

IV. Facilities Needs

A. Space Needs Analysis

1. Introduction

a. Process

Paulien & Associates was provided with facilities, course, and staffing data from fall 2009. The facilities inventory provides building, square footage, room use, and departmental information on a room-by-room basis. The course data contains the course number and description, student enrollments, course capacity, start and stop times, and meeting locations. The staffing data contains the departmental code, major employee category, and number of employees. This data provided a snapshot of the activities for the fall 2009 term, which is used as the analysis' base year.

In addition to these main datasets, other information was collected to assist in the analysis. The additional data included: historical and projected student enrollments; research expenditure information for fiscal year 2009; library collections and reader station counts; and program plans for buildings under construction or recently approved and funded. The university's strategic plan, *Flagship 2030*, and all of the supporting task force reports were used in creating the analysis.

The course data is used to study the present utilization of classrooms (room use code 110) and teaching laboratories (room use code 210) and to project space needs for both of these facility types. It is a reliable source of information for the colleges and schools and provides a good picture of how these instructional facilities are used or how much instructional space is needed.

The facilities data is used to quantify existing space amounts and the staffing information is used to estimate office space needs and review research activity.

b. On-Site Work Sessions

The consultants came to campus on several different occasions to meet with college and school representatives from the Academic Needs and Space Utilization Task Force committee. In many cases the dean or associate or assistant dean participated in the meeting.

These work sessions were held so that the consultant could understand whether or not the space needs of the college or school were fully represented in the Academic Needs and Space Utilization Task Force Report and tour some of the college's or school's space. Because Paulien & Associates has participated in the CU-Boulder master planning efforts and many building programming efforts over the last couple of decades, the consultant team was already familiar with the campus. However, the team wanted to tour new facilities or renovated spaces

to further understand how the colleges and schools were currently using their space.

The facilities inventory was spot checked for accuracy of space use codes and departmental assignment at the time of the tour. Some changes were made to the inventory records so that it would reflect current usage and occupancy.

2. Guideline Assumptions and Application

This section summarizes the space needs by functional space category. The Colorado Commission on Higher Education (CCHE) rescinded their space guidelines for master planning a few years ago. Therefore; the consultant team relied upon their experience at determining appropriate space guidelines for this analysis. The consultant also received guidance from CU-Boulder's Planning Office to understand the internal guidelines used for new construction. Besides the consultants' experience, the basis for some of the analysis rests upon benchmarking, review of design and/or program plans completed for prior projects, and empirical data to project space needs. For some space categories, the guidelines employed in this study are more detailed and appropriate for this level of an analysis.

The operating assumption in applying these different methods was to provide CU-Boulder with enough space to conduct its current and future activities. The sections below specify the guideline(s) applied to each space category and provide an explanation of the guideline application. In order to apply the various guidelines and conduct the space needs analysis, several assumptions were made in this report. Assumptions applied to the specific space categories are listed in this section.

3. Overview of Findings

- The analysis reflects a snapshot in time for fall 2009. The 2020 and 2030 planning horizons reflect the projections set forth in CU-Boulder's *Flagship 2030* and its various task force reports for enrollments, faculty growth, research growth, and additional housing.
- CU-Boulder averages 140 ASF per student FTE (non-annualized, fall term). This is 39 percent lower than the 225 ASF the peer universities average.
- Classroom utilization is very high for centrally scheduled classrooms averaging 42 weekly room hours at 72 percent student station occupancy. When departmentally controlled classrooms are included, the average drops to 37 weekly room hours at 69 percent student station occupancy. This average is still good for an institution of CU-Boulder's caliber.
- Teaching laboratories average 20 hours per week of scheduled use. This average is good relative to other institutions similar to CU-Boulder.

- Space deficits exist in every space category.
- The largest deficit of space is in research, instructional space (classrooms, teaching laboratories, and open laboratories combined), recreation/athletics, and office.
- The actual use of research laboratory space need will be split between research laboratories and office space to house the research professionals.
- Residential space shows a large space need of between 612,500 ASF and 2,850,000 ASF when 1,700 and 4,300 beds are the projected need.
- Because of the need for more research space, the natural sciences (College of Arts and Sciences), College of Engineering and Applied Science, and the vice chancellor for research areas show the greatest need for space. However, the Colleges of Music and Architecture and Planning also have significant needs for space.

4. Space Needs by Use Category

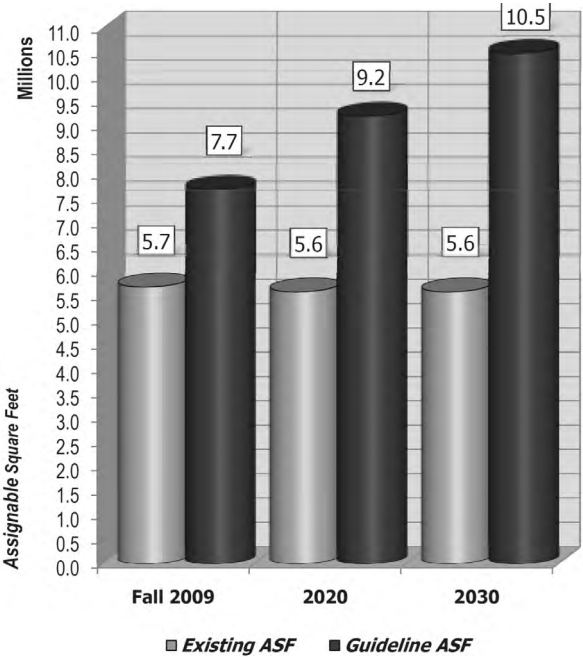
a. Land Use Objectives

The Main Campus of CU-Boulder is a compact academic village, which has facilitated communication. Most academic facilities are located within a reasonable walking distance of each other. Arts and humanities are concentrated on the west part of the Main Campus. Teaching and research activities benefit from the physical proximity of related disciplines. Proximity increases opportunities for the desirable interchange of students and faculty between related disciplines, and has contributed to the creation of many interdisciplinary centers and institutes, thus furthering the institution's prominence in research. Interdisciplinary centers and institutes are often located literally between their related disciplines.

Undergraduate classes are concentrated geographically, most within a 10-minute walk, allowing for as many class periods during the day as possible. The principle factor in locating new academic buildings should be to continue this combination of efficiency and synergistic interaction. This plan endorses retaining the 10-minute class change period for the 10-year planning period. This means that space for undergraduate classes needs to be given priority within the 10-minute walking area shown in Exhibit IV-A-3. However, greater flexibility in scheduling policy may be needed in the future.

This is an example of the indented quote paragraph style. The university's most important functions (teaching and research) are best focused on the Main Campus even though it is largely built out. In order to manage the facilities growth that is necessitated by the expected growth in demand, more efficient and appropriate use of the Main Campus is necessary, giving priority to academic uses in the campus core. In addition, plans made for academic use expansion in the adjoining Grandview area will need to be implemented. Research activities with fewer student contacts can find greater space available on the East Campus, where several of the life sciences and space sciences have located.

Existing Space Compared to Guideline Need



Analysis by Paulien & Associates

b. Classroom and Classroom Service Space

Classrooms are defined as any room generally used for scheduled instruction requiring no special equipment and referred to as a “general purpose” classroom, seminar room, or lecture hall. Classroom service space directly supports one or more classrooms as an extension of the classroom activities, providing media space, preparation areas, or storage. The classroom station size includes the classroom service area space. However, additional service space can be justified on a program or classroom basis.

There are many spaces classified as classrooms in the facilities inventory, such as the classrooms in the residence halls. Many of these spaces do not show any scheduled use. The campus may better reflect the use of these spaces by reclassifying them to other space use categories.

Prior to 2000, many guidelines for classroom space were developed at a time when tablet armchair classrooms were the predominant seating preference. These guidelines called for approximately 15 ASF per student station, which is significantly lower than what today’s active learning-centered classrooms require. Classrooms that have good sight lines—which are required by technology and flexible seating arrangements needed for collaborative instructional methods—usually average between 20 and 25 ASF per student station. For this exercise, the consultants used 22 ASF per student station. This factor provides enough space for a variety of seating arrangements across the CU-Boulder campus.

Review of the classroom utilization analysis presented previously in this document showed that classrooms at the CU-Boulder campus are scheduled more than the desired utilization expectations and centrally scheduled classrooms far exceed the utilization expectations. However, current classroom capacities show that the average square footage per student station is 18 percent less than the guideline selected for this analysis.

Classroom space requirements are determined by a formula that takes the target utilization of 35 hours per week, multiplies it by the target student station occupancy of 67 percent, and divides the result into the 22 square feet per student station. This calculation produces a guideline of 0.938 ASF per weekly student contact hour (WSCH) for lecture and seminar courses. Assignable square feet per weekly student contact hour (ASF/WSCH) is calculated as follows:

Lecture Guideline per Weekly Student Contact Hour (WSCH):		
	22 ASF/STATION	= 0.938 ASF/WSCH
35 WEEKLY ROOM HOURS X 67% STUDENT STATION OCCUPANCY		

Analysis by Paulien & Associates

As further explanation, the total number of weekly contact hours for a lecture course section is obtained by multiplying the enrollment of the course section by the number of meeting hours in one week. For example a mathematics course with 45 students enrolled which meets three times a week for one hour produces 135 weekly student contact hours (WSCH). Multiplying the 135 weekly student contact hours by the classroom guideline of 0.938 generates 126.6 ASF of classroom space.

EXAMPLE OF CLASSROOM GUIDELINE APPLICATION	
Step 1 • Calculate Weekly Student Contact Hours for Lecture Section Enrollment (45) X Weekly Room Hours (3) = Weekly Student Contact Hours (135)	
Step 2 • Calculate Classroom Guideline <div>22 ASF/Station</div> <div>45 Weekly Room Hours X 67% Student Station Occupancy</div> = 0.938 ASF/WSCH	
Step 3 • Calculate Guideline Square Footage Weekly Student Contact Hours (135) X ASF/WSCH (0.938) = Guideline Square Footage (126.6)	

Analysis by Paulien & Associates

There is no true comparison of existing classroom space to guideline space on a program-by-program basis. This is due to the fact that the guidelines are applied by course so that the departmental classroom needs can then be calculated; however, the majority (70 percent) of the classrooms are viewed as a campus-wide resource, are centrally scheduled, and are under the purview of the university registrar. So while a department may have some departmental classrooms, more than likely it will need to use general purpose classrooms to meet its needs.

For fall 2009, there is a university-wide need for approximately 123,400 ASF in additional classroom space. While there is 15,000 ASF of new classroom space being built, an additional 124,500 ASF is needed for 2020 and 146,000 ASF is needed for 2030.

University officials requested that the use of Residential Academic Programs (RAPs) be reviewed. In the fall 2009 course data provided by the Office of the Registrar, there were 38 courses identified with a RAP. Only 36 of those courses had enrollments, which totaled 828 students. Of the 36 courses, 20 courses did not have a room location and only 10 of the 20 had a building location. While most of the RAP courses did not contribute to the classroom utilization study (shown in Section 6), all but one of the 36 courses contributed to the classroom needs analysis illustrated above. The one omitted course had enrollment but no start and end time and, therefore, could not generate weekly room hours.

Collaborative learning environments and technology require more space per student than traditional classroom arrangements. Presently, the average student station size is 18 ASF for all the classrooms. For the general purpose classrooms, the average decreases to 17 ASF.

Classroom & Service Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
College of Architecture and Planning	470	6,329	(5,859)	470	6,502	(6,032)	6,777	(6,307)
College of Arts and Sciences	30,768	259,989	(229,221)	39,712	268,627	(228,915)	281,608	(241,896)
Leeds School of Business	17,767	25,882	(8,115)	17,767	27,772	(10,005)	29,861	(12,094)
School of Education	2,240	4,912	(2,672)	2,240	5,562	(3,322)	6,241	(4,001)
College of Engineering and Applied Science	8,673	29,153	(20,480)	14,952	31,600	(16,648)	34,275	(19,323)
School of Journalism and Mass Communication	1,436	4,754	(3,318)	1,436	4,917	(3,481)	5,180	(3,744)
School of Law	12,820	6,744	6,076	12,820	8,744	4,076	10,555	2,265
College of Music	3,870	5,024	(1,154)	3,870	5,309	(1,439)	5,664	(1,794)
Provost & Exec. Vice Chancellor, Academic Affairs	4,923	2,312	2,611	4,923	2,341	2,582	2,434	2,489
Vice Chancellor, Research & Dean, Graduate School	0	39	(39)	0	49	(49)	58	(58)
University Libraries	732	43	689	732	43	689	46	686
Vice Chancellor, Student Affairs	0	59	(59)	0	59	(59)	62	(62)
Centrally Scheduled Classrooms	138,100	0	138,100	138,100	0	138,100	0	138,100
TOTAL	221,799	345,240	(123,441)	237,022	361,525	(124,503)	382,761	(145,739)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

The guideline used in the analysis is approximately 20 percent greater than what exists, which is a strong driver for the space deficit in this category. As new classrooms are constructed, they will require more space than in the past. As existing classrooms are renovated, seating capacity will be lost to accommodate technology and to create a collaborative environment.

c. Teaching Laboratories and Service Space

Teaching laboratories are defined as rooms used primarily by regularly scheduled classes that require special purpose equipment to serve the needs of particular disciplines for group instruction, participation, observation, experimentation, or practice. Because stations in teaching laboratories tend to vary by discipline, the ASF per student station and weekly room hour expectations requirements may also vary accordingly.

For this analysis the consultants used 20 weekly room hours and 80 percent student station occupancy rate as utilization targets. The Teaching Laboratory Space Standards table shows the amount of space per student station, including service space, and the utilization targets for each discipline that had laboratory courses. The amount of space per student station was based on the consultant’s experience, both at the master plan level and at a program plan level. The table below illustrates how the guidelines were applied to each discipline with laboratory needs.

It is typical for the scheduled weekly room hour expectation for teaching laboratories to be less than the scheduled use of classrooms due to the need for preparation time of specialized equipment prior to class. Conversely, the student station occupancy is normally

higher as the number enrolled in a laboratory exercise is more closely monitored, safety being a key issue as well as the limitations of faculty observation.

For fall 2009, CU-Boulder shows a need for teaching laboratory space of approximately 81,400 ASF (refer to chart on page 9). The College of Engineering and Applied Science and the College of Arts and Sciences collectively generate over 75 percent of this deficit. In particular, the chemistry and biochemistry program in the natural sciences division shows a strong need for space as does the College of Architecture and Planning and the College of Music.

The new space at the Visual Arts Complex was still under construction during fall 2009. Therefore the target year analysis shows the Visual Arts Complex as being completed and the art program giving up the space in Fleming and the Housing System Service Center, which results in a net decrease of space. Additionally the target year shows the Jennie Smoly Caruthers Systems Biotechnology Building as being available for use. The amount of temporary space occupied by art and art history was more than the programmed space in the Visual Arts Complex; therefore, this anomaly results in a slight decrease of teaching laboratory space.

The 2020 target year shows a slight increase in need at 88,700 ASF. The 2030 planning horizon shows a much greater need for 105,900 ASF of additional teaching laboratory space. Almost all programs show a need for more space of this type.

Teaching Laboratory Space Standards

Program	ASF/ Station	Student Station Occupancy	Weekly Room Hours	ASF/ WSCH
College of Architecture and Planning	80	80%	20	5.00
College of Arts & Sciences				
<i>Arts & Humanities</i>				
Art	80	80%	20	5.00
Dance / Theatre	150	80%	20	9.38
Film Studies	50	80%	20	3.13
<i>Natural Sciences</i>				
Chemistry & Biochemistry / Physics	75	80%	20	4.69
EEB / Environmental Studies / Physiology / MCDB	65	80%	20	4.06
Astrophysical & Planetary Sciences / Atmospheric & Oceanic Sciences / Geography / Geological Sciences	60	80%	20	3.75
Mathematics	40	80%	20	2.50
Psychology	50	80%	20	3.13
<i>Social Sciences</i>				
Anthropology	60	80%	20	3.75
College of Engineering	80	80%	20	5.00
Aerospace Engineering / Mechanical Engineering	140	80%	20	8.75
Chemical & Biological / Civil, Environmental & Architectural / General Engineering / Lockheed Martin Engineering Management	120	80%	20	7.50
Electrical, Computer & Energy / Interdisciplinary Telecommunications	100	80%	20	6.25
Computer Science	60	80%	20	3.75
College of Music	60	80%	20	3.75
School of Business	40	80%	20	2.50
School of Education	40	80%	20	2.50
School of Journalism & Mass Communication	50	80%	20	3.13
School of Law	50	80%	20	3.13

WSCH = Weekly Student Contact Hour; ASF = Assignable Square Feet

Analysis by Paulien & Associates

d. Open Laboratories

The space classified as Open Laboratories includes rooms that are open for student use and that are not used on a regularly scheduled basis (space use codes 220, 225, 230, and 235). These rooms may provide equipment to serve the needs of particular disciplines for group instruction in informally or irregularly scheduled classes. Alternatively, these rooms are used for individual student experimentation, observation, or practice in a particular field of study. The size of these laboratories is based on equipment size, the station size, and student count desired, and therefore should be determined on an individual basis. Types of rooms included in this category include computer laboratories, language laboratories, learning labs, tutorial and testing facilities, and music practice rooms and studios. For purposes of this analysis, senior capstone space is also considered open laboratory space as well as collaborative learning spaces.

Open laboratories are not specifically addressed by most guideline systems. In recent benchmarking and consulting work with several statewide systems, the consultant found between five and ten ASF per student FTE allocated for space in this category. The consultants note that the amount of space that CU-Boulder has classified in this category is 3.5 ASF per student FTE, at the lower end of what the consultants expect to find.

