for construction of facilities. Typically such fees are used to pay for construction and renewal of facilities such as student unions and student recreation buildings. It is rare that such fees are collected for the purpose of constructing new academic buildings (and never research facilities). While the practice of using student fees to construct academic space is still not common, it is a practice that is gaining adherents. There are recent examples in which students have voted increases in fees in order to pay for badly needed campus instructional space. In the few instances to date in which students have paid for academic facilities at public institutions, the situations were unique, typically ones in which state funds were not available for a critically needed building. Student funding of a new Law School facility at the University of Colorado—needed to meet accreditation requirements at a time of state revenue declines—is a good illustration. This very nascent movement represents further recognition that students—not the state—are the dependable source of institutional revenues. This is explicitly the case regarding operating funds in the several states in which tuition revenues exceed state appropriations. With this precedent in place, there is no reason to believe that the practice will not evolve on the capital side as well.

It should be noted that funds obtained from students are acquired in ways (and at a rate) that make their use consistent with repayment of bonded indebtedness rather than up-front payment for construction or renovation.

B. State Governments

States have historically been—and continue to be—the primary provider of funds for the construction (and reconstruction) of academic buildings on college campuses. While institutions are always seeking to diversify sources of funds for capital projects, very few public institutions get to the point where states become the junior partner in such ventures. This situation is unlikely to change. Buildings are very tangible; legislators know quite precisely what they are getting when they appropriate funds for campus construction. Capital appropriations have at least two other attractive features:

1. They create (construction) jobs for blue-collar workers and thus spread the benefits across a wider swath of the citizenry.

2. They do not obligate the legislature to ongoing payments in the same way as do increases in appropriations for operating purposes. This feature explains why it is often easier to get funds for capital (one-time) expenditures than for increases in the operating budget.

The mechanisms used by states to provide funds for capital constructions vary over a relatively narrow range. On one side are states that adhere to a pay-as-you-go philosophy and appropriate funds in a lump sum to pay for construction (although the payment may be split with payment for planning being covered in one year's appropriation and actual construction in another). Other states are more prone to issue bonds to pay for campus capital projects. Some states (North Carolina, New Jersey) issue general obligation bonds that are backed by the full faith and credit of the state; the states, not the institutions, are responsible for repaying the debt. In other states, legislatures establish ground rules (and sometimes devices for pooling borrowing in the search for better rates) that let institutions borrow up to some predetermined limit. In such cases, institutions often must pledge tuition as collateral for the debt. While the state is not directly responsible for the debt,

there is recognition that, in case of institutional default, the obligation will likely end up on the legislative doorstep. With this in mind, the state's authorization to issue debt instruments is typically coupled with inclusion of repayment amounts in the operating budgets requested by, and appropriated to, the institutions.

C. Local Governments

In the main, only community colleges that have their own taxing authority have been in a position to acquire and use local tax revenues to pay for capital construction projects. The norm is a situation in which the state establishes an upper limit on the tax rate (almost always a real property mill levy) that can be imposed without a referendum approving an override. Given the nature of the revenue stream, these tax revenues are most frequently used to repay debt rather than being accumulated and utilized in a pay-as-you-go manner.

Recently, there has been a break in the tradition of local tax revenues being confined to use by community colleges having their own taxing authority. The City of Phoenix has successfully passed a tax referendum that will provide local tax support for the construction of a downtown campus for Arizona State University. As local governments increasingly recognize the value of institutions of higher education as "anchor tenants" in their downtown redevelopment efforts, there will likely be opportunities for such arrangements in other urban areas.

D. The Federal Government

In the 1960s, the federal government—through the Higher Education Facilities Act—was a major funder of academic facilities on college campuses. Those days are long since past. Now federal funds for capital projects are limited to facilities that are:

1. In direct support of a federal priority. This translates almost completely into support for the construction of special-purpose research facilities that will house activities of a very select nature (for example, research into different issues related to bio-terrorism).

2. Constructed as a result of Congressional earmarking. These appropriations can cover any type of facilities and are dependent solely on relationships with a Member in a position to "bring home the bacon" to an institution in his/her state or district. Since the level and nature of earmarking is causing considerable consternation in some quarters, this may be a funding mechanism that has reached its high-water mark.

E. Private Donors

For some public institutions—specifically those with large (and affluent) alumni bases and effective fund-raising offices—private donors have been, and will continue to be, important sources of financing for capital projects. Such support is typically found at major research universities; comprehensive universities and community colleges are much less likely to obtain major funding from such sources. Very few public institutions have an alumni base—and a history of success in tapping that alumni base for academic building support—to make this source a reliable one for most institutions. It takes a rare combination of a rich alum and common ground between donor and institutional need to bring such funding to fruition. Even when such funds are provided, they are much more likely to be focused on facilities normally not priorities of the state. Most donors would consider general academic buildings at public institutions to be a state responsibility.