The consultants believe that a reasonable guideline for CU-Boulder in open laboratory space is 5.5 ASF per student FTE. This guideline is sufficient to provide the CU-Boulder programs with space lacking in this category such as studios and music practice rooms, as well as some senior capstone space and collaborative learning spaces. The guideline produced a deficit of about 54,000 ASF or 58 percent of existing open laboratory space for fall 2009. After the addition of the studio spaces in the Visual Arts Complex and the computing labs in the Caruthers Systems Biotechnology Building (about 20,000 ASF total), the deficit decreases to about 53,000 ASF for the planning horizon.

The guideline was portioned out among the existing programs based upon needs expressed during the on-site work sessions, existing building programs, the Master Plan Task Force Report on Academic Needs and Space Utilization, and current and projected student FTE enrollments. A specific allotment of open laboratory space was provided to the provost and executive vice chancellor for future collaborative learning and capstone spaces and other open laboratories that have yet to be determined for CU-Boulder. For some units, such as architecture and planning, it is best to review the needs in the open laboratory in conjunction with the needs shown in the teaching and research laboratory space categories as activities conducted in each of these spaces often overlap.

Open Laboratories & Service Analysis						
College / School / Unit	Fall 2009			2020		
	Existing ASF	Guideline ASF	Surplus/ (Deficit)	Projected Existing ASF	Guideline ASF	Surplus/ (Deficit)
College of Architecture and Planning	29,649	32,000	(2,351)	29,649	34,500	(4,851)
College of Arts and Sciences	32,270	58,736	(26,466)	48,795	62,083	(13,288)
Leeds School of Business	1,342	1,500	(158)	1,342	1,700	(358)
College of Engineering and Applied Science	15,348	27,056	(11,708)	18,960	28,567	(9,707)
School of Journalism and Mass Communication	461	800	(339)	461	1,200	(739)
School of Law	846	846	0	846	846	0
College of Music	8,014	12,000	(3,986)	8,014	13,000	(4,986)
Provost & Exec. Vice Chancellor, Academic Affairs	3,734	12,234	(8,500)	3,734	13,734	(10,000)
Vice Chancellor, Research & Dean, Graduate School	757	1,224	(467)	757	1,224	(467)
University Libraries	1,070	1,070	0	1,070	1,070	0
TOTAL	93,491	147,466	(53,975)	113,531	157,924	(44,393)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

Teaching Laboratories & Service Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		Guideline ASF	Surplus/ (Deficit)
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)		
College of Architecture and Planning	1,090	18,630	(17,540)	1,090	18,705	(17,615)	19,780	(18,690)
College of Arts and Sciences	155,087	185,319	(30,232)	146,183	187,391	(41,208)	197,286	(51,103)
Leeds School of Business	1,457	3,188	(1,731)	1,457	3,281	(1,824)	3,443	(1,986)
School of Education	0	110	(110)	0	130	(130)	154	(154)
College of Engineering and Applied Science	43,049	74,156	(31,107)	50,480	76,703	(26,223)	81,020	(30,540)
School of Journalism and Mass Communication	305	4,606	(4,301)	305	4,896	(4,591)	5,291	(4,986)
School of Law	2,404	584	1,820	2,404	744	1,660	891	1,513
College of Music	7,892	20,197	(12,305)	7,892	20,805	(12,913)	21,804	(13,912)
Provost & Exec. Vice Chancellor, Academic Affairs	13,257	2,678	10,579	13,257	2,682	10,575	2,807	10,450
Continuing Education and Professional Studies	798	0	798	798	0	798	0	798
Vice Chancellor, Research & Dean, Graduate School	2,012	55	1,957	2,012	70	1,942	85	1,927
Senior Vice Chancellor and Chief Financial Officer	800	0	800	800	0	800	0	800
TOTAL	228,151	309,523	(81,372)	226,678	315,407	(88,729)	332,561	(105,883)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

e. Research Laboratories

Research laboratories (250s) are rooms used for unscheduled laboratory experimentation or training in research methods and observation. The research may be conducted by either faculty or students for both funded and non-funded research. This room type does not have utilization expectations.

The computation of research space is a complex issue. Different approaches could be used at this level of planning—a space factor per \$100,000 in research expenditures; a space factor per research team; or a space factor per tenured/tenure track faculty. Officials at CU-Boulder provided the research expenditures for fiscal year 2010. The consultants reviewed a variety of the university’s research performance indicators to assist in developing the best approach for determining research space needs. The following table indicates each major unit space per \$100,000 in research expenditures, square footage per tenure/tenure-track faculty, and expenditures per tenure/tenure-track faculty. Appendix D shows detailed expenditures by program.

When reviewing the existing square footage per \$100,000, the consultants found that many programs did not have a direct correlation between existing space allocations, faculty home departments, and research expenditures. In other words, there are units at CU-Boulder with large amounts of sponsored research dollars that do not have substantial amounts of research space and vice versa. This is not uncommon at institutions that have a large number of interdisciplinary and transdisciplinary research programs.

There are three areas where most of the research space is allocated: the vice chancellor for research and dean of the Graduate School, the natural sciences in the College of Arts and Sciences, and the College of Engineering and Applied Science. The social sciences also have some research space, as does the Leeds School of Business. The vice chancellor for research is the reporting unit for all of the institutes where research space is allocated, but the faculty are dispersed among their home departments.

As a result of this disconnect, the consultants decided to use a space factor per \$100,000 in research expenditures. These space factors are appropriate and were applied to those units with existing research space or where non-office-based research space is required. The Research Laboratory Guidelines table shows the guidelines applied to those units that had research expenditures for fiscal year 2010 as well as existing space or a demonstrated need for research space. For those units that require small computational labs, resource rooms, or a collaboration room, very low square footages were applied, such as the case for business, humanities, and education.

Research Performance Indicators June 2010						
FY 2010						
College / School / Unit	No. of Projects	Total Expenditures	Existing ASF**	Tenured/Track Faculty*	ASF per \$100,000	ASF per T/T-T Faculty
Assoc VC Undergraduate Education	9	\$1,714,493			n/a	n/a
VC Academic & Campus Technology	36	\$2,197,765			n/a	n/a
VC Research & Dean of Graduate School	1,329	\$178,335,589	106,143		60	n/a
Assoc VC & Dean Cont Ed & Summer	4	\$26,553			n/a	n/a
College of Arts and Sciences	1,233	\$81,888,562	289,574	601	354	482
Arts and Humanities	27	\$2,191,705	0	148	n/a	n/a
Arts	1	\$472	0	26	n/a	n/a
Humanities	26	\$2,191,233	0	122	n/a	n/a
Natural Sciences	1,112	\$77,038,131	282,037	333	366	847
Social Sciences	94	\$2,658,726	7,537	120	283	63
School of Business	4	\$2,677,093	913	52	34	18
School of Education	59	\$4,687,585	30		n/a	n/a
College of Engineering and Applied Science	953	\$52,648,928	136,862	174	260	787
College of Music	2	\$8,116		55	n/a	n/a
School of Journalism & Mass Communication	2	\$204,190		22	n/a	n/a
School of Law	10	\$1,027,140		36	n/a	n/a
Libraries	9	\$43,353			n/a	n/a
Vice Chancellor for Student Affairs	11	\$5,079,401			n/a	n/a
Diversity & Equity	3	\$406,902			n/a	n/a
TOTAL	3,664	\$330,945,670	533,492	970	161	550

* Tenured/Tenure-Track Faculty included only if unit has space or research expenditures.

Analysis by Paulien & Associates

Research Laboratory Guidelines

Disciplines / Programs	ASF/ \$100,000
Natural and Physical Sciences	500
Engineering, Psychology, and Speech Language & Hearing Sciences	350
Geography, Social Sciences, and CARTSS	250
Institutes under the Vice Chancellor for Research	250
Mathematics	100
Business	50
Education	25

NOTE: Guidelines only applied to those units with existing research space.

Analysis by Paulien & Associates

Growth in research expenditures was projected at 5 percent compounded annually and adjusted for inflation. The inflation factor was set at 2.41 percent, resulting in a net growth of 2.59 percent compounded annually. The fiscal year 2010 research expenditures were \$330,945,670. For the 2020 target year, the projection is \$427,372,921 (2010 dollars) and \$551,896,068 (2010 dollars) for the 2030 planning horizon.

The Research Laboratories and Service Analysis table below shows the result of the guideline application. The guidelines produced an 84 percent deficit of approximately 450,000 ASF for fall 2009. All units show a need for additional research space. For the College of Arts and Sciences, 79 percent of the need is in the natural sciences and 21 percent in the social sciences. The research space under the vice chancellor for research is attributed to CIRES, CLAS, IBG, IBS, ICS, INSTAAR, JILA, and LASP.

In the 2030 planning horizon, existing space reflects over 100,000 ASF in research space gains by the additions of the new IBS building, JILA expansion, and the Caruthers Systems Biotechnology Building. Even after the addition of this funded construction, the research deficit increases to 603,000 ASF for the 2020 target year and 966,000 ASF, a 152 percent shortage, at the 2030 horizon. This shortage is reflective of the projected growth in research activity.

It should be noted that a portion of this space may actually be developed as research office space. Many of the institutes have non-CU staff requiring offices. Some of this space is now housed in leased property. It is anticipated that the units of NOAA, NEON, NREL, USGS, and NSO will need space, expansion room, or will move from existing space to CU-owned facilities.

Research Laboratories & Service Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
College of Arts and Sciences	289,574	362,651	(73,077)	345,876	456,942	(111,066)	591,124	(245,248)
Leeds School of Business	913	1,339	(426)	913	1,687	(774)	2,182	(1,269)
School of Education	0	1,172	(1,172)	0	1,477	(1,477)	1,910	(1,910)
College of Engineering and Applied Science	136,862	183,640	(46,778)	173,175	231,389	(58,214)	299,336	(126,161)
School of Journalism and Mass Communication	370	800	(430)	370	1,000	(630)	1,000	(630)
Vice Chancellor, Research & Dean, Graduate School	106,143	433,118	(326,975)	114,945	545,729	(430,784)	705,982	(591,037)
TOTAL	533,862	982,720	(448,858)	635,279	1,238,224	(602,945)	1,601,534	(966,255)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

f. Office Space (Academic and Administrative)

The guideline application for office space needs is based upon major categories of staff types and the additional application of space amounts for office service and conference space needs. The university provided summary staffing information with IPEDS code, title, and department. The consultant then organized each into major categories as shown in the Office Space Guidelines table. Guidance from the Office of Planning, Design, and Construction was used to establish the office space guidelines based on their internal planning standards.

Academic Office Space Analysis

The analysis shows a space deficit for fall 2009 in academic office space totaling about 97,500 ASF. The largest deficit is in the arts and sciences although some of this deficit may be offset by the surplus under the vice chancellor for research as some individuals have office space at the institutes. The College of Music also shows a strong need for additional studio office space.

At the 2020 planning horizon, the deficit increases to about 140,600 ASF, and the 2030 planning target also increases to 190,000 ASF. The College of Engineering and Applied Science increases its existing office space by about 26,000 ASF and then shows a surplus of space. About half of this surplus is in conference room space. It may be that some of this conference room space should be allocated to research as it supports the research teams.

When it comes to office space analysis, it is important to keep in mind that while there may be a surplus of space, there may not be enough doors or rooms. Therefore, the overall deficit may actually be more than what is being portrayed in the analysis due to inventory issues and existing structural constraints.

The average faculty office size is 158 ASF. The sizes range from a low of 108 ASF to a high of 261 ASF. To be expected, the College of Music has a greater average (180 ASF) due to the need for studio offices. The analysis uses 150 ASF as a general size for full-time faculty offices. Some offices are located in legacy buildings where the offices were built to greater square footage standards than the one utilized in this study. For example, Duane Physics averages 159 ASF per faculty office. Economics and Hellems average 164 ASF. Offices in the engineering, electrical, and mechanical wings average 190 ASF. Ketchum Arts and Sciences averages 198 ASF. Conversely, there are buildings where the averages are considerably lower, such as Koelbel Business, which averages 124 ASF.

Office Space Guidelines

	Office ASF	Conference ASF	Service ASF
Employee Type: <i>Applied per Headcount</i>			
Executive / Administrative / Managerial	200-400	50	30
Faculty including Research, Visiting, and Clinical	150	20	30
Studio Faculty Offices	225	20	30
Law Faculty	175	20	30
Faculty (FT Non Tenure Track) including Instructors and Lecturers	150	0	0
Emeriti Faculty	50	0	0
Part-time Faculty (assumes three to an office) including PT adjuncts, instructors, and lecturers	50	0	0
Other Professionals including those Skilled Craft and Service & Maintenance workers that require offices	150	15	20
Research Professionals (Professional Research Assistants, Research Associates)	150	15	30
Law Professionals	175	15	30
Technical & Paraprofessional	100	15	15
Clerical & Secretarial	100	15	15
Part Time Other Professionals	50	0	0
Graduate / Teaching / Research Assistants (Students)	50	0	0
Student Worker	25	0	0
Skilled Crafts	0	0	0
Service & Maintenance	0	0	0
Library Personnel (Office Space in Library Guidelines)		0	0

Additional service space and conference room space as needed by individual units.

Analysis by Paulien & Associates

Academic Offices & Service Analysis

College / School / Unit	Fall 2009			2020			2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)	Projected Existing ASF	Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
College of Architecture and Planning	8,210	8,995	(785)	8,210	10,245	(2,035)	10,745	(2,535)
College of Arts and Sciences	379,077	441,450	(62,373)	384,078	482,595	(98,517)	507,395	(123,317)
Leeds School of Business	42,550	46,050	(3,490)	42,550	51,445	(8,895)	53,995	(11,445)
School of Education	18,503	25,045	(6,542)	18,503	26,745	(8,242)	28,370	(9,867)
College of Engineering and Applied Science	115,727	124,655	(8,928)	141,961	134,290	7,571	140,235	1,626
School of Journalism and Mass Communication	11,242	13,360	(2,118)	11,242	15,260	(4,018)	16,085	(4,843)
School of Law	29,636	28,670	966	29,636	30,870	(1,234)	32,210	(2,574)
College of Music	21,229	33,675	(12,446)	21,229	34,975	(13,746)	36,895	(15,666)
Provost & Exec. Vice Chancellor, Academic Affairs	64,568	68,530	(3,962)	64,574	70,360	(5,786)	72,445	(7,871)
Continuing Education and Professional Studies	7,100	13,255	(6,155)	7,100	13,845	(6,745)	14,050	(6,950)
Vice Chancellor, Diversity, Equity, & Community Engagement	8,812	8,475	337	8,230	8,710	(480)	8,945	(715)
Vice Chancellor, Research & Dean, Graduate School	209,807	201,825	7,982	216,383	214,970	1,419	222,005	(5,616)
TOTAL	916,491	1,013,985	(97,494)	953,612	1,094,210	(140,598)	1,143,365	(189,753)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

Average Faculty Office Size by College/School/Unit

College/Administrative Unit	Room Use Code	No. of Offices	Average Assignable Square Feet	Mini-mum	Maxi-mum
College of Architecture and Planning	312 Faculty Office	21	143	89	250
College of Arts and Sciences	312 Faculty Office	924	159	61	347
College of Engineering and Applied Science	312 Faculty Office	236	158	66	319
College of Music	312 Faculty Office	75	180	77	338
Continuing Education and Professional Studies	312 Faculty Office	1	261	261	261
Leeds School of Business	312 Faculty Office	98	124	53	276
Provost & Exec. Vice Chancellor, Academic Affairs	312 Faculty Office	21	162	59	302
School of Education	312 Faculty Office	52	156	81	301
School of Journalism and Mass Communication	312 Faculty Office	34	163	87	277
School of Law	312 Faculty Office	63	162	141	302
Vice Chancellor, Diversity, Equity, & Community Eng	312 Faculty Office	1	108	108	108
Vice Chancellor, Research & Dean, Graduate School	312 Faculty Office	126	169	66	294

INSTITUTION COUNT AND AVERAGE 1,652 158 53 347

NOTE: Only offices that have between 50 ASF and 350 ASF have been included.

Analysis by Paulien & Associates

Administrative Offices & Service Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
Office of the Chancellor	4,859	5,100	(241)	4,859	5,100	(241)	5,285	(426)
Senior Vice Chancellor and Chief Financial Officer	88,722	86,135	2,587	90,311	89,405	906	91,535	(1,224)
Vice Chancellor, Administration	73,717	70,710	3,007	73,867	73,185	682	74,915	(1,048)
Vice Chancellor, Student Affairs	81,989	94,465	(12,476)	85,502	97,615	(12,113)	99,350	(13,848)
TOTAL	249,287	256,410	(7,123)	254,539	265,305	(10,766)	271,085	(16,546)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

Administrative Office Space Analysis

The fall 2009 Administrative Office Analysis shows a deficit of office space of approximately 7,000 ASF. Student affairs has the greatest deficit at about 12,500 ASF. At the 2030 planning horizon, the surpluses become deficits totaling to about 16,500 ASF for 2030.

g. Library Space

The consultant acknowledges the changing trends in modern-day libraries. The reference collection, many periodicals, and some of the up-to-date collections are being digitized and are available electronically. Stack space is being converted to study stations. Learning commons and cyber cafés are now part of the fabric of the library.

Even with these transformations, the best way to predict

the space needs of the library is by understanding the amount of print collections, number of students, and amount and types of technical services and staffing the library needs.

Most of the guideline systems for library space utilize one set of factors for collections, another for users, and a third for service space. The consultants reviewed different guidelines that have been used in recent years. For library collections, the consultants recommend a sliding scale guideline starting with .10 ASF per volume to .07 ASF per volume for collection space. If compact shelving is being used, then .004 ASF per volume should be used for that portion of the collection that will be stored on compact units.

Study space calculations for this analysis were based upon the current study space ratios to student head-

count on either a campus-wide basis or, in the case of the Wise Law Library, a discipline-specific basis. In determining the guidelines for study station sizes, the consultants believe 30 ASF per study station is appropriate, understanding that some will require less and others will require more.

Service space is calculated on a percent of the total collection and study station space. Depending on the type of library, the recommendation is either 10 percent or 12.5 percent of the total collection and study station space for service and staff space. It should be noted that the service space calculation is intended to include office space for the library staff.

The university library system has five branch libraries: Business, Earth Sciences/Map, Engineering, Math/Physics, and Music. Additionally, the campus stores part of its collections at a state-of-the-art, high-density storage facility named PASCAL (Preservation and Access Service Center for Colorado Academic Libraries). The university library administration provided details on collections, reader station counts, and average acquisition rates for the library system for fall 2009. Approximately 1.1 million volumes are being stored at PASCAL. Therefore the collection space needed has been reduced by 1.1 million volumes.

Library Guideline Analysis - University Libraries

The following table illustrates how the library guidelines were applied and the amount of space needed for the university libraries. For fall 2009, the university libraries needed approximately 32,000 ASF in space. This need increases to 43,400 ASF for 2020 and 54,000 ASF for the 2030 planning horizon. It should be noted that the guidelines applied to this analysis are conservative. In a programming exercise it may be determined that more space is needed. Currently, the library has unmet space needs. For example, a large set of special collections is being housed in the basement of Norlin Library, where there is no climate or moisture control. Given the current build-out on the Main Campus, the additional need for space may be accommodated on the East Campus.

Library Guideline Analysis - Law Library

Following is library analysis for the William A. Wise Law Library. The analysis indicates a surplus of space in the library for fall 2009 clear through the 2030 planning horizon. General observation concurs with this finding, as the library has the ability to convert existing stack space to compact shelving on the lower level. Then freed stack space can be converted to study stations or group study areas.

Library Analysis

For fall 2009, the analysis shows that the libraries have a 7 percent shortage of space or a need for approximately 23,800 additional ASF. For the target year, a 12 percent space deficit is shown resulting in a need for 38,900 ASF of additional space for 2020. The 2030 horizon shows an increase in the deficit to 53,600 ASF. The majority of the projected deficits can be attributed to student enrollment growth.

William A. Wise Law Library

	Current Items	Conversion Factor	Fall 2009 Volumes	Volume Growth	2020 Volumes	Volume Growth	2030 Volumes
Print Volumes	302,000	1.00	302,000	20.00%	362,400	46.00%	440,920
Total Volume Equivalents			302,000		362,400		440,920

Library Guideline Application and Analysis

							Fall 2009 Guideline ASF	2020 Guideline ASF	2030 Guideline ASF	
No. of Volume Equivalents							26,820	28,934	31,682	
Collection Space	0 - 250,000	250,001 - 500,000	500,001 - 750,000	750,001 - 2,000,000	2,000,001 and above					
ASF per Volume	0.10	0.04	0.04	0.04	0.04					
Fall 2009 Collection Space	25,000	1,820	0	0	0					
2020 Collection Space	25,000	3,934	0	0	0					
2030 Collection Space	25,000	6,682	0	0	0					
Total Collection Space										
Study Space	Percent of Headcount	Fall 2009 Headcount	Fall 2009 Stations	2020 Headcount	2020 Stations	2030 Headcount	2030 Stations	12,780	13,920	14,880
Undergraduate Students	0%	0	0	0	0	0	0			
Graduate Students	80%	533	426	580	464	620	496			
Faculty (Headcount)	0%	0	0	0	0	0	0			
Total Study Stations	100% @ 30 ASF/Station		426		464		496			
Total Study Space							12,780	13,920	14,880	
TOTAL COLLECTION & STUDY SPACE							39,600	42,854	46,562	
Service Space (10.0% of Total Collection and Study Space)							3,960	4,285	4,656	
TOTAL LIBRARY GUIDELINE SPACE							43,560	47,139	51,218	
Existing Space							51,633	51,633	51,633	
SURPLUS / (DEFICIT)							8,073	4,494	415	

Analysis by Paulien & Associates

University Libraries

Library Collections		Current Items	Conversion Factor	Fall 2009 Volumes	Volume Growth	2020 Volumes	Volume Growth	2030 Volumes
Volumes		3,321,632	1.00	3,321,632	5.00%	3,487,714	10.00%	3,653,795
Total Volume Equivalents				3,321,632		3,487,714		3,653,795

Library Guideline Application and Analysis										Fall 2009 Guideline ASF	2020 Guideline ASF	2030 Guideline ASF
Collection Space		No. of Volume Equivalents										
		0 - 150,000	150,001 - 300,000	300,001 - 600,000	600,001 - 2,000,000	2,000,001 and above						
ASF per Volume		0.10	0.09	0.08	0.07	0.04						
Fall 2009 Collection Space		15,000	13,500	24,000	98,000	46,257						
2020 Collection Space		15,000	13,500	24,000	98,000	52,070						
2030 Collection Space		15,000	13,500	24,000	98,000	57,863						
Total Collection Space							196,757	202,570	208,383			
Study Space		Percent of FTE		Fall 2009 FTE	Fall 2009 Stations	2020 FTE	2020 Stations	2030 FTE	2030 Stations			
		10%		24,084	2,408	25,134	2,513	25,973	2,597			
		5%		2,728	136	3,579	179	4,302	215			
		0%		1,557	0	0	0	1,866	0			
		Total Study Stations		100% @ 30 ASF/Station		2,545		2,692		2,812		
Total Study Space							76,350	80,760	84,360			
TOTAL COLLECTION & STUDY SPACE							273,107	283,330	292,743			
Service Space (12.5% of Total Collection and Study Space)							34,138	35,416	36,593			
TOTAL LIBRARY GUIDELINE SPACE							307,246	318,746	329,336			
Existing Space							275,345	275,345	275,345			
SURPLUS / (DEFICIT)							(31,901)	(43,401)	(53,991)			

Analysis by Paulien & Associates

Library Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
School of Law	51,633	43,560	8,073	51,633	47,139	4,494	51,218	415
University Libraries	275,345	307,246	(31,901)	275,345	318,746	(43,401)	329,336	(53,991)
TOTAL	326,978	350,806	(23,828)	326,978	365,885	(38,907)	380,554	(53,576)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

h. Assembly and Exhibit Space

Assembly and exhibit space is defined as any room designed and equipped for the assembly of large numbers of people. This includes theaters, auditoriums, concert halls, and arenas. Exhibit spaces are used for exhibition of materials, works of art, or artifacts intended for general use by students and the public.

In recent years Paulien & Associates has been using a guideline originally promulgated by the Council of Educational Facility Planners International. This guideline has a core allowance of 22,450 ASF for institutions with a minimum of 5,000 student FTE and an active fine arts program. It then allows for an additional six ASF per student FTE over the 5,000 FTE minimum. The guideline is intended to support the academic programs of an institution. In cases where there are additional facilities of this type that support not only the academic program but have a significant outreach/community component, additional allocations of space are added to this guideline.

An additional allotment of 40,000 ASF for CU-Boulder at the base year and 50,000 ASF for both planning horizons has been added. The reason for this addition is that the guideline is not large enough to cover the needs of the CU Museum of Natural History.

The guideline application produced a deficit of 93,500 ASF for fall 2009 of assembly and exhibit space at CU-Boulder. This deficit decreases to 81,700 ASF for the 2020 target and 91,100 ASF for the 2030 horizon. The consultants portioned the guideline among the departments requiring this space type. The increase in existing space at the 2020 target year includes the addition of the auditorium and the auditorium pre-function space, and the gallery (about 8,700 ASF) in the Biotechnology Building and the art museum space and exhibition areas in the Visual Arts Complex (19,000 ASF).

The College of Music has the greatest need for this

space type as it needs additional rehearsal facilities and a stated need for a 1,000-seat performance venue. About half of the need is met for the College of Arts and Sciences at the target years, which reflects the new gallery space for the CU Museum of Art in the Visual Arts Complex. The additional needs shown under arts and sciences are for rehearsal and performance spaces for theatre and dance and a small exhibition area for anthropology. The need for museum space under the vice chancellor for research reflects the need for an expansion of the CU Museum of Natural History and the need for a science museum. The Task Force on Space Needs and Utilization suggested both of these museums be moved to the East Campus. The Leeds Schools of Business, the School of Education, and the Law School all have need for some exhibition space. Without programming the particulars, 2,000 ASF has been allocated to each of these schools, recognizing this space need.

i. Other Department Space (Academic and Administrative)

The space classified as Other Department Space includes all other space assigned to a department that has not been included in the other classifications of classrooms, teaching laboratories, open laboratories, research, or office. These areas consist of a variety of spaces including:

- Animal quarters.
- Armories.
- Clinics.
- Computer rooms.
- Demonstration rooms.
- Food facilities.
- Greenhouses.
- Learning center space.
- Lounges.
- Media production.
- Meeting rooms.
- Shop space.

- Study rooms.

Due to the diversity of these spaces and the different ways various campuses might classify these spaces, they are not always addressed by recognized guideline systems.

Other Academic Department Space

There is about 262,000 ASF assigned to this space category. The following lists the major amounts of space and users of each space type included under this category.

- Approximately 21,200 ASF is animal facilities, the majority of which belongs to molecular, cellular, and developmental biology; psychology; IBG; ecology and evolutionary biology; and integrative physiology. New animal facilities are being built in the Caruthers Systems Biotechnology Building, which is reflected in the target years.
- The ROTC programs have 6,000 ASF in armory space.
- There is 6,500 ASF in clinic spaces belonging to speech, language, and hearing sciences (4,000 ASF) and psychology (2,500 ASF).
- Of about 16,500 in computing spaces (server rooms, mainframes, system areas), half is assigned to ITS administration with LASP (1,800 ASF) and CIRES (1,500 ASF) each having about 10 percent of the total space. Another 25 units have some space ranging from 25 ASF to 800 ASF each.

- Greenhouses under ecology and evolutionary biology (14,500 ASF) and chemistry (1,900 ASF) total about 16,400 ASF
- Departmental lounges total approximately 12,700 ASF under 21 different units.
- Approximately 40,600 ASF of non-physical plant shop space is occupied by seventeen different units: 13,000 ASF is assigned to the College of Music; JILA has 5,500 ASF; LASP 3,800 ASF; CIRES 3,700 ASF; and Physics has 3,200 ASF.
- Departmental study/resource rooms (400 space use code) accounts for another 63,000 ASF across 38 departments. ITS has about 38 percent of the space at 24,000 ASF, and the Leeds School of Business uses about 3,000 ASF of the total space.
- Central storage (730 space use code) is about 63,000 ASF spread throughout 55 different academic units. Theatre and dance has the most space at about 13,200 ASF; architecture has about 4,900 ASF; CIRES has 3,800 ASF; and music has 3,300 ASF. Art and art history had temporary storage of about 10,700 ASF that is shown as being vacated at the target year.
- There is about 23,000 ASF in these space use categories under 39 different units: meeting rooms, miscellaneous food service facilities, media production spaces, hazardous materials, demonstration rooms, merchandising space, and vehicle storage.

Other academic space at CU-Boulder averages 10 ASF

Other Academic Department Space Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
College of Architecture and Planning	7,268	9,000	(1,732)	7,268	11,000	(3,732)	11,000	(3,732)
College of Arts and Sciences	101,055	100,952	103	93,535	106,336	(12,801)	112,906	(19,371)
Leeds School of Business	7,427	7,976	(549)	7,427	8,239	(812)	8,826	(1,399)
School of Education	6,169	6,626	(457)	6,169	6,844	(675)	7,331	(1,162)
College of Engineering and Applied Science	19,599	31,804	(12,205)	31,053	33,553	(2,500)	35,055	(4,002)
School of Journalism and Mass Communication	2,300	2,470	(170)	2,300	2,551	(251)	2,734	(434)
School of Law	6,886	8,766	(1,880)	6,886	10,766	(3,880)	12,766	(5,880)
College of Music	19,337	20,566	(1,229)	19,337	21,153	(1,816)	22,469	(3,132)
Provost & Exec. Vice Chancellor, Academic Affairs	48,454	53,141	(4,687)	50,366	54,882	(4,516)	58,105	(7,739)
Continuing Education and Professional Studies	2,649	2,845	(196)	2,649	2,939	(290)	3,148	(499)
Vice Chancellor, Diversity, Equity, & Community Engagement	0	3,500	(3,500)	4,407	5,000	(593)	5,000	(593)
Vice Chancellor, Research & Dean, Graduate School	41,173	47,292	(6,119)	46,915	52,586	(5,671)	53,692	(6,777)
TOTAL	262,317	294,938	(32,621)	278,312	315,849	(37,537)	333,032	(54,720)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

Assembly & Exhibit Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
College of Architecture and Planning	3,030	6,000	(2,970)	3,030	6,000	(2,970)	6,000	(2,970)
College of Arts and Sciences	18,222	51,400	(33,178)	37,629	56,200	(18,571)	58,000	(20,371)
Leeds School of Business	0	2,000	(2,000)	0	2,000	(2,000)	2,000	(2,000)
School of Education	0	2,000	(2,000)	0	2,000	(2,000)	2,000	(2,000)
College of Engineering and Applied Science	2,539	11,326	(8,787)	11,326	11,326	0	11,326	0
School of Law	0	2,000	(2,000)	0	2,000	(2,000)	2,000	(2,000)
College of Music	38,357	70,060	(31,703)	38,357	71,666	(33,309)	79,238	(40,881)
Vice Chancellor, Research & Dean, Graduate School	42,675	53,536	(10,861)	42,675	63,536	(20,861)	63,536	(20,861)
TOTAL	104,823	198,322	(93,499)	133,017	214,728	(81,711)	224,100	(91,083)

ASF = Assignable Square Feet

Analysis by Paulien & Associate

per student FTE. The consultants believe that a reasonable guideline to apply in this category is 11 ASF per student FTE. This factor reflects the needs of all the CU-Boulder programs for fall 2009 plus the space that is currently under construction, and additional spaces of this type that are being planned for the near future. The guideline application shows a space deficit of around 32,600 ASF in this category for fall 2009, an increase in the deficit to 37,500 ASF for 2020, and a 54,700 ASF deficit for the 2030 horizon.

As with the open laboratory category, the guideline was portioned out among the existing programs.

Other Administrative Department Space

Other administrative space averaged slightly more than one ASF per student FTE, which is significantly less than what the consultant would expect. Part of this may be due to the fact that certain administrative functions are done by University of Colorado System offices, which are not included in this study. About 30,000 ASF is included in this space category. The space types included are very similar to the Other Academic Department Space. The following lists the space types included and the major occupants of the space.

- Central storage is about 8,700 ASF of the total allocated in 12 different administrative units. The majority of the space is split between Public Safety, Registration Services, and RPS-Research Building Systems.
- About 5,000 ASF of central service space belongs to Imaging Services.
- The Alumni Association has about 4,700 of exhibition space for its museum collection.
- About 4,600 ASF of meeting room space is dispersed among five units: Admissions; Planning, Budget, and Analysis; Career Services; RPS-Research Building Systems; and Housing & Dining Services.
- Media production space for University Communications accounts for 2,400 ASF.
- The remaining 4,600 ASF is in physical training rooms, non-physical plant shop space, lounges, and computer rooms.
- The guideline used for the analysis is two ASF per student FTE. The guideline application shows a space deficit of about 23,600 ASF at the base year. For the target year deficits increase to 25,500 ASF for 2020 and 28,600 for 2030.

Other Administrative Department Space Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
Senior Vice Chancellor and Chief Financial Officer	9,769	16,765	(6,996)	9,769	18,306	(8,537)	19,397	(9,628)
Vice Chancellor, Administration	11,740	20,147	(8,407)	11,740	21,999	(10,259)	23,311	(11,571)
Vice Chancellor, Student Affairs	8,535	16,711	(8,176)	10,426	17,121	(6,695)	17,844	(7,418)
TOTAL	30,044	53,623	(23,579)	31,935	57,426	(25,491)	60,552	(28,617)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

j. Student Recreation and Athletics

Student Recreation

This category includes rooms that have space use codes of 520, 523, 525, 670, 675, and 730, which are used for student recreation. The facilities are located in the Student Recreation Center, Carlson Gymnasium, and Bear Creek Commons, as well as the Clare Small Arts and Sciences natatorium. For the student recreation analysis, the consultants are using a guideline developed by Bareither & Schillinger in their book University Space Planning. Application of the guideline includes 12.1 ASF for each undergraduate student, 25 percent of the graduate students, and 15 percent of non-student staff.

Application of this guideline for fall 2009 shows a current need for approximately 144,800 ASF of additional space in this category. As the university grows to 35,000 students, the need for additional space in this category increases to 161,100 ASF for 2020 and 174,300 ASF for the 2030 horizon. This need is for indoor recreation space only. Outdoor playing fields would be in addition to this finding. The office need for the Recreation Center-Special Operations is about 7,000 ASF, which brings the total 2030 space need for this unit to just under 350,000 ASF.

Athletics

The need for athletics space is based on the number, type, and level of competitive sports played. CU-Boulder is joining the Pac-10 Conference NCAA Division I in 2011 when it becomes the PAC-12. CU-Boulder has 16 varsity sports. Due to the varied space requirements of indoor athletics program space, there is no one guideline that addresses this space category. The consultants conducted a comparative analysis of athletics space as part of the benchmarking for this analysis. Based on the consultant's knowledge of indoor athletics facilities, 400,000 ASF for athletics space is a reasonable amount of square footage to use as a guideline for this master planning exercise. The amount of space generated for this space type does not include offices for the staff. It includes only the 520 range of room use codes plus space for concessions, training facilities, locker/shower rooms, and meeting/viewing/conference facilities required to support intercollegiate athletics. Space needs calculated in this report are for indoor space only and do not include the needs for outdoor athletics facilities.