Donors with the ability to provide substantial amounts of funds for capital projects will typically provide:

1. All the funding for a building, or

2. Funds that match those from another (type of) contributor—usually the state or federal government.

In almost all cases, they are interested in having naming rights for the building—they want either themselves or someone of their choosing to have their names inscribed in stone on the campus. This particular interest on the part of donors means that money from this source is rarely available for renewal and renovation projects; naming rights for existing buildings have long since been granted.

Accepting funds from private donors can create problems as well as benefits. It is not unheard of for donors to provide funds for a building that is

not a campus priority—or may not even be on the institution's radar screen. Institutions are hard-pressed to say "no" in such circumstances, but saying "yes" may cause friction within the institution and with the state over issues of funding the maintenance and operations of the building and the programs it is designed to house. Further, the gift may be for a priority project but come with complicating strings attached. A major gift for construction of a sports facility at the University of North Dakota came with the stipulation that the "Fighting Sioux" label on the sports teams be retained, a requirement that has put the University in a difficult position vis-à-vis the NCAA.

F. Institution's Own Funds

There are circumstances in which institutions can, and do, use undesignated general fund revenues to renovate or acquire academic buildings. This is particularly the case regarding renovation projects that are required but unfunded by other sources, specifically state governments. However, there are also instances in which campuses acquire new academic buildings using their own resources. Two instruments are favored under such circumstances:

1. Bonded indebtedness in which the "full faith and credit" of the institution lies behind the securities. This is little different from state bonds that must be repaid by institutions with the exception that there is less tacit understanding that state appropriations are made with repayment in mind. Another variation on this theme is the circumstance in which universities designate indirect cost reimbursement funds to pay off indebtedness on research facilities. Even in situations where this arrangement is utilized, special permissions may be requested from the state—or such arrangements may be included in the broader financing plan for major construction projects. This was the case for the financing of the new Health Science complex at the University of Colorado.

2. Lease-purchase arrangements in which the institution enters into a long-term lease arrangement with an owner with a provision that title transfers to the institution at some specified point in the future. This mechanism is easier to arrange for residential space since the owner can find an alternative use should the institution renege on its obligations. The more specialized the space, the more difficult it is to make a lease/purchase work—it is easier, for example, with general office space than with science laboratories.

Regardless of the instrument, these arrangements require a regulatory environment that allows institutions to engage in such practices. Such is not often the case; most states insist on prior approval that may or may not be granted under the premise that such actions are indirect means of obligating the state to future payments. The rules around this practice vary substantially from sate to state. They also require institutions to accept the responsibility of making the associated payments an annual budget priority—taking funds "off the top" of the annual budget—in the face of vagaries in funding streams for general institutional operations.

Perhaps the least constrained environment for use of institutional funds to repay borrowing for construction of academic buildings is in Arizona, where the state formulaically establishes a ceiling on borrowing and allows institutions to manage their own borrowing portfolios within the limits established.

MECHANISMS

In one way or another, all of the frequently used mechanisms were discussed in the prior section. This section serves to summarize the bits and pieces in a more orderly fashion. In reality there are only two generic mechanisms for supporting capital projects—outright purchase or acquisition through payments over time. The equivalent is paying cash or borrowing and repaying the loan.

The former is straightforward; the institution accumulates resources and pays for the capital project when the funds are accumulated. The funders who are in a position to support such an approach are state governments, the federal government, and private donors.

The case in which institutions essentially borrow funds and pay them off over time is only slightly more complicated. The basic instruments are either debt or lease/purchase arrangements. There are numerous variations around the former:

- Whose obligation is it—the state or the institution?
- What is the nature of the collateral—full faith and credit or specific revenue streams (housing revenues, tuition, indirect cost recovery)?
- What is the recourse in case of default?
- What is the specific nature of the instrument—revenue bonds, tax anticipation notes, etc.?

While these are highly technical differences, the basics are fundamentally the same.

State practices vary enormously in this arena. Some states believe strongly in pay-as-you-go funding for capital construction and pay for most construction out of general fund appropriations for specific construction projects. Others rely heavily on state bond issues where the proceeds are utilized for campus construction projects and annual payments are made by the state. Massive bond issues in North Carolina and California are examples. Finally, there are states like Arizona that allow institutions to borrow (up to a limit) with repayment coming from the institutions' operating funds. Typically the state appropriations to institutions are structured with these repayment obligations in mind. The latter arrangement provides institutions with the most freedom; it also carries the most risk.