There is approximately 266,600 ASF of existing space located in the Carlson Gymnasium, Dal Ward Athletic Center, Coors Events Center, Balch Fieldhouse Complex, Soccer Locker Room, the Stadium building, and a variety of temporary buildings. The guideline application shows a total deficit of about 134,000 ASF for the base year. For the planning horizons, the existing ASF increases by 22,000 ASF, reflecting the completion of the new Basketball/Volleyball Practice Facility. As a result of the new facility, the deficit increases to 111,400 ASF for

both the 2020 and 2030 planning targets.

The total space need for the athletics program includes 400,000 ASF of indoor space plus approximately 25,000 ASF of office facilities for a total of 425,000 ASF.

Recreation Guideline Analysis

Fall 2009	FTE	Guideline Percentage	Guideline Users	Guideline ASF (Users * 12.1)
Undergraduate Students	24,084	100%	24,084	291,416
Graduate Students	2,728	25%	682	8,252
Total Faculty and Staff	6,827	15%	1,024	12,391
Total Guideline ASF				312,060
Existing ASF				167,278
Surplus / (Deficit)				(144,782)

2020	FTE	Guideline Percentage	Guideline Users	Guideline ASF (Users * 12.1)
Undergraduate Students	25,134	100%	25,134	304,121
Graduate Students	3,579	25%	895	10,826
Total Faculty and Staff	7,392	15%	1,109	13,416
Total Guideline ASF				328,364
Existing ASF				167,278
Surplus / (Deficit)				(161,086)

2030	FTE	Guideline Percentage	Guideline Users	Guideline ASF (Users * 12.1)
Undergraduate Students	25,973	100%	25,973	314,273
Graduate Students	4,302	25%	1,076	13,014
Total Faculty and Staff	7,854	15%	1,178	14,255
Total Guideline ASF				341,542
Existing ASF				167,278
Surplus / (Deficit)				(174,264)

Analysis by Paulien & Associates

k. Student Union / Center Space (including Dining and Bookstore Space)

Widely used formulas recommend nine or ten ASF per student for generating student space. These guidelines for space application provide space for the various functions and the space use code designations that are typically found in a comprehensive student center including: food service (630s), bookstore (660s), lounge (650s), recreation space (670s), meeting space (680s), student government/club space (300s and 680s), and other student service type space categories. Existing facilities in this category include space in the University Memorial Center (vice chancellor, student affairs), the CU Book Store (vice chancellor, administration), and food services in the Koelbel Business building and the Wolf Law Building.

The existing facilities counted in this category average 5.3 ASF per student FTE. The guideline applied by the consultants is nine ASF per student FTE for student space at CU-Boulder. At fall 2009 enrollment levels, the application of this space guideline shows a deficit of about 135,000 ASF. At the target years, the deficit decreases to approximately 96,200 ASF for 2020 and 115,600 ASF for the 2030 planning year. This is due to the additional dining facilities in the Caruthers Biotechnology Building and the Center for Community.

l. Student Health Care Facilities

The variety of services offered by student health care programs varies from institution to institution. The space included as student health care at CU-Boulder is the non-office space in the Wardenburg Health Center and Counseling and Psychological Services (CAPS). The office space needed for both of these units is calculated and included under student affairs administrative offices.

For this analysis the consultants used 0.50 ASF per student FTE. The guideline application shows a deficit of space for this space type at the base year and both target years of approximately 850 ASF, 900 ASF, and

1,700 ASF respectively. CAPS is projected to be in the new Center for Community building at the future year.

The approximate amount of facilities required for campus health services at the university would be the total of the Student Health Care guideline plus the office space required by its personnel.

m. Physical Plant

Physical plant space includes room use codes 720 through 765 and excludes parking decks. If central storage space (730s) is not space assigned to and controlled by physical plant operations, it is counted in other space categories such as other academic or administrative department space, library, athletics, or residence life.

Most guidelines suggest a percentage of 6 percent to 8 percent of all square footage on campus, minus existing physical plant and residence life space, be used to drive master plan needs in this category. In most cases, these percentages generate a space need that is greater than the amount of physical plant space typically found at an institution. From previous studies, the consultants have found that the average percentage used to drive physical plant space needs is approximately 4 percent to 6 percent.

For CU-Boulder the consultant applied 4.5 percent as the physical plant guideline. At the base year, the guideline is calculated against existing ASF minus residence space, but for future projections, it is calculated against the projected guideline ASF minus residence space. In the base year, the guideline generated about a 40,360 ASF deficit. For the 2020 planning horizon, a 110,000 ASF deficit is shown, which increases to 135,000 ASF for 2030.

It should be noted that this analysis does not reflect the duplication of physical plant space that might be needed to support multiple campuses. Existing operations are currently hampered by the lack of space on the East Campus for outdoor maintenance equipment

and yards. Additional study is needed to determine whether consolidation of physical plant operation in one site (likely to be remote from all campuses) and then transporting equipment to each work location is more cost effective than duplicating service centers on each campus and avoiding transportation costs or if some combination of these is most beneficial.

n. Residence Life Space

Undergraduate Housing

Across the nation, there are changes in student demands for housing. These changes result in more housing space per student in most recently constructed facilities. A guideline widely used in higher education residence life planning is 275 ASF per bed. A 275 ASF per bed guideline provides sufficient space for a variety of housing types ranging from traditional double-loaded corridor layouts to suite and apartment-style housing. This analysis uses 275 ASF per bed as the guideline to address undergraduate housing needs. The consultant recognizes that CU-Boulder has been able to obtain a much more efficient square footage (less than 150 ASF per bed) for its traditional double-loaded corridor layout. However, for future housing the 275 ASF will give the institution some flexibility as to the types of housing it offers and the implementation of additional living-learning concepts which require more community space in each building.

According to the Task Force Report on Living-Learning Environments, CU-Boulder needs to increase its residence capacity by 1,500 beds minimum in order to accommodate first-year students and a residential population of 20 percent returning students for a successful Residential Academic Program (RAP). For a more effective percentage (30 percent) of returning students and a successful Residential College, 2,000 beds are needed.

This analysis uses 1,500 as the additional number of beds that are needed beyond the current housing stock for the fall 2009 analysis. For the 2030 analysis, 2,000 beds are used as the additional number of beds needed. Multiplying the 275 ASF per additional bed generates a need for about 412,500 ASF more residence life space at the base year. At the 2030 planning horizon, using 2,000 beds as the number of additional beds needed, a need for an additional 550,000 ASF is calculated.

Graduate / Family-Style Housing

The majority of the family-style housing is north of Boulder Creek. It includes Athens Court, Athens North Court, Family/Staff Court, Marine Court, and Newton Court. These communities contain a total of 650 units. There are approximately 200 units at Smiley Court, which is located just south of Boulder Creek on the East Campus. In total, there are about 850 existing units.

The units just north of Boulder Creek are 40 to 70 years old without any substantial renovation. Their life

expectancy has expired and they need to be replaced. The desire is to replace this housing with about 1,300 units at a minimum. At maximum density, this area could support up to 1,900 units. The 200 units at Smiley Court also need to be replaced.

Currently there are 200 family-style units planned at Williams Village. These new units could provide the domino effect needed to replace some of the existing family-style housing stock. The goal of the university is to provide housing for 20 percent of the graduate student population by the end of the planning period. In total, there is a need for 1,700 to 2,300 family-style units, which includes the housing need for graduate international students. The goal of the Department of Housing & Dining Services is to develop sub-communities within the overall community. These sub-communities would have between 200 and 300 apartments each with their own unique identity. Those units that are not rented to students would be rented to faculty and staff.

For fall 2009, 200 new family-style units are included in the analysis (those planned at Williams Village). The guideline used for family-style housing is 1,000 ASF. This amount per unit will allow for not only the housing unit itself but the auxiliary spaces need to build these communities. For the target years, complete replacement of the existing family-style housing units is planned thereby increasing the need to 1,700 units for 2020 and the complete build-out of 2,300 units in the 2030 planning horizon. The existing family-style complexes have been removed from the inventory—a total of about 500,000 ASF.

The table below shows progression of housing units for both undergraduate and graduate/family-style housing units.

Residential Space		Fall 2009		2020		2030	
		ASF per Bed	No. of New Beds Total ASF	No. of New Beds Total ASF	No. of New Beds Total ASF	No. of New Beds Total ASF	
Existing ASF			1,917,789		1,917,789		1,917,789
New Undergraduate Housing (includes undergraduate international students)	275	1,500	412,500	1,500	412,500	2,000	550,000
Family-Style Housing (includes graduate international students)	1,000	200	200,000	1,700	1,700,000	2,300	2,300,000
New Housing Total		1,700	+612,500	3,200	+2,112,500	4,300	+2,850,000
Minus Housing to be Razed (includes Athens Court, Athens North Court, Faculty/Staff Court, Marine Court, Newton Court, and Smiley Court)			0		-606,178		-606,178
Plus New Construction (includes Smith Hall Addition and Williams Village Phase II Pod C)					+105,915		+105,915
TOTAL ASF			2,530,289		3,530,026		4,267,526

Analysis by Paulien & Associates

Student Union/Center Space Analysis

College / School / Unit	Fall 2009			Projected Existing ASF	2020		2030	
	Existing ASF	Guideline ASF	Surplus/ (Deficit)		Guideline ASF	Surplus/ (Deficit)	Guideline ASF	Surplus/ (Deficit)
Leeds School of Business	2,243	4,300	(2,057)	2,243	4,300	(2,057)	4,300	(2,057)
College of Engineering and Applied Science	0	9,443	(9,443)	9,443	9,443	0	9,443	0
School of Law	3,091	3,091	0	3,091	3,091	0	3,091	0
Vice Chancellor, Administration	31,149	45,000	(13,851)	31,149	45,000	(13,851)	45,000	(13,851)
Vice Chancellor, Student Affairs	104,490	214,097	(109,607)	153,075	233,339	(80,264)	252,725	(99,650)
TOTAL	140,973	275,931	(134,958)	199,001	295,173	(96,172)	314,559	(115,558)

ASF = Assignable Square Feet

Analysis by Paulien & Associates

B. Academic Facilities Needs

Academic facilities needs are those most integral to the mission of the university. Academic facilities include classrooms, instructional and research labs, academic offices, assembly and exhibit spaces, libraries, and academic support spaces. Academic programs in residence halls are addressed in the residential section (IV.F) of this plan.

Academic uses occupy 168 acres (29 percent) of the three-campus area, as shown in Exhibit IV-B-1. Academic spaces account for almost half (48 percent) of all building space, about 2,398,000 assignable square feet.

1. Academic Land Use and Facilities Objectives

The campus planning goals that are most important for academic land use and facilities planning are as follows (excerpted from Section I.A):

- Provide high-quality facilities to meet institutional needs. This includes the need to renovate or replace obsolete facilities, facilitate improved ways of teaching and learning, and develop new facilities that meet the growing and changing mission of the institution.
- Accommodate a projected enrollment growth of 9 to 11 percent (through 2020–2021).
- Facilitate increased graduate student enrollment to meet the demands of the research enterprise
- Retain the 10-minute class change period possibility for most undergraduate courses.

In achieving these goals, it is important to recognize that trends identified in the last master plan will continue to influence academic planning in the future. Research will continue to be increasingly more interdisciplinary and technologically sophisticated. Students will demand more experiential learning opportunities. Technology will continue to expand its role in teaching, learning, and research. The changes in academic facilities proposed in this plan are designed to help meet these goals and help ensure a total learning environment.

a. Land Use Objectives

The Main Campus of CU-Boulder has traditionally been a compact academic village, which has facilitated communication between academic units and students. Most existing academic facilities are located within reasonable walking distance of each other. Arts and humanities are concentrated on the west part of the Main Campus. Laboratory sciences are concentrated on the east part of Main Campus. Teaching and research activities benefit from the physical proximity of related disciplines. Proximity increases opportunities for the desirable interchange of students and faculty between related disciplines, and has contributed to the creation of many interdisciplinary centers and institutes, thus furthering the institution’s prominence in research.

On the Main Campus, undergraduate classes are con-

centrated geographically, most within a 10-minute walk, allowing for as many class periods during the day as possible. The principal factor in locating new academic buildings should be to continue this combination of efficiency and synergistic interaction. This plan endorses retaining the 10-minute class change period for the 10-year planning period on the Main Campus and creating a second 10-minute class change zone on the East Campus as teaching begins to migrate toward proposed new development. There will be a 20- to 30-minute offset in class schedule between the two zones, which will give students 30 to 40 minutes to transit between East and Main Campus classes. Within each zone, space for undergraduate classes needs to be given priority within the 10-minute walking areas shown in Exhibit IV-B-2. With the advance in computer systems it may become possible to tailor each student’s schedule to take into account the distance between each individual’s classes.

The coming 10-year planning period will be one of transition for academic and research units on the Boulder campus. Previously, teaching and research functions were concentrated on the Main Campus, within the core. As the population has grown, the campus has become denser, to the point where many of those involved in the master planning process have reported that the campus is too crowded and overdeveloped. This has led to the decision to develop the East Campus as a teaching and research campus focused on science.

The East Campus is planned to foster and expand the interdisciplinary research found on the Main Campus. Five academic and research clusters are planned. Programs relocating from the Main Campus will be located in one of the clusters with similar focus so as to encourage cross-discipline dialog. For more information about the vision for the East Campus, refer to Section V.B.1.

b. Facilities Objectives

The University of Colorado Boulder needs to address both the quantity and quality of the academic facilities. The quantified facilities needs are described in the preceding space needs analysis (Section IV.A) based on projected enrollment and research growth. Financing of capital projects will likely be constrained through much of the planning period, thus efficiencies must be sought through wise use of existing land and building resources, efficient development of new resources, and interdisciplinary partnerships between academic units and with outside agencies.

Existing resources must be renewed to extend their useful life. At the time of this writing, the deferred maintenance backlog for the university exceeded \$300 million. Eighty-five percent of the buildings were more than 25 years old and during the life of this master plan, more than 50 percent of the buildings will become more than 50 years old. A great emphasis will be placed on maintaining and modernizing existing buildings. Where programs are moved into new buildings, the existing

buildings will be re-purposed for new programs appropriate to the type of building. This does not necessarily mean that a laboratory building will remain a laboratory building. In some cases, it may be appropriate to move a less intense use into the building rather than bring the existing building up to the standards of a modern science facility.

Technology continues to have a major impact on what is taught, on how teaching and learning occur, and on how information is developed, stored, and disseminated. Technology is changing space needs. A worldwide library is available to anyone with Internet access, causing universities to re-examine the role of their libraries, which traditionally have been the great storehouses of information.

Given the climate of change, academic facilities must be versatile, adaptable, and flexible to ensure the university’s ability to provide all of its services. Buildings such as the Jennie Smoly Caruthers Biotechnology Building represent this objective by providing the core facilities and infrastructure for a wide variety of life science disciplines while allow the individual labs to be tailored to the needs of the specific researcher. As the research changes, the labs can be adapted to the new research focus without the expensive infrastructure reconfiguration necessary in many of the existing buildings on campus.

CU-Boulder’s instructional and research outputs are the products of its faculty. Facilities of all kinds are a major factor in attracting and retaining faculty. The Flagship 2030 strategic plan outlined the university’s desire to grow the faculty and research enterprise. This was studied further by the Academic Needs and Space Utilization Task Force and refined further through staff analysis to determine the number of faculty and researchers that is described in Section I.D. The faculty’s facilities needs are detailed throughout this section.

Supporting and increasing diversity among faculty,

students, and staff is one goal of the desired campus growth. For example, no academic discipline is limited to students of one gender. Yet 45 years ago the Engineering Center was built with an assumption that almost all engineers would be male. Facilities are also being added on campus to accommodate diversified academic interests, such as women’s studies, Native American studies, ethnic and foreign cultures, and studies of people with various physical limitations.

Academic land use planning is not limited to addressing the needs of traditional students. A wide range of non-traditional and community audiences is served through evening classes, concerts, presentations, conferences, and other continuing education activities. These lifelong learning opportunities afford broad access to CU-Boulder’s educational resources, enhance diversity, and advance economic vitality and quality of life. Educational resources of CU-Boulder also extend beyond the borders of its physical campus through the Internet and distance education activities. The use of campus buildings for continuing and distance education, evening, weekend, and summer activities is included in academic facilities planning.

2. Classroom and Instructional Lab Space

About 806,000 assignable square feet are devoted to classrooms, instructional labs, and related instructional facilities at CU-Boulder. The space needs analysis (IV-A) indicated that there is a shortage of classrooms even after buildings now under construction are completed. Additional buildings planned or proposed (enumerated as academic capital improvements later in this section) will provide instructional space that will address much of the need. At issue is the distribution and type of classroom space, particularly as the East Campus grows and the Main Campus densifies. Some of the space lies outside the 10-minute class change zone (e.g., Fleming Building). Larger classroom spaces are

Classroom Utilization Analysis by Capacity Summary

Room Capacity	No. of Rooms	Average Room Size	Average ASF per Station	Average Section Size	Average Weekly Room Hours	Hours in Use Student Station Occupancy %
20 and Under	31	395	22	13	26	77%
21 - 25	24	548	23	17	32	73%
26 - 30	39	459	17	18	39	67%
31 - 35	22	593	18	24	45	69%
36 - 40	21	650	17	27	44	71%
41 - 45	14	722	17	28	41	65%
46 - 50	26	859	18	30	37	64%
51 - 60	11	871	16	35	43	66%
61 - 75	9	1,166	17	40	36	59%
76 - 100	20	1,304	15	54	38	62%
101 - 150	7	1,608	13	99	38	80%
151 - 250	7	2,099	11	148	37	81%
251 and Over	4	3,881	10	305	36	76%
AVERAGE TOTAL	235	809	18	36	37	69%

needed to keep pace with growing enrollment even if the calculated number indicates that we have sufficient small classroom spaces.

The university has 164 centrally scheduled classrooms. There are 71 additional specialized classrooms, teaching labs, and seminar rooms that are departmentally controlled. The total number of classroom seats provided is 12,391. Classroom utilization remains very high, suggesting that additional improvements in utilization will be difficult.

Throughout the master planning process, there was discussion about the need for larger classrooms. The number of classrooms with seating capacities over 200 has remained constant with only 8 classrooms this size and only 4 classrooms over 251 seats. At least one more auditorium of 250 seats or more is needed for academic purposes and consideration has been given to creating a very large classroom with a seating capacity of 800 seats or more. A very large auditorium would economically accommodate instruction and could create a facility for many non-course-related activities such as general colloquia, public lectures, and film that can fill such a large space. At this time, the decision was made to not include a very large classroom in the plan; however, that may change if funding continues to be reduced while enrollment continues to increase, thus necessitating faculty teaching larger sections.

To facilitate the desired increase in graduate students, more small classrooms will be needed, particularly seminar rooms. These types of spaces are being included in the Jennie Smoly Caruthers Biotechnology Building and others planned for the Boulder campus. Small classrooms are also desirable for upper-division undergraduate teaching. They help maintain the university's low student to faculty ratio.

The inherent diversity of the university mandates that a variety of teaching and research modalities—ranging from the traditional to the most novel and modern—must be accommodated on campus. Lectures and traditional experimental labs will exist side by side with interactive classrooms and computer simulations. Innovative learning environments already include individualized personal computer instruction, facilitation of collaborative group learning, simulations, and distance learning. The university has been a leader in this concept with the Drescher Undergraduate Engineering building and the Alliance for Teaching, Learning, and Society (ATLAS) Center. The university will continue to seek ways of better new teaching pedagogies into facilities.

The wide variety of instructional laboratories and other instructional spaces also needs continual upgrading to stay current with disciplines, knowledge, and technology. Students benefit greatly from experiential learning. Educational laboratories, studios, and other spaces need to reflect or even lead changes in their fields. The

obsolete and even potentially hazardous facilities should be replaced.

3. Office Space

CU-Boulder has about 916,500 assignable square feet of academic office and service space. This is the largest single category of academic space. Existing office space is 90 percent of the recommended space standard, and the magnitude of the shortage is substantial: 97,500 square feet, projected to grow to 140,600 square feet in the year 2020 if enrollment grows as projected. It is already very difficult to find office space for new faculty and staff.

Office and service space shortages have implications for research as well as teaching.

New office space in the Jennie Smoly Caruthers Biotechnology Building will help, but much more is needed. The capital projects listed at the end of this section include a substantial amount of office space included in academic projects.

Space for graduate students is frequently compromised when demand for faculty offices is not met. It is important to locate doctoral student space within departments to the extent possible. As new buildings come on line, backfill space will be sought for more graduate student space for GTPIs and TAs (Graduate Teacher Program Instructorships and Teaching Assistants). Ideally, there will be study spaces for doctoral students at 0.5 spaces per doctoral student. Locked carrels may be provided at the library as the transition to an information center continues.

4. Research Laboratories

The campus has 534,000 assignable square feet of research labs and related service space, which is inadequate. A considerable amount of additional space would be needed for the campus to reach its full research potential (see Section IV.A). Sufficient space to house research being conducted on campus is essential in order to attract and retain faculty at a research university. The amount of research is not related to enrollment, but rather to the productivity of the faculty and research associates. The University of Colorado Boulder has less research space per research dollar than comparable institutions (See Sections I.C.1 and V.A.5).

Several problems have been identified with much of the research space on campus. First, laboratories in many buildings were built 40 or more years ago and have reached the end of their intended lives as effective laboratory sites. Utilities needed to service these labs are sometimes outdated and inadequate. Building structures often do not have the space for upgraded building systems that would be found in a modern laboratory.

Second, there are not enough laboratories in several units to manage anticipated faculty growth. As noted in

the Section IV.A, substantial deficits exist in the natural sciences, engineering, and research institutes—all areas expected to grow the most during the planning period.

The research space shortage has several causes. First, existing research needs more space on an ongoing basis as, for instance, new equipment is added to existing space or new computational stations and data storage facilities are required. Second, more research is being undertaken on campus than ever before. Third, while the relative growth of demand for research space varies considerably from unit to unit, most research space is allocated at the unit level, making for large differences in the relative intensity of the space shortage between units. Fourth, renovations to increase research space in existing buildings are difficult to accomplish since the cutting-edge nature of many programs cannot afford disruption, thus new research space is often “shoe-horned” into suboptimal space.

The movement of several programs to the East Campus offers the opportunity to address some of these issues. Constructing new research laboratories that are flexible and adaptable creates research space that can be modified economically over time as new procedures or equipment is needed. New facilities can be sized to accommodate some level of growth, anticipating the demand in growing disciplines. Making the buildings interdisciplinary will allow units to expand and contract as research dollars vary. The construction of new facilities allows existing laboratories to proceed without disruption until the new buildings are built, thereby minimizing downtime. The Caruthers Biotechnology Building is the prototype for this new generation of research buildings.

Research integrated with undergraduate education identifies first-class research institutions as providers of quality undergraduate education. For this reason, academic classes will be relocated to the East Campus. On the Main Campus, more research space will need to be constructed, perhaps at Grandview Terrace.

Research is increasingly interdisciplinary and technologically sophisticated. New building program plans should incorporate more research flexibility by considering multiple research needs rather than single programmatic focuses.

5. Assembly and Exhibit Space

Certain academic spaces are cultural resources for the community and state populations. These include major performance halls, such as Macky Auditorium and the University Theatre, and museums, such as the natural history museum in Henderson and the CU Art Museum in the Visual Arts Complex. These spaces are vital for the education of students, who may perform in a music or theatre event, prepare or study a museum exhibit, watch a play, hear a concert, or attend a guest lecture. About 104,000 assignable square feet of major public venues have been classified in this category, which does

not include classrooms or laboratories.

The Boulder campus has less major assembly and exhibit space than other major public research universities. In part, this reflects a dependence on cultural facilities off campus, such as Chautauqua Auditorium in Boulder and the Denver Center for the Performing Arts. But it also reflects a true shortage of space in which to perform and exhibit. For example, potential audiences for the excellent music and musical theatre programs at CU-Boulder often exceed the 500-seat Grusin Music Hall or the 250-seat Lyric Theatre, both of which severely limit performance revenues. On the other hand, the 2,000-seat Macky Auditorium is too large for most theater or student voices. A performing arts facility of roughly 1,000 seats, with backstage and support facilities, would greatly strengthen the university's programs and revenue. Because the City of Boulder also needs such a facility, the university and the community have, at various times, considered joint or cooperative cultural resources planning. Renewed collaborative efforts in the future are a recommendation of this master plan.

During the previous planning period, substantial improvements have been made in the university's museum facilities. Some of the natural history collection was moved into a climate controlled facility in the Bruce Curtis Building for Museum Collections. A new fine arts museum and storage facility was constructed as a part of the Visual Arts Complex. Still, more is needed for the natural history museum, where valuable collections in the Henderson building and the herbarium in Clare Small Arts and Sciences building remain in un-airconditioned space, where they are subject to degradation. There is a need for a new science museum, to be constructed on the East Campus. Such a facility is recommended by this plan but is not included on the list of capital projects. The likely funding source being donations, this project would move forward when a suitable donor is found.

6. Libraries

In the Jeffersonian tradition, a university's library is at the heart of the campus. Libraries have served as the central repository of information and the place to learn how to access information. Large numbers of people use libraries for research and study. But changes in technology mean an evolution—if not revolution—for libraries. The Internet increases the need for qualitative changes in campus libraries. Alternatives to print media now abound. Users are faced with an often confounding proliferation of media, technology, and information. The library is the place on campus where students can go to learn how to evaluate and reliably access appropriate resources for research and scholarship.

The University Libraries on the Boulder campus includes Norlin Library and its five branch libraries. The University of Colorado Law Library is administered separately. In addition, there are a number of departmental reading

rooms and specialized collections. The rapidly changing technological environment for research and publishing impacts the libraries of the Boulder campus. According to the space needs analysis (Section IV.A), for fall 2009, the analysis shows that the University Libraries have a 7 percent shortage of space or a need for approximately 23,800 additional ASF. For the target year, a 12 percent space deficit is shown resulting in a need for 38,900 ASF of additional space by 2020.

a. Norlin Library

Norlin Library is a major resource not only for CU-Boulder but also for the state of Colorado. With specialized collections and electronic networks, an increasing number of scholars are served. The extensive Norlin collections and services range from historical archives to multimedia. Norlin is approximately 330,000 gross square feet (210,000 assignable square feet). Campus wide, there are approximately 327,000 total assignable square feet in all library facilities.

The plan is to convert Norlin Library to an information concourse, where all who visit can access and “shop” the world of information. The retrofitting will:

- Create the learning library of the future, with new collaborative learning spaces;
- Provide for the demands of current and evolving information technology;
- Create a space to facilitate access and preservation of special collections and archives that represent the most unique and valuable of the university’s collections;
- Make the building a more inviting home for its many users;
- Create a better-organized, more efficient library;
- Improve ease of use and clarify how to circulate throughout the building;
- Upgrade the building’s west entrance to be a more inviting and functional presence; and,
- Preserve and enhance the building’s architectural integrity in terms of its historic exterior and interior spaces.

b. Branch Libraries

The branch libraries outside Norlin (and proposed plans for them) are:

- Leonard H. Gemmill Engineering Library. Design work is completed and a proposal to renovate the 1st floor of the library into a Learning Commons was submitted to Academic Affairs as a fiscal year 2011 Academic Infrastructure Improvement Request.
- William M. White Business Library. No change is proposed since it was recently reconstructed.
- Oliver C. Lester Library of Mathematics and Physics. This library is slated to close in summer 2011.
- Jerry Crail Johnson Earth Sciences Library. No change is proposed.
- Howard B. Waltz Music Library. The library is inadequately sized, so additional space will need to be

found, but no specific proposal has been set forth yet.

c. The Law Library

The William A. Wise Law Library is a unique resource within the University of Colorado system and the state of Colorado. It is the largest law library, public or private, in the state and the region, and provides legal information resources to the university community and the state. The Wise Law Library presently occupies approximately 52,000 assignable square feet, plus a reference collection for the faculty known as the Lasky Library, both in the Wolf Law Building.

This new law library is an efficiently organized and technologically sophisticated facility. It includes space for instruction in book and computer-based resources, extensive computer facilities, and group and individual study. Staff spaces reflect the dramatic impact technology has brought to library operations. The entire facility features flexible spaces and is designed to accommodate technological tools as they evolve.

e. Remote Storage Facility

Due to insufficient space and floor weight-loading limitations in Norlin, a large number of volumes have been moved to the Preservation and Access Service Center for Colorado Academic Libraries (PASCAL), a high-density, environmentally-sound preservation facility. Rather than occupy valuable real estate and limited library space on the Boulder campus, infrequently used information resources will continue to be housed in this facility located on the Anschutz Medical Campus. On-campus facilities will be devoted to housing user services and frequently accessed general collections and specialized collections (i.e., special collections and archives), which have unique usage, security, and housing requirements.

f. Departmental Reading Rooms and Specialized Collections

The following are among the largest departmental reading rooms and specialized collections that are administratively separate from the University of Colorado Boulder Libraries (with proposals for changes indicated):

- Woodruff Women’s Studies Cottage Reading Room. No change proposed.
- Visual Resource Center (VRC) Slide Collection. No change is proposed since it is in a new facility.
- Anthropology Reading Room. No change since it is relatively new.
- Morris Reading Room, a philosophy library with an extensive collection of ethics, value, and social policy literature. No change is proposed since it is relatively new.
- Roger G. Barry Resource Office for Cryospheric Studies (ROCS). ROCS offers a unique set of collections focused on both science and history in the Earth’s frozen regions, including the Arctic, Antarc-

- tica, the Poles, glaciers, ice sheets, sea ice, frozen ground, and more. No changes are anticipated.
- MCD Biology Reading Room. No change is proposed since it is relatively new.
- Institute for Behavioral Sciences Library: No changes are proposed as it is in a new facility.

The changing nature of periodicals and technical journals will greatly change the way scientific research is done in the next 10 years. There will likely be the migration to online formats that will reduce the space needed for reading rooms. At the same time, printed materials are still being produced and play an important part in the understanding of particular issues. Reading rooms also help foster collaboration as faculty and students comingle in a common space and have discussions about their work. This suggests that reading rooms will continue to be part of the campus culture but evolve in their roles into interdisciplinary spaces where collaboration takes place.

g. Space Planning Principles

The following space planning principles are set forth for libraries on the Boulder campus:

- A robust campus information technology network and infrastructure will be in place.
- Libraries will continue to provide a core of basic services, e.g., research assistance, information literacy instruction, and information resource development services; however, the media through which information is carried, packaged, and transmitted will change.
- Electronic publishing is becoming more commonplace but is not yet a substitute for local collection, development, and physical storage; the design of new library space should, however, project growth of paper-based collections at lower rates than in the recent past.
- Dependence on the printed word will decrease, but will not disappear. Many print resources will not be available in electronic format, at least in the foreseeable future. Libraries will continue to preserve and provide access to the plethora of print materials that are needed for research and instruction at a research university.
- The library’s responsibility to teach students to be continuous learners will not decrease with new facilities. New or renovated construction should house instructional facilities designed specifically for access to, and retrieval of, the scholarly record.
- Library users require a range of diverse learning environments, so dedicated areas for quiet study, group study, group instruction, individual instruction, videoconferencing, and use of electronic information resources and technology are implied.
- Seating capacity guidelines as recognized by library planning standards will be used in all library designs so as to accommodate the populations being served.

- Almost all library space will be designed to be flexible, so that when a space use change is needed, it can be met with as little modification and expense as possible.
- Space planning will take into account furniture and workstations to support increasing use of portable technology applications.
- Building and renovation plans will include noise and environmental controls.
- The increase in technology will require a corresponding increase in information technology budgeting, support staff, and space for this staff. Technology has also radically changed how support staff performs their jobs so workspaces must be redesigned accordingly.
- Many materials will be stored off site with on-campus user access services provided. New on-campus storage designs will accommodate movable compact storage wherever possible.



7. Academic Capital Improvements

Based on the preceding analysis, the space deficits identified in Section IV.A, and the need for up-to-date facilities, many academic capital projects are needed. The following lists include projects over \$2 million proposed for this planning period (through 2019–20). Location, timing, square footage, and cost estimates for these projects are detailed in the Building Plan (Section V.A). Most projects address both the need to upgrade existing facilities and the need to accommodate the projected growth. The list includes projects that have come on line since the space analysis was begun in 2009.

a. Major Projects Underway (in alphabetical order):

- **Ekeley Sciences East Wing Renovation:** This renovation has completed design and is waiting for funding from the state.
- **Information Technology Infrastructure:** In December 2010 the campus completed a new technology backbone that provided high-speed wiring to desktops in buildings, new equipment in General Fund buildings, and wireless access to most areas of campus.
- **Institute for Behavioral Sciences:** This 75,000 GSF office building was completed in fall 2010.
- **Jennie Smoly Caruthers Biotechnology Building:** A 330,000 GSF interdisciplinary research and academic building is being built on the East Campus for Biochemistry, Chemical, and Biological Engineering and for the Colorado Initiative in Molecular Biology and will open in March 2012.
- **JILA Addition:** A 46,000 GSF addition to the south end of the Duane Physical Sciences Complex will add research laboratories to the existing program. The project is under construction and will come on line in the fall 2012.
- **Visual Arts Complex:** This building, completed in March 2010, replaced the Sibell Wolle Fine Arts building with a new state-of-the-art studio building and fine arts museum. The new building is 187,000 GSF, increasing the space for the department by more than 35 percent.

b. Proposed Renovations

The Boulder campus is relatively old for a Colorado higher education institution; thus renovations are a greater need than on newer campuses. As discussed in Section I.A.6, 85 percent of the campus buildings are 25 years or older and by 2016, more than 50 percent of the buildings will be 50 years or older. There are too many older academic buildings in need of renovation work to list each individually. The extent of such renovations varies considerably. Renovations may occur when:

- Buildings are approaching 100 years old or, as a result of a major change of use, require complete reorganization of space and replacement of building systems such as electrical, plumbing, and heating/cooling.
- Programs in older science buildings have a defi-

ciency of suitable space.

- Science buildings built across the country in the early 1970s change their scientific techniques.
- Academic buildings are retrofitted for informational technology equipment in light of technology's short cycles.
- Existing programs vacate space to a new building or space.
- Deferred maintenance, controlled maintenance, or capital renewal projects are slated to address one or more systems in a building.

Major renovations fall into two broad categories: those due to capital renewal projects that address infrastructure with only limited change to the programs, and those that are due to programmatic changes anticipated in the planning period.

Capital renewal projects are that may occur in the planning period (in alphabetical order) include:

- **Clare Small Arts and Sciences**
- **Education**
- **Guggenheim Geography**
- **Hellems Arts and Sciences**
- **Henderson Museum**
- **Ketchum Arts and Sciences (design is complete and awaiting funding)**
- **McKenna Languages**

Major renovation projects that may come forward (in alphabetical order) include:

- **Carlson Gymnasium Renovation:** The completion of the Basketball/Volleyball Practice Facility resents the opportunity for conversion of this facility into an educational or recreational use.
- **Cristol Chemistry and Biochemistry Renovation:** The completion of the Jennie Smoly Caruthers Biotechnology building will free up space in several buildings, the largest of which will be Cristol. New programs supporting research and teaching will go into the core campus facility.
- **Fleming Building Renovation:** With the completion of the Wolf Law Building, Fleming has been used as surge space during the renovation of Business and the construction of the Visual Arts Complex and will likely be used as surge space during some of the capital renewal projects. In the future, it would be appropriate for other teaching and select library collections uses that do not need core campus locations.
- **Geosciences:** Plans are to acquire and renovate a building for academic and research programs that investigate environmental and earth science issues. The project will also involve a new laboratory building described below.
- **Norlin Library Renovation:** The main library has begun a multi-phase renovation program that will last over the entire planning period to modernize the facility as described above.