USES

As indicated in Table 1, there is but a limited number of different kinds of capital projects:

- Renewal and renovation projects
- New construction projects
  - Auxiliaries
  - General Academic
  - Research

The relationships between revenue sources and uses were noted in several instances in Section II but will be treated more systematically here.

A. Renewal and Renovation

In most states renewal and renovation projects take their place alongside new construction projects and get prioritized in competition with them. Projects dealing specifically with safety concerns frequently migrate to the top of the priority list while others slip to the bottom—a new building is much more attractive to funders than replacing steam lines or replacing the electrical system in Old Main.

The funders for such projects are predominantly the states, local taxing authorities (typically only for community colleges), and the institutions themselves, with the states being the primary source. They tend to use the same approaches—direct funding or debt—regardless of the type of project. One can make a very good case for shifting responsibility for renovation and renewal projects entirely to the institutions, leaving the state's capital projects appropriations to cover new construction projects. The rationale goes as follows:

1. The state (or some other funder) paid for the facility in the first instance; at that point it becomes the institution's responsibility. The state should not have to pay multiple times for the same facility.
2. Sound management practices would call for depreciation accounts (1½-2% of replacement value) that accumulate funds for renewal purposes. GASB accounting rules now require recognition of depreciation expense. Unfortunately such rules did not take effect until well into the useful lives of most buildings. The new rules help to avoid further accumulation of deferred maintenance liabilities. They do little to reduce the level of deferred maintenance that had occurred prior to the GASB reforms.
3. Use of set-aside funds puts establishment of priorities in the hands of the institutions where, many would argue, it rightfully belongs. Legislatures are not in a position to establish interinstitutional priorities for such projects.
4. Legislatures are much better equipped—and much more interested—in establishing priorities for new buildings.

The state of Missouri follows this policy (at least it did a few years ago). Under this policy the institution was obliged to spend the equivalent of the depreciation expense amount on renewal and renovation projects. The institutions selected the projects; their only obligation to the state was an accountability requirement indicating that the required funds had, indeed, been allocated to renewal projects.

In reality, institutions typically find ways to use their own funds only when needs become dire and funds are not forthcoming from the state (or any other source).

Sound practice with regard to funding renewal and renovation would have the following features:

- An explicit, system-wide determination of levels of deferred maintenance on each campus.

- A multi-year plan for the elimination (or significant reduction) of this backlog. This plan should be established as separate from financing for new facilities. The "cleanest" approach would be a state bond issue paid from general operating revenues and intended to remove R&R from the agenda as a state obligation.

- A requirement that an amount equal to GASB depreciation amounts be spent each year out of institutional operating funds on renewal and renovation projects. The institutions should make the selection of projects to be so funded. The accountability requirement should be that a) the institution has an annually updated list of R&R priorities, and b) funds in the amount of prior year's deprecation amount are expended on the highest priority items.

  Such a process, if implemented, would result in elimination of past accumulations of deferred maintenance and make the institutions, not the state, responsible for ensuring that deferrals do not accumulate in the future. Such a policy would also create disincentives for institutions to acquire additional facilities of marginal benefit or to hang onto facilities that might better be removed from the inventory. Finally, it would keep the focus of the capital process on new facilities—a focus consistent with legislators' interests and policy determinations and eliminate the confounding of policy decisions (new facilities) with ongoing operational decisions at the campus level. Kentucky would do well to consider such a policy.

B. New Construction Projects

1. Auxiliary Facilities

   Construction of auxiliary facilities—residential and dining facilities—is almost always funded by students through direct use charges (room and board fees). If such use charges are insufficient, institutional funds are tapped as a last resort to fill the gap.

   Construction of facilities such as student unions and recreation facilities are also typically paid for by students although the mechanism is almost always a broadly applied student fee rather than a use charge. For these types of facilities, private donors often contribute as part of a larger capital campaign. In some instances, states contribute directly to construction of such facilities.

   In virtually all projects supported by student charges or fees, the instrument used is some form of long-term debt.

2. General Academic Facilities

   The predominant funders of general academic facilities—classrooms, labs, offices, and libraries—are state and local governments and private donors. In rare instances students (through an imposed fee) and institutions themselves contribute. The federal government will participate only in the case of Congressional earmarks.

   The instruments most likely to be used by the state are direct appropriations for construction of the building or debt instruments that are repaid by the state either directly or indirectly through annual appropriations to the institutions. Conceptually, the most satisfying approach is likely to be one similar to Arizona, where the state establishes a borrowing cap for each institution and empowers the institution to borrow in its own

name. This avoids much of the competition for funds borrowed through a centralized state pool. A compromise is to establish borrowing limits for each institution but bundle the bond offerings each year as a way of securing better rates than can be negotiated by each institution acting independently.