This list is not comprehensive. During interviews with deans and institute directors, numerous renovation projects were discussed of various sizes and scopes. Not all of the renovations could be listed here and only the major projects where some scope definition has been investigated were included. More academic and research renovation projects will come forward in the planning period as need and funding sources are identified.

c. Additions and New Buildings:

Major additions proposed for academic (including research uses) are in alphabetical order:

- **Aerospace and Energy Systems Addition:** A major addition to the Engineering Center, this project would add a research and teaching building between the Discovery Learning Center and the Aerospace Engineering wing.
- **Auditorium Addition to an Academic Building:** At least one more auditorium in the range of 250 seats is needed to support the teaching mission. The Leeds School of Business conducts introductory classes of this size and must hold them in a 400-seat auditorium in the Mathematics Building. Teaching in a more appropriate sized space would free the larger classroom for appropriately sized teaching.
- **Chemistry and Life Sciences Building:** The move to the East Campus of Biochemistry divides the Department of Chemistry and Biochemistry. This project would move all but the beginning teaching functions to a new building. Integrated Physiology, located in inadequate space in Carlson Gymnasium, would likely move as well, given its affinities with the other biosciences to be located in the biotechnology building.
- **Duane Physical Laboratories "H" Wing Addition and Renovation:** A substantial addition, planned since the construction of Duane in 1971, could accommodate the physicists now located in an obsolete and remote building on the East Campus, and help meet the needs of physicists and astrophysicists for academic/research space.
- **Geosciences Laboratory Building:** A wet laboratory building will be built with the office and dry lab space once a site has been identified and acquired. This will hold the analytical chemistry research and teaching labs in the energy and environmental programs.
- **Grandview Research/Academic Buildings:** New research space in Grandview may be required if programs that are not being considered for the East Campus need to expand.
- **Imig Music Building:** As the College of Music outgrows the Imig Music Building, more intensive use of the site should be considered in place of one-story portions of the building. Planning for this might start in the 10-year period but it is unlikely to be completed in that time, and so will not appear on the capital projects list.

- **LASP Space Technology Research Center:** CU-Boulder's space science research continues to grow. Funding for LASP continues to increase and many of the programs last more than 10 years. An addition would allow an increase in the production facilities for experiments.
- **Norlin Library Addition:** Special Collections and Archives are housed in spaces in Norlin where they are at risk of damage or subject to deterioration. The addition would provide a climate-controlled, high-density storage facility for easy retrieval. Because of the nature of the materials, they are not suitable for PASCAL.
- **Performing Arts Center:** A 1,000-seat performance facility for the College of Music would fill a gap in the performance venues between Macky Auditorium and Grusin Music Hall. This would greatly improve the opera program and the ensemble program over current facilities.
- **Research Property System (RPS) Office Building:** To address the deficit of research space, an office building in the Research Park would accommodate many disciplines, centers, and institutes.

This master plan also identifies several locations for academic and research buildings on the Main Campus and East Campus that are unspecified. Given the demand for space, these sites and space allocations are for the later stages of the master planning period to allow for potential projects to be proposed that are not yet known.

Location, scheduling, square footage, and estimates for these proposed capital improvements are detailed in the Building Plan (Section V-A).



C. Service and Administrative Needs

Administrative units of the university provide essential support to the students, faculty, and staff. With more than 36,000 people at the University of Colorado Boulder during a semester, the university is, in essence, a “city within a city.”

Services and administrative uses occupy 75 acres, 12 percent of the developed three-campus area in Boulder. See Exhibit IV-C-1. These spaces account for 9.8 percent of all building space, about 562,700 assignable square feet.

1. Services and Administration Objectives

For the 10-year planning period, the University of Colorado Boulder is projecting an enrollment growth of 9 percent. This increase will drive the need for additional faculty and staff in order to maintain an appropriate level of support services. The university must continue to restructure its existing service delivery system if it is to meet current and future demands to provide services in a convenient and efficient manner. Particularly, the campus must improve the processes of:

- Conducting student transactions (registration, financial aid, etc.) in a seamless, integrated, efficient and effective way.
- Improving existing facilities, and planning new facilities, to accommodate efficiently the space needs of administrative and student services staff.
- Developing new services to support international students and preparing American students to study abroad, due to the globalization of the university.
- Meeting needs for a variety of student and employee services, including food and health, in an efficient and customer-oriented manner.
- Incorporating new technologies into the service delivery systems in order to support the intellectual, personal, social, cultural, and physical well-being of students, faculty, and staff.
- Improving the services, transportation, and communication systems linking the campus properties in Boulder.

Improved service delivery supports the following principles of the Flagship 2030 strategic plan outlined in Section I of this plan, namely supporting customized learning and making enterprise work.

2. Office Services for Students, Faculty, and Staff

Office space constitutes the largest block of non-residential space on campus at 30.9 percent. It is composed of offices and support space for the administration of the campus, faculty, researchers, and related support staff, student support services, student

organizations and graduate students. Office space on campus in its present form is highly utilized, yielding the perception that that there is a lack of suitable space on campus.

Over the past 10 years, much of the administrative and student service office space has been consolidated into four locations:

- **Regent Administrative Center** houses the front door services such as admissions, registrar, bursar, office of the provost, vice chancellor for administration, and vice chancellor for diversity, equity, and community engagement.
- **The Center for Community** houses many of the student development and services offices.
- **The University Administrative Center** houses the chancellor, University Counsel, and the rest of the vice chancellors.
- **Administrative and Research Center-East Campus (ARCE)** houses the “back of house” functions of the administrative units.

There are also a few administrative offices directly associated with individual colleges that they support. For example, both the Colorado Law and the Leeds School of Business have their own admissions offices. Consolidation of administrative functions will continue to provide better service to students and increase efficiency.

According to the space needs analysis (Section IV.A), there is a 36 percent deficit of office space for services and administration, compared to the guideline. This is expected to grow to 38 percent at the end of the planning period.

Campus services are organized in the following manner:

a. Office of the Chancellor

The Office of the Chancellor provides executive oversight and administration for the CU-Boulder campus. The provost and executive vice chancellor for academic affairs, senior vice chancellor and chief financial officer, and the athletic director report to the chancellor. The chancellor’s office is housed in the University Administrative Center.

b. Division of Academic Affairs

The Division of Academic Affairs is responsible for administering the academic programs and policies of the Boulder campus, and for providing intellectual leadership for excellence in teaching, scholarship, and creative work. The division recruits faculty, deans, and other academic leaders, and allocates resources to ensure high-quality teaching, research and creative work, and service. Units reporting to Academic Affairs include:

- All the academic schools and colleges.
- Dean of the Graduate School.
- Vice chancellor for student affairs.
- Vice chancellor for research.

- Vice chancellor for diversity, equity, and community Engagement.
- Omsbuds Office.
- Alliance for Teaching, Learning, and Society.
- Faculty Affairs.
- Undergraduate education.
- Continuing education and professional studies.
- Outreach and engagement.

Most of the academic affairs units not associated with a school or college are located in the Regent Administrative Center, Center for Community, or Administrative and Research Center–East Campus. The exceptions are student affairs that is located in the Center for Community and continuing education and outreach and engagement that are located in Grandview. There is a constant pressure to grow these departments due to ever increasing state and federal regulation, and increasing demand as the student population grows.

c. Division of Student Affairs

The primary focus of the Division of Student Affairs is to create a positive learning environment that fosters successful learning and personal development, both inside and outside of the traditional classroom. Student learning and success is enhanced when the academic environment and community support students’ full development as individuals—not just as isolated intellects—and when students are seen as important partners in the learning experience.

A wide variety of office service units report to the vice chancellor for student affairs (VCSA), including:

- Wardenburg Health Center.*
- Counseling and Psychological Services.
- Recreation Services.*
- Victims Assistance.
- Dean of Students.
- Housing & Dining Services.
- Career Services.
- University Memorial Center.*
- Orientation.
- Veteran Affairs.
- Environmental Center.*
- Office of Student Conduct/Honor Code.
- Student Outreach Retention Center for Equity (SORCE)*
- Women’s Resource Center.*
- Gay, Lesbian, Bisexual, and Transgender Resource Center.*
- Interactive Theater Project.*
- Jewish Affairs.*
- Center for Multicultural Affairs.*
- Student Organization Finance Office.*
- Volunteer Resource Center.*
- Off-Campus Student Services.*
- Student Legal Services.*

The VCSA is also the reporting link with the student

government, which has an autonomy agreement with the Board of Regents. Services in the list above denoted with an asterisk (*) are programs that are jointly managed with CU Student Government (CUSG).

Jointly managed programs are largely located in one of the three CUSG cost centers: the Student Recreation Center, UMC, or Wardenburg Health Center. The remainder of student services are located in either the Center for Community or Regent Administrative Center. This represents a significant consolidation of these services that has taken place over the past 10 years to create nearly a one-stop experience for students seeking services. Additional consolidation will be sought where feasible.

d. Office of the Vice Chancellor for Research (VCR)

The Office of the Vice Chancellor for Research serves as a focal point for the investment in campus research, scholarship, and creative works, and strives to provide the types of infrastructure and administrative support that is necessary to promote and sustain our world-class faculty and research programs. The units reporting to the VCR include:

- All the Boulder campus institutes, colleges, schools, and departments conducting research.
- Office of Contracts and Grants.
- Research Integrity.
- Conflicts of Interest.
- Animal Resources.

All of the offices associated with the VCR are located within the Regent Administrative Center and the Administrative and Research Center–East Campus. The need for additional office space continues to grow as more sponsored research grants are awarded to CU-Boulder and reporting requirements expand.

e. Office of Diversity, Equity, and Community Engagement (ODECE)

Led by the vice chancellor for diversity, equity, and community engagement, ODECE provides dedicated leadership to CU-Boulder’s campus diversity efforts. The office fosters CU-Boulder’s vision for a diverse campus climate and works with students, faculty, and staff to implement the campus diversity plan. The units that report through ODECE include:

- Disability Services.
- Pre-College Services.
- Student Success.
- Campus Climate and Community Engagement.
- Faculty Success/Faculty Associates.

Four campus-wide standing committees also report the ODECE:

- Chancellor’s Standing Committee on Gay, Lesbian, Bisexual, and Transgender Issues.
- Chancellor’s Committee for Women.
- Chancellor’s Advisory Committee on Minority Affairs.
- Chancellor’s Committee on Program Accessibility.

Offices for ODECE are located within the Regent Administrative Center and Center for Community. Flagship 2030 places emphasis on diversity in the next 10-year planning period as Colorado’s population is expected to become more multicultural. This, combined with an increase in international students planned, suggest that there will be a large increase in the demand for the services provided by ODECE. Given the relatively small amount of space in ODECE, there could be a potentially large percentage increase in the amount of office space required.

f. Office of the Senior Vice Chancellor and Chief Financial Officer

The senior vice chancellor and chief financial officer provides leadership in the financial management, operational, and planning activities of the campus. The office is responsible for all business operations of the institution, ensuring sound financial management.

A wide variety of business operations report to the senior vice chancellor including:

- Vice Chancellor for Administration (VCA).
- Enrollment Management.
- University Communications.
- Budget and Finance.
- Real Estate Acquisitions.
- Chief Information Officer/Information Technology Services (ITS).

Operational units of the VCA have office space mostly in the Administrative and Research Center–East Campus or associated with their individual departments and are detailed below. Information Technology Services is located in the Telecommunications Building on the Main Campus and the Computing Center on the East Campus and its office needs are discussed in Section V.B.1. The remaining units have high-touch services located in the Regent Administrative Center and low-touch services located in ARCE.

Space for campus business services have been greatly compressed over the past planning period as technology has improved work process and funding cuts have forced staff reductions. It is likely that for much of the planning period, funding will remain tight for these services, thus the trend toward consolidation will continue and there will be little space growth in several of these units.

g. Division of Administration

The Division of Administration, overseen by the vice chancellor for administration (VCA), develops and maintains the infrastructure of the university so that CU-Boulder’s mission of teaching, research, and service can be fulfilled. The division oversees all capital construction, public safety, and human resources.

Units that report to the VCA include:

- The three operational units in Facilities Manage-

ment: Planning, Design and Construction, Business Services, and Facilities Operations.

- Environmental Health and Safety.
- Police, Public Safety, and Parking and Transportation Services.
- Human Resources.
- CU Book Store.

Offices for divisions that are not considered physical plant operations are housed in the Regent Administrative Center or in the Administrative and Research Center–East Campus. Space within these units is largely considered adequate after the consolidation of services in ARCE. During the 10-year planning period, there will be some oscillation of space needs but the demand for more space is not expected exceed that which is available in ARCE.

3. Student Center, Dining, and Health Services

The University of Colorado Boulder provides the campus community with essential support services at the University Memorial Center (student center), the Wardenburg Health Center, and a variety of dining services. These facilities are conveniently located on the Main Campus. In the future, some or all of these services may need to be located or duplicated on the East Campus; however, during the planning period it is unlikely that this will occur with the exception of dining services.

a. Student Center

The student center was constructed in 1953 and dedicated as the University Memorial Center (UMC) to Colorado citizens who died during World Wars I and II. The UMC serves the campus community by providing space for student organizations and programs, meeting/conference rooms, the Book Store, catering services, recreational activities (bowling, billiards, game room, etc.), study areas, dining services, a credit union, and miscellaneous retail shops and kiosks. Major capacity additions to the building occurred in 1964 and in 2001. Renovations of the building occurred in 1986, 2001, and in 2010 that have upgraded the appearance of the building without increasing capacity.

Student enrollment has increased from 25,000 to 30,000 in the past 10 years and the addition completed in 2001 was sized to catch up with campus growth from the 1960s. Thus, the UMC is heavily scheduled and student groups have to share office space. The lack of meeting space appears in individual programs and with interviews conducted with some deans and directors where requests for ballroom, conferencing space, and large flat-floor meeting rooms were made. The space needs analysis indicates that there is a demand today of more than 134,000 assignable square feet that will remain fairly constant through the planning period. This suggests that another addition to the UMC may be warranted—or perhaps a new satellite facility should be considered. A future expansion over the east wing is

shown on the Long-Term Potential Development Areas map (Exhibit V-A-1), if and when additional growth of this facility is warranted.

Renovations to the UMC will also be needed in the planning period. The most recent renovation provided a cosmetic upgrade to the food servery but did not address the back-of-house functions in the kitchen. Much of that area dates to the 1964 addition and cannot support the current cooking practices. Renovation of this area is likely to happen in the planning period.

Renovation of the Glenn Miller Ballroom is also needed. It has not had any significant renovation since it was built in 1953. It is an important university and community asset as the largest meeting space in the City of Boulder and its history is filled with many important events. Modernizing it will enhance its capability while preserving it as a part of the campus heritage.

b. Dining

Dining facilities serve an important function in the academic community beyond providing a necessary place to purchase or eat a meal during the day. Dining facilities should serve as vital points of contact between students, faculty, and staff. They should also encourage the exchange of views, opinions, and ideas, serving as places where students of diverse backgrounds can gather and interact together. This is the essence of a university. Dining services are available on and around campus in several forms. Large-scale dining facilities exist in the UMC, Center for Community, and several residence halls. Smaller “satellite” cafes and dining areas are located in some buildings around campus.

The UMC is the major retail dining facility on campus. It offers several campus-run and private-vendor dining options. The UMC also has a catering kitchen that provides services for the many meetings, conferences, and miscellaneous events around campus. As noted above, the food service facilities were partially renovated in 2001 and 2010 but additional work is needed in the production kitchen.

The Department of Housing & Dining Services (HDS) operates dining centers for the residence halls and also provides a catering service for university events. Dining Centers are located in the Center for Community, Farrand Hall, Sewall Hall, Libby Hall, and Darley Commons. They are focused on providing a residential dining experience, rather than the retail experience of the UMC and other vendors on campus.

All the dining centers except Darley Commons are brand new or have received substantial renovation within the last 10 years. Gone are the traditional cafeteria lines, which are now replaced with “Marché” style cooking stations where food is prepared in front of the patron. This greatly improves the perception of quality, increasing student satisfaction. Darley Commons will be renovated or replaced during the planning period.

HDS also operates several “Grab-and-Go” facilities on campus. Grab-and-Go facilities offer carry out food service that can be purchased either as part of a meal plan or using Campus Cash, a declining-balance card systems that is available to anyone on campus. The Grab-and-Gos help spread out hours of operation and serve students that are in a hurry or cannot eat at dining center during normal hours.

In 2003, the UMC closed its satellite retail facilities around campus that were no longer financially viable. New private vendors have stepped in to provide food service operations in several new and renovated buildings. Private vendors operate in Wolf Law, Koebel Business, the ATLAS Center, the Engineering Center, Norlin Library, McAllister Center, and Porter Biosciences. Another is planned for the Jennie Smoly Caruthers Biotechnology Building. HDS operates two fully retail operations in the Center for Community—a bakery and a late night food service that offer pizza and sandwiches. There is constant demand for these convenient venues and it is likely that more will be added in future buildings, assuming that there is market support.

Recently, a new form of dining has begun to appear on campus—mobile street vendors. These vendors do not have permanent space on campus but rather bring a servery to campus in the form of a trailer. Their operation may park on campus a few days per week for limited hours. The advantage to the university is it provides another venue that can shave off-peak demand without dedicating valuable permanent space on campus. There are management issues that will have to be addressed so that this type of vending does not saturate campus, and logistical problems with finding a suitable location for the vendor. Land planning will need to recognize this form of dining and provide appropriate, planned locations for this service.

Off-campus dining options exist, although not close enough for most of the campus community to use, given limited time during the day. West of campus is the “Hill” commercial area. The Hill offers the campus community an eclectic mix of coffeehouses, casual dining, and ethnic restaurants. Limited food service options are available elsewhere on the campus perimeter as well.

c. Health Center

The Wardenburg Health Center is a fully accredited, comprehensive, outpatient, health-care facility. Services are available to the campus constituent base of students, faculty, staff, retirees, and their families. The 56,000 gross-square-foot facility was built in 1959 and renovated in the early 1990s and in 2006.

Outpatient care is offered in general and internal medicine, minor surgery, psychological health, sports medicine, women’s health, and peer health education. The center also includes a psychiatry clinic that offers individual and group therapy; stress management; bio-feedback training; and drug, alcohol, and sexual health

counseling.

Additionally, the center conducts health education programs on acquaintance rape awareness, sexual health peer education, nutritional counseling, stress management, and stop smoking programs.

Wardenburg also houses the Clinical Translational Research Center (CTRC), which is the human research center for the Department of Integrative Physiology and other departments conducting human clinical and translational research on campus. The CTRC was created by the merger of four similar facilities at the University of Colorado Hospital, Children’s Hospital, National Jewish Health, and CU-Boulder. These centers provide services in bionutrition, core laboratory services, IT and statistical support, medical support, subject safety, and pharmacy. These services require that they are located in an accredited facility for human research and Wardenburg is the only facility on the Boulder campus at the present time.

During the planning period, the demand for space in Wardenburg is expected to grow. Medical services for the expanding student population will need more space and human research will grow as more grants are acquired in this field. During the past planning period, several concepts for expanding Wardenburg to the east have been proposed but not implemented. It is likely that some form of expansion will be needed, either at the current site or perhaps in a new location, depending on financial models.

4. Physical Plant Space

The Physical Plant is the space needed for operational services of the university. The three main elements of physical plant space are:

- Facilities Management, including Distribution Services and Mailing Services.
- Environmental Health and Safety.
- Public Safety.

It does not include maintenance shops of the Department of Housing & Dining Services.

Physical plant space is about two-thirds of the space typically provided for such functions (per the space needs analysis, Section IV.A) with a current deficit of more than 40,000 ASF. This deficit will nearly triple as the East Campus develops in the planning period.

a. Facilities Management

Facilities Management is the largest of the physical plant departments. It is responsible for the planning, design, construction, maintenance, and operation of all buildings and grounds on campus as well as the distribution of materials to departments and the removal of waste and recyclables. The mission of the department is to provide a safe physical environment that promotes the advancement and transfer of knowledge.

Facilities Management has its primary facilities in the Stadium Building (for shops and the Service Desk), Research Laboratory No. 2 (for Business Services and Planning, Design, and Construction), 3300 Walnut Street (for Distribution and Mailing Services, and the Stores facility for materials), and the Grounds Building (for grounds, fire alarm shop, and recycling processing). Satellite offices exist around campus to support custodial operations in several academic buildings.

Facility Management’s shop functions are not an optimal utilization of valuable space in the core campus. Most of Facilities Management should be moved off the Main Campus to a consolidated facility. Such a facility would provide certain efficiencies because loading docks, equipment, and shop and repair space would be shared. The vacated space in the Stadium Building should be converted either for academic use or Intercollegiate Athletics.

The Grounds Building is located in the expansion area for the Dal Ward Athletic Center or for a new parking structure and fieldhouse. In order to accomplish either, it is likely that the operations in the Grounds Building would have to be moved. This work is not currently in the planning period; however, the need for this or expanded Facilities Management space is likely and may be accelerated by the other projects and campus sustainability efforts. If so, the evaluation of which services should be moved will need to take place.

The Distribution Center and Mailing Services is located in a leased industrial facility located at 3300 Walnut Street that is owned by the CU Real Estate Foundation. The entire building is quite large, with only about 40 percent of the building occupied by university operations. This affords some flexibility in meeting the department’s storage needs since more space can be leased when growth is desired. This building should be considered when relocation of some or all of the shops, grounds, or environmental management operation is evaluated.

b. Environmental Health and Safety (EH&S)

The Environmental Health and Safety department at the University of Colorado Boulder provides comprehensive environmental, health, and safety services to minimize health and safety impacts to the campus and the greater Boulder community. EH&S accomplishes this through training, emergency planning, and consultation and partnership with members of the campus community as well as with local, state, and federal agencies. EH&S is responsible for emergency management, business continuity during emergencies, hazardous materials and waste management, radiation safety, and asbestos and lead removal and monitoring.

The Main Campus is served by the Environmental Health and Safety Center where hazardous materials are processed before disposal. The existing facility is of adequate size for the Main Campus and has an expansion capability should the demand on the Main Campus

grow. Buildings on the East Campus cannot now be served by the Main Campus facility because untreated waste cannot be transported over the city streets. This means that as more waste producing programs are moved to the East Campus, there will be a need to build a satellite facility to process waste. This is not currently anticipated in the planning period.

c. Public Safety

The Department of Public Safety is comprised of the Police Department and Parking and Transportation Services. The police enforce state laws, municipal ordinances, and university rules and regulations. Parking and Transportation Services is responsible for managing and maintaining much of the parking on campus.

The Department of Public Safety is located in the Police and Parking Services Center adjacent to the Regent Drive AutoPark. The building was constructed in 1991 and was expanded in 2009. The building is adequate for existing demand but will be undersized as the campus grows.

The Police Department also maintains a branch station on the Williams Village Campus in the Bear Creek Commons Building. Another branch station will be needed on the East Campus as it develops. A dedicated branch is not included in this plan; however if one is needed, it could be incorporated into one of the buildings that are planned or will be acquired.

5. Services and Administration Capital Improvements

Based on the preceding analysis, the space deficits identified in IV.A, and the need for up-to-date facilities, several projects to accommodate various services and administration are needed. The following lists include projects over \$2 million proposed for this planning period (through 2020–21). Location, timing, square footage, and cost estimates for these projects are detailed in the Building Plan (Section V.A). All projects address both the need to upgrade existing facilities and the need to accommodate the projected growth.

a. Projects Underway

At the time of this writing, a new utility plant and a renovation of the existing plant is being planned. The existing power house would be renamed the West District Utility Plant and a new plant will be constructed near the Coors Events Center. These plants would provide more steam and chilled water capacity for the Main Campus and reduce the carbon footprint, helping to achieve the campus’s sustainability goals.

b. Proposed Renovations, Additions, and New Construction

Several projects are proposed in order to provide needed services (listed alphabetically):

- **Facilities Management Building.** A consolidated

service center housing all Facilities Management and Distribution Services functions is planned. The proposed Athletics Fieldhouse will necessitate moving Facilities Management functions in and around the Grounds Building (which is to be demolished). Ideally, this would be located proximate to the Distribution Center.

- **Koenig Alumni Center Addition.** The Alumni Center is out of space to accommodate services to alumni, and could be expanded if resources (perhaps a donor) become available.
- **Miscellaneous renovations for service and administrative functions.** As noted above, there are pressing needs for renovations within many of the service and administration areas. There will likely be additional renovations in Regent Administrative Center as student services are consolidated. The UMC needs additional renovation of the food service area, particularly the back-of-house functions and the Glenn Miller Ballroom. One of the former IBS buildings will be remodeled for Outreach and Community Engagement. Also, the renovation of the Wardenburg Health Center may be needed to improve services.
- **Service projects on the East Campus.** Projects and services needed to support the expanding research and academic mission of the East Campus may be considered during the planning period. These may be included in individual projects or aggregated together into a stand-alone facility.
- **Transportation Projects.** Transportation projects are considered in the Transportation Plan (V.E) and may include additional structured parking and transit center improvements. Improvements to the 19th Street Trail will likely occur in the planning period.
- **Utility Infrastructure Projects.** Utility services are considered in the Utilities Infrastructure Plan (V.F) and may include improvements to the civil utilities (water, sewer, etc), communications infrastructure, utility generation capacity, and initial utilities or flood control improvements with other governmental agencies at CU-Boulder South.
- **Welcome Center.** Creating a positive first impression is important in attracting the best and brightest students to CU-Boulder. A Welcome Center that provides a one-stop location for prospective students and their parents to obtain information about the university would be ideal. Such a center might be possible in the former University Club, or as a part of an academic building.

D. Intercollegiate Athletics Facilities Needs

Organized sports activities at CU-Boulder occur within either Intercollegiate Athletics or Recreation Services programs. Both offer students training and competition in a variety of sports. There are also relationships with a variety of academic disciplines, most notably integrative physiology (formerly kinesiology). Sports activities provide an important image of the campus to the community and beyond. Athletics and recreation activities occupy 81 acres, which is 13 percent of the three-campus area. See Exhibit IV-D-1. Within campus buildings, Intercollegiate Athletics occupies about 266,600 assignable square feet, 4.7 percent of the building area for all CU-Boulder uses. When compared to peer institutions, CU-Boulder has about 30 percent less space than the average of indoor space typically devoted to athletics.

1. Athletics Objectives

The University of Colorado enters a new era as a member of the prestigious Pac-12 Athletic Conference beginning with the 2011 academic year. As a member of NCAA Division I, Intercollegiate Athletics is required to support 16 sports programs. The department intends to offer 17–18 sport programs. The Pac-10 sponsors 11 men’s sports and 11 women’s sports. Additionally, the conference is a member of the Mountain Pacific Sports Federation (MPSF) in four other men’s sports and three women’s sports. The Colorado Buffaloes have won 23 NCAA championships, including 17 in skiing, three in men’s cross country, two in women’s cross country, and one in football. The Buffaloes had at least 10 teams nationally ranked in each of the last 12 years. Men’s varsity sports are football, basketball, cross-country, golf, skiing, and indoor and outdoor track and field. Women’s varsity sports are basketball, cross-country, skiing, tennis, golf, soccer, indoor and outdoor track and field, and volleyball.

The Intercollegiate Athletics Department’s mission statement is to “provide student athletes a rewarding academic and athletic opportunity while embracing the principles of equity and diversity. The department represents the university with distinction, serves as a rallying point for its constituents, and instills pride in the institution.” The department promotes a total person concept for student athletes, stressing students’ abilities to excel in both athletic competition and academic achievement while developing positive character traits that will be of sustaining value to them and to society.

2. Athletics Facilities

Facilities for athletics events include the stadium complex with approximately 53,750 seats for Folsom Field (for football), the 11,200-seat Coors Events Center (for basketball and volleyball), plus indoor and outdoor track and field facilities. Tennis teams practice on the

CU-Boulder South tennis courts and also have the use of a local indoor facility. Golf team members use the Colorado National Golf Club courses in Erie for practice and competition. The ski team practices at Eldora Mountain Resort, which is about 40 minutes west of Boulder. Locker and changing areas for the ski team are located in a temporary building adjacent to Potts Field. The women’s volleyball team uses the Coors Events Center for practice and games. In general, facilities are only marginally adequate to support intercollegiate competition. Many facilities are antiquated relative to peer institutions, and some sports rely on off-campus facilities controlled by others. Fan expectation for amenities at sport venues has increased greatly over the years and improvements are required to maintain booster support. Furthermore, compliance with federal Title IX standards will likely require the addition of women’s sport teams and associated facilities. Consequently, this Campus Master Plan includes major capital investments for athletics.

a. Stadium Complex

Folsom Field was originally constructed in 1924. Upper seating sections were added with the Stadium Building in 1956, and partial renovations occurred in 1968 and 1976. Stadium Sky Box facilities were completed in 2003. The field itself is approximately 1.8 acres. The playing surface was replaced in 1999 with a combination natural and synthetic turf system, underlain with a steam heating system. New scoreboards were also added in 1999.

The stadium serves as the primary competition and secondary practice facility for the football program, and it also hosts other campus and community events. The university intends to keep the existing Folsom Field as the premier venue for collegiate football in the Rocky Mountain region.

Concerns have been raised over the years about how much land the stadium complex takes up in close proximity to the academic core of the campus. But there are synergies keeping the stadium on campus: stadium event parking uses existing on-campus and off-campus parking and recreational fields, alumni revisit the campus while attending games, and concurrent campus events reunite groups and promote other university activities. With no plans to relocate the stadium, it makes sense to program the facility for a variety of events, make needed stadium improvements, and help ensure access to the stadium by all transportation modes.

The Stadium Building and Balch Fieldhouse contain support facilities for field events. Support facilities in the Stadium Building were greatly improved on the east side of the stadium with the addition of the club seats and suites, the east concourse, and related support facilities. Balch Fieldhouse Pressbox, constructed in 1968, has six levels of club, box, and press facilities overlooking the field that are in need of significant improvements

and may be considered for replacement within the latter part of the planning period. Updated video boards and improved sound are needed to enhance the fan and player experience to match those of comparable venues. Balch Fieldhouse, a 65,662-gross-square-foot multipurpose facility, opened in 1936. In addition to providing needed access, concessions, and restrooms for football games, it is the primary practice and competition facility for the men’s and women’s track program and serves as a venue for small concerts and recreation activities. Structural issues with the Balch facility and outdated support facilities may require renovations to the facility prior to the development of a new fieldhouse. With renovation of the Balch facility, the west side of the stadium complex should be studied to increase general and box seating, improve circulation around the stadium for campus, improve event egress for spectators, and improve support facilities (restrooms, concessions, media support facilities, food service areas). Optimal use of existing office space in this centrally located property needs additional study, recognizing the need for additional academic space. Not just the relationship to Folsom Field should be considered, but also the relationship to surrounding campus development.

The 104,165-gross-square-foot Dal Ward Athletic Center, which overlooks the north end of Folsom Field, was built in 1991. This facility houses sports medicine and locker facilities for several intercollegiate sports teams, a banquet facility, academic support services, administrative offices, football coaches’ offices, and a strength and conditioning facility. Dal Ward is used primarily by the Department of Intercollegiate Athletics but also accommodates campus special events in its large training room and auditorium.

b. Other Indoor Facilities

The Coors Events Center, constructed in 1979, is a 152,071-gross-square-foot facility with an arena that accommodates approximately 11,000 people with the basketball operations center and a court sports weight and fitness room. New video boards and ribbon boards, a permanent sports floor, and fly-in practice baskets have been added to improve the center for the three varsity court sports. It is used primarily as a practice and competition facility for men’s basketball, women’s basketball, and women’s volleyball. A 42,762-gross-square-foot addition is currently under construction and includes two practice gymnasiums, office and locker room facilities for women’s volleyball, and support areas. Other uses may include concerts, conferences, university and community events, and trade shows.

Carlson Gymnasium, a 56,446-gross-square-foot facility, was built in 1924. It houses sports medicine and locker facilities for several of the Intercollegiate Athletics teams; Carlson Gym has also served as a practice facility for the women’s volleyball team and a secondary practice

facility for the men’s and women’s basketball teams. The Department of Integrative Physiology and the Student Recreation Center house some of their research, academic, and recreation functions in Carlson.

The Ski Center, a 3,500-gross-square-foot facility, was updated and expanded in 2010. This temporary building located adjacent to Potts Field houses locker and changing areas for the ski athletes and offices for the coaching staff. Further development of the East Campus for academic uses may require replacement of these facilities.

Upon completion of the court sports practice addition to Coors Event Center, Intercollegiate Athletics uses in Carlson may relocate so that all of this centrally located building can be used for academic or recreational purposes. The College of Arts and Sciences is considering using the building for teaching and associated research in allied health sciences, given the proximity to existing integrated physiology and MCD biology departments.

c. Other Outdoor Facilities

Football practice fields across Boulder Creek north of Folsom Field were developed in 1968. These three fields occupy approximately 5.6 acres and serve as the primary practice facility for the football program. The seasonal Kruse-Boedecker Indoor Practice Facility, constructed in 2007, covers one practice field during the fall and winter months.

Potts Field on the East Campus was constructed in 1968. It includes a 400-meter running track, a throws area, long jump pits, a storage building, restroom facilities, and temporary seating for approximately 2,000 spectators. Potts Field serves as the primary practice and competition facility for the men’s and women’s outdoor track programs as well as a recreational amenity for the East Campus.

Prentup Field was constructed in 1968 on the East Campus as CU-Boulder’s only baseball field. In 2006 Prentup Field became home to the Women’s Soccer Program. Locker rooms and a permanent scoreboard were added along with temporary seating for approximately 2,000 fans. Both Potts Field and Prentup Field may ultimately be developed for academic/research uses. These may be relocated during the planning period with functions at Prentup Field moving to the area north of Boulder Creek and Potts field relocated to CU-Boulder South.

Built in 2005, 12 tennis courts at CU-Boulder South serve as the primary practice and competition facility for the women’s tennis program. This facility has seating for approximately 400 spectators. Limited facilities are provided to support these outdoor courts.

3. Athletics Capital Improvements

The space needs analysis (IV.A) identified a shortage of at least 134,000 assignable square feet of indoor space

for athletics programs. The primary project to address this shortage is a new fieldhouse, and a number of other projects are also proposed to upgrade or add facilities:

- **Balch Fieldhouse Renovation:** Renovations of the existing Balch Fieldhouse would include upgrades or replacement of the pressbox, gates and plazas, and concession facilities.
- **Dal Ward Athletic Center Expansion for Women’s Sports:** An expansion of the Dal Ward complex would provide additional training, office, and student athlete support areas at the northeast corner of the stadium. Also planned are additional stadium seats in this area to replace those that were removed due to unstable soil.
- **Fieldhouse and Parking Structure:** An indoor practice facility, primarily for football, is envisioned north of Franklin Field, adjoining the stadium complex. About 400 to 600 structured parking spaces are planned to be included. Uses now in Carlson Gymnasium and Balch Fieldhouse may be relocated to the new fieldhouse. Relocation of Facilities Management grounds and recycling operations on the new fieldhouse site will be necessary as part of the project. An alternative site for the fieldhouse could be north of Boulder Creek, near the football practice fields.
- **Performance Facility for Soccer and Lacrosse:** This is seen as a replacement facility for the current uses at Prentup Field. Replacement of this field is likely as the East Campus is developed for academic uses over the next 10 years. Replacement fields could be developed north of Boulder Creek or at CU-Boulder South.
- **Track and Field Facility:** This is planned as a replacement for Potts Field. Relocation and replacement of existing track and field facilities is likely as the East Campus is developed for academic uses over the next 10 years. Replacement fields could be developed north of Boulder Creek or at CU-Boulder South.
- **Other Outdoor Fields and Courts:** Substantial improvements to existing outdoor facilities, and some new construction, will be necessary in order to remain competitive in the Pac-12 Conference and the NCAA as a whole. Depending upon which sports are added, additional facilities and land will be required. CU-Boulder South is the most likely site for significant new outdoor practice facilities.
- **Indoor Tennis Facility:** This may be developed in cooperation with Recreation Services. A site or sites have not been chosen. Development of this facility in conjunction with the proposed new fieldhouse could be considered to share various support facilities required for each.