Donor contributions most often come in the form of outright gifts.

3. Research Facilities

The primary funders of research facilities are state and federal governments and private donors (either individuals or philanthropic organizations). Funds from the latter two providers most frequently come in the form of lump-sum contributions. Funds from states follow the same pattern as funding for other academic facilities—in some states it is direct, pay-as-you-go appropriation. In other states, funds are provided through issuance and repayment of debt instruments. States fund research facilities in much the same way as they fund other academic facilities. Pay-as-you-go states maintain this practice for research facilities. States that borrow for general academic space also borrow for research facilities. To the extent that there are variations, they take the form of:

a. The state providing a challenge grant that leverages the capacity of the institution to generate funds from private sources.

b. Comprehensive financing plans for truly large undertakings such as the multi-billion dollar Health Services Campus at the University of Colorado.

SUMMARY

Reverting to Table 1 and filling in the blanks, primary funding patterns for higher education facilities are predominantly as indicated in Table 7.2.

While there are exceptions in almost all instances, the summary in Table 7.2 represents the weight of practice.

TABLE 7.2
Primary Funding Patterns for Higher Education Facilities

USES	SOURCES					
	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation	—	Approp./debt	—	—	—	Approp./debt
New Construction						
• Auxiliary						
– Residential/dining	Use charges	—	—	—	—	—
– Recreation	Fees	Approp./debt	—	—	Gifts	—
• Academic facilities	Fees	Approp./debt	Debt	—	Gifts	Lease/purchase
• Research facilities	—	Approp./debt	—	Grants	Gifts	—

Table 7.3 below is presented as a worksheet for KPES.

Here, the subtotals of the "Strategic Funding" scenario suggested in Section 6.8 are shown in the "Amount Needed, from 2006 Study" column.

KPES policy makers can use Table 7.3 as a framework to allocate the Amounts Needed across the most likely sources of funds to create KPES' 15 Year Funding Plan.

If KPES chooses to suppliment this study with additional information, any additional capital investments identified would need to be included.

TABLE 7.3
KPES Funding Patterns Worksheet for Higher Education Facilities

USES		SOURCES					
	Amount Needed, from 2006 Study	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation							
• Condition/End of Life	$4.471m		Approp./debt				Approp./debt
• Space Adequacy	$862m		Approp./debt				Approp./debt
New Construction							
• Auxiliary	n/a						
2006 Capacity							
• Academic facilities	$902m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$515m		Approp./debt		Grants	Gifts	
2020 Capacity							
• Academic facilities	$3,415m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$1,633m		Approp./debt		Grants	Gifts	
• TOTAL	$11,799m						

Section 8:
Recommended Next Steps

The VFA | Paulien | NCHEMS team recommends KPES and each institution work closely together to align each institution's capital needs with its strategic priorities for the coming 15 years. The following steps should be considered to help complete the picture that this study has started to paint, and well position the Commonwealth's public higher education system as a national leader in stewardship of its facilities:

1. **Establish strategic goals for the 15-year capital plan**, possibly broken down into three 5-year periods. The strategic goals may go beyond those considered or recommended in this study, such as a new emphasis on building research capacity, a residential campus or other programmatic goals specific to the institutions.

2. **Complete the data** so that the 15-year plan includes ALL assets. There are various ways to establish or estimate the investments needed to address condition and space needs for the facilities not yet studied, including more facility condition assessments, further sampling and extrapolating condition or space results of similar buildings, or pure modeling based on age and use profiles of buildings yet to be studied.

3. **Integrate all capital planning data into central records** for each asset, and maintain those records to reflect recent changes (improvements or degradations). Records should be stored in capital planning and management software that makes strategic planning, spend management, and progress tracking easy.

4. **Fund according to needs –** as established in this and subsequent studies. "Needs based funding" can serve as a defensible, transparent way to allocate funds while addressing any past capital investment inequalities among the institutions, or on any particular campus. Funding allocated by percent of student population or annual increases to historical distributions tend to perpetuate past inefficiencies.

5. **Pool institutional capital needs** with similar needs from other Kentucky postecondary education institutions, to facilitate better sources and financial terms for those funds.

It is the consultants' strong belief that the Kentucky Postsecondary System and the institutions have already made a wise investment in their facilities through this study, which should serve as the basis for well-informed capital decisions that will help the institutions and the Commonwealth achieve their 15 year goals.

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