Location, timing, square footage, and cost estimates for these proposed capital improvements are detailed in the building plan (V.A). Most of these athletics capital projects are not related to the projected student growth, with the notable exception of the additional stadium

seats (northeast corner) which may be desired to help accommodate the student body at stadium functions.

E. Recreation Services Facilities Needs

Recreational sports, fitness and wellness programs, services, and facilities at CU-Boulder are developed and implemented by the Department of Recreation Services, a cost center within CUSG supported by student fee funding. Informal and organized recreational programs create a rich and wonderful environment for students to enhance their educational and social experience outside of the academic classroom. Recent recreation facility entry data shows that approximately 88 percent of enrolled, full-time students use Student Recreation Services.

Recreation and athletics programs occupy 81 acres, which is 13 percent of the three-campus area. Of the area, 21.3 acres are used by Recreation Services for outdoor courts and fields, 14.2 acres are assigned to athletics fields. Within campus buildings, recreation occupies about 167,000 assignable square feet, 2.9 percent of the building area for all CU-Boulder uses. Compared to peer institutions, this is only 65 percent of the indoor space typically devoted to recreation.

Based upon Buff OneCard entry data, an average of 3,500 to 5,000 students use the Student Recreation Center every day. Student surveys conducted in fiscal year 2010 by the consulting firm of Brailsford & Dunlavey indicated CU-Boulder students participate in recreation at a 10 percent higher rate than the national average, with 85 percent of students reporting that they either work out solely on campus or also go off-campus for informal sports or self-directed drop-in usage. Fifteen percent of students surveyed participate in drop-in recreation only off campus.

The limited size and current state of the Student Recreation Center and outdoor recreation facilities present challenges in efforts to meet the high student demand. Indoor facilities have had only minor improvements and maintenance since their construction. These conditions combined with a 20 percent growth in student enrollment over the past two decades placed extreme pressures upon existing facilities, which require significant attention. The campus has dropped below its regional and national competitors in the amount of both indoor and outdoor space. The amount of fitness and conditioning space is well below the national average as is outdoor field space and basketball courts.

Students surveyed identified their top needs for additional space being cardiovascular and weight training areas and indoor courts for basketball and other sports. One of top reasons for students to recreate off campus was crowding of CU’s facilities. Expansion of sport clubs and intramural programs is currently capped due to inadequate amounts of space to expanded programs.

Registration for participation in the intramural sports program is typically closed within hours of opening and students find themselves on wait lists to participate in indoor and outdoor recreational sports programs.

1. Recreation Services Objectives

The mission of Recreation Services (RS) is to promote overall student wellness through engagement of body and mind in formal and spontaneous programs designed for fun, fitness, social interaction, competitive sports experiences, and skill acquisition. Recreation Services contributes to campus life by providing opportunities for students to develop meaningful connections to others while becoming part of a healthy student body—one that is focused, self assured, and academically successful.

At a flagship institution that is competing nationally and internationally for the best students, faculty, and partners, a strong, healthy campus recreation program will complement the university’s academic and research strengths, providing balance and a desirable quality of life that allows people to excel at the highest levels. Stress mitigation, recruiting, community building, and lifelong healthy decisions are the direct benefits of a strong Recreation Services program. To maximize its potential to the campus community, Recreation Services must have the proper resources and support. Flexible, appropriately sized, state-of-the-art facilities (both indoor and outdoor) are the keystone to successful recreation programming.

CU-Boulder has always been known for “educating the whole person.” Recreation Services programs support the university’s mission by providing opportunities for improving health and wellness, developing leadership skills, and building campus community.

2. Recreation Facilities

The Student Recreation Center draws a wide variety of students for fun, fitness, and organized sport-specific activities. Facilities are open 119 hours per week serving 880,000 student visits annually. Informal and organized recreational programs create a rich and wonderful environment for students to enhance their educational and social experience outside of the academic classroom.

Student recreation has six primary types of programs that use the facilities:

- **Drop-in Services.** Those programs, services, and facilities are available for informal use and do not require an additional fee or service charge beyond the mandatory student fee. Spaces and programs supported by the drop-in program include strength and conditioning areas; the ice rink; swimming pools; and the racquetball, basketball, volleyball, and tennis courts.
- **Sport Clubs.** Organized competitive sports teams compete with other universities across the region

and nation. Students can participate in 34 competitive sports that include hockey, swimming, rugby, lacrosse, and many other offerings.

- **Fitness and Wellness Programs.** A schedule of more than 150 class sessions per week in a diverse range of fitness and activities (classes are noncredit) are offered for students and members who want to learn a new skill, fine-tune an old one, or simply keep in shape.
- **Intramurals.** Students, faculty, and staff have with the opportunity to participate in a variety of competitive men’s, women’s, and coed recreational sports on campus in a safe environment.
- **Outdoor Program and the Challenge Ropes Course.** Programs provides a gateway for students to enjoy the great Colorado outdoors, emphasizing adventure, environmental awareness, education, safety, and a sense of community through single and multi-day trips, tailor-made programs, and events.
- **Event Scheduling.** This office provides services to student clubs and organizations and coordinates with CU Conference Services to provide facilities, staff, and equipment to facilitate successful events and activities.

Within the past five years, base standards for indoor and outdoor recreation have been established by the National Intramural Recreational Sports Association. Based on current student enrollment, standards indicate that CU-Boulder provides about two thirds of the space suggested for both indoor and outdoor recreation facilities.

a. Indoor Facilities

The Student Recreation Center is a 235,379-gross-square-foot complex (151,483 ASF), built in 1973 and enlarged in 1990, which includes a wide range of sports, conditioning, and meeting facilities. This facility was state-of-the-art and expansive at the time of its construction; it is now outdated and undersized for current campus enrollment and industry standards.

Recreation Services uses additional indoor facilities when available to administer its programs. These facilities include:

- **Carlson Gymnasium** (8,609 ASF). The gym, swimming pool, and exercise room are shared among Intercollegiate Athletics, Recreation Services, and the Department of Integrative Physiology.
- **Clare Small Arts and Sciences Building and swimming pool** (4,514 ASF). There is an underground connection between the Student Recreation Center and the Clare Small pool, making access convenient.
- **Bear Creek Commons Recreation Center** (4,139 ASF). This satellite center offers drop-in hours and instructional programs in a weight and cardiovascular area and multipurpose studio.

b. Outdoor Facilities

Recreation fields overseen by Recreation Services on campus (totaling 18.8) acres are:

- **Business Field** (4.1 acres).
- **Farrand Field** (2.5 acres).
- **Williams Village Soccer Fields** (1.9 acres).
- **Kittredge Field** (6.9 acres).
- **Franklin Field** (3.4 acres).
- **Additional outdoor areas** (totaling 3.6 acres) as-igned to Recreation Services include:
- **Recreation Tennis Courts** (0.5 acres).
- **Coors Event Center Basketball Courts** (0.5 acres).
- **Williams Village Tennis Courts** (0.9 acres).
- **Williams Village Challenge Ropes Course** (1.7 acres).

Outdoor recreation fields require ongoing maintenance. Two days per week are, or should be, reserved for maintenance and rejuvenation of the natural turf. During these days, any scheduled use of the fields is prohibited because overuse will have a negative impact on the surface.

The Department of Housing and Dining Services provides additional outdoor recreation amenities within the Kittredge, Williams Village, and Family Housing complexes. Housing facilities are intended for the use of the adjacent residents to help build community and are not part of Recreation Services.

3. Recreation Capital Improvements

Recreation Services will emphasize upgrading and expanding indoor recreation programs through a combination of renovations and additions to existing facilities. Space needs analysis indicates an indoor recreation space shortage of at least 130,000 assignable square feet. Recreation Services will continue to look for opportunities to address the 10-acre deficit in outdoor courts and field space. Future club and intramural sports fields are preferred to be artificial turf to limit schedule impacts due to weather and the need to allow natural turf to rest for proper health. Where possible, lighted courts and fields are desired to allow student participation during evenings when academic commitments are limited. Projects proposed to upgrade or add facilities include:

- * **Recreation Center Addition and Renovation.** Renovations to the existing Student Recreation Center would include major upgrades to the existing facility and building expansion to double the strength and fitness areas, install new indoor turf, add multi-activity gymnasium space, and develop an outdoor aquatics/social pool.
- **Sports Fields.** New outdoor club and intramural sports fields would be developed for practice and completion events. Fields could be developed north of Boulder Creek or other location yet to be determined.
- **Tennis Court Replacement.** This project is intended

to replace tennis courts that would be displaced with the expansion of the Student Recreation Center. Courts could be developed north of Boulder Creek or other location yet to be determined.

The location, timing, square footage and cost of these proposed capital improvements are detailed in the building plan (V.A). The scope of these improvements is closely related to the size of student enrollment.



F. Residential and Conference Services Needs

Introduction

On-campus housing at the University of Colorado Boulder is provided in residence halls, apartments at Bear Creek (for single students), and family/graduate housing apartments, all operated by the Department of Housing & Dining Services (HDS). Approximately 7,250 students are housed in these three types of facilities.

At the start of 2010–11 academic year, residence halls accommodated most of the freshman class and some additional students, for a total of 6,044 beds. Bear Creek apartments have capacity of 977 student beds. There are 808 family housing units; approximately 525 of these house students while the remaining units are occupied by faculty/staff, post doctoral candidates, and visiting scholars. One thousand beds will come online with renovation of space in Willard and Hallett Halls (formerly occupied with offices now located in the Center for Community), the addition to Smith Hall, and the new residence hall at Williams Village.

In addition to sleeping rooms and apartments, space and facilities are provided in housing areas for classrooms, dining, studying, meetings, recreation, and other student activities. With an additional 1,000 student beds are due to be online in 2011, current surge space of 393 beds in Athens North Court and at College Inn could be used for family housing programs or decommissioned. Out of the total 29,718 students (fall 2009), 24 percent were housed by CU-Boulder. The balance of the student population lives off-campus. During the summer term, HDS uses many of the residence halls for conference business. CU Conference Services, a unit of HDS, manages summer conference operations.

Residential uses occupy 129 acres, which is 21 percent of the acreage of the three developed campuses in Boulder. Residential buildings include about 1,775,000 assignable square feet, which is 35 percent of all campus buildings (data from Exhibits II-D-2 and III-A-1). About 47 percent of HDS buildings are 25–50 years old; 31 percent are over 50 years old. Only 22 percent of HDS facilities have been built or fully renovated within the past 25 years. While age of a facility does not directly equate to quality of facilities, having 78 percent of HDS facilities older than 25 years is an indication that residential facilities may lack adequate amenities and have other inadequacies.

1. Housing and Dining Services (HDS) Objectives

CU-Boulder has been a residential campus since the construction of student dormitories in the late 19th century. Residential campuses by design are a means of integrating faculty and students with living and learning, to achieve community and personal engagement over a multi-year period. Within a residential campus, students

become a part of a greater educational whole and are actively engaged in supporting the learning enterprise. Institutions implementing this model confirm there is an obvious positive change in the student and campus culture, specifically relating to improved student social behaviors with alcohol and other drugs, interpersonal relationships, and diversity.

Providing a sense of community and the support for student academic goals is the principle reason that the university provides housing. Residence Life, a subgroup of HDS, has adopted a philosophy of residence life encompassed in three words: connect, grow, succeed. Research shows that living on campus creates more opportunities for students to become connected and ultimately thrive in the CU environment. Residence Life wishes to see residential students begin to connect within the university with other students, staff, and their professors. Emotional, intellectual, and behavioral growth among students is encouraged. Success is fostered through strong mentorship by the residence hall staff. These areas illustrate the many benefits of living in the residence hall system.

The Flagship 2030 vision put the creation of residential colleges (Flagship Initiative 1) at the very foundation of its strategy to transform the undergraduate educational experience at the University of Colorado Boulder. This is the logical extension of the creation of Residential Academic Programs, in which students attend classes in or near the place where they live. These programs are especially effective for first-year students as they navigate the transition from high school and home to the challenges of university life.

With the growth in the number of incoming students in recent years steadily outpacing increases in housing capacity at CU-Boulder, the residential population has become dominated by first-year students, peaking at close to 96 percent. As a result, a residential culture has been created that is almost entirely populated by those students least capable of self-regulating their behavior and understanding what is required to succeed at the university, while squandering the incredible potential of the residential component of the university experience for non-first-year students (academics, leadership training, and integration of lifestyle choices with life ambitions). Far beyond simply addressing concerns about behavior, the clear vision of developing the residential college system is creating a holistic culture centered on the academic mission of the university.

CU-Boulder campus housing is generally full, due to the high cost of off-campus Boulder housing and the freshman residency requirement which mandates that freshmen live in the residence halls. Students may petition the HDS for an exception to this requirement if they are married, or reside with parents or guardians in the local area.

Through the master planning process, CU-Boulder so-

lited input from various campus groups on residential life. HDS recommended the following objectives that are adopted in this plan:

- **Provide housing that promotes the residential colleges initiative of Flagship 2030 with emphasis on developing living and learning communities in the residence halls.** This goal will require that the physical, intellectual, and social environments of residences be structured to become centers of learning. Programs will need to provide educational breadth, with emphasis on intellectualism, service, leadership, diversity, and building community. All residential facilities need to have the flexibility to provide lounges, meeting spaces, and social areas. Academic settings—including classrooms, faculty offices, and faculty-in-residence apartments—need to be integrated within residential facilities to enhance the intellectual environment.
- **Provide housing that is moderately affordable for students and economically feasible to construct and maintain for the university.** Financial concerns are paramount in creating housing on campus. CU-Boulder needs to seek out non-traditional ways of financing new construction for family and graduate housing on campus. Public/private partnerships need to be sought to reduce the financial burden on the university. Undergraduate residential housing should continue to be financed by the revenue generated from fees for room and board. A balance needs to be sought between the demand for housing and available occupancy.
- **Provide housing and dining facilities that promote sustainability and carbon neutrality as part of the students’ living environment.** Sustainability has become a crucial element in modern society and has proven to be an important part of student life on the Boulder campus. Providing students with facilities that encourage a sustainable lifestyle and providing tools to make decisions about the impact they have in the environment not only educates students, but makes economic sense with lower operational and maintenance costs for the facilities.
- **Provide housing that is appealing to both today’s undergraduate and graduate students.** The amenities provided in CU-Boulder’s housing options need to be more consistent with students’ expectations. Many residence hall rooms are two-occupant or greater, and look like what most people consider to be classic “dorm rooms.” Consideration will be given to diversifying the types of housing available to appeal to a broad range of students.
- **Provide dining services that appeal to today’s diverse student/staff population with more sophisticated taste.** The remaining older dining service facilities need to be modernized to meet current programming goals, support a community experience, and become flexible to adapt to future changes. Newer facilities should be allowed to adapt

to new food trends to keep pace with changing student populations. Consideration should be given to developing programs that can encourage off-campus resident students, faculty, and staff needs for meals while on campus.

- **Provide open space, recreational, and childcare opportunities that enhance the experience of students during their academic career on campus.** Merely warehousing students is not sufficient. Students need passive and active recreation spaces near where they live. Common community spaces enhance the housing experience. Childcare facilities and other facilities for youth need to be created and enhanced for the children of students and faculty living on campus. Meeting these needs is tempered by the finite land resources of the campus and financial requirements of HDS.
- **Develop and maintain undergraduate housing capacity in the residence halls that is no less than the current percentage of freshman plus 20 percent for returning upper-division students (revised percentage from Residential Campus 2020).** During the past 10 years, CU-Boulder housing capacity has at times been barely able to meet the freshman housing needs. In order to achieve the goal of housing freshman students as well as about 20 percent of additional upper-division students, CU-Boulder will need to add a minimum of 900 beds over the next 10 years. Due to steady enrollment growth patterns and a step function of constructing new housing units, there are times that housing capacity may be below the capacity goals. Additional bed capacity will need to balance growth to minimize the extremes of significant under or overcapacity situations.
- **Replace outdated graduate and family housing facilities and maintain a capacity that provides housing for up to 20 percent of the graduate student population (approximately 600 apartments).** Due to the age and condition of existing family housing facilities this is becoming a high priority for HDS. The cost of operations and maintenance of these facilities is rapidly reaching a point that it could exceed the income generated. Due to the high cost and large scope of replacing the entire existing graduate and family housing stock, a public/private partnership should be considered to meet this need.
- **Provide facilities for student activities that promote personal growth and social interests as defined in Residential Campus 2020.** Renovations of existing facilities and development of new residence halls need to include program elements to address the social needs of the residents. Elements include informal interior spaces for student use along with exterior areas for recreation and informal student gathering.
- **Address the high cost of housing in the Boulder community for faculty, staff, and graduate students through the redevelopment of the existing graduate and family housing facilities.** The

university recognizes that housing availability affects the university’s ability to recruit and retain the best faculty and staff. It is also desirable to have faculty available close to campus to create a supportive educational community. CU-Boulder needs to assess the interest in providing faculty and staff housing. A wide variety of options—including mortgage assistance, university-owned houses, new facilities, and public/private partnerships—should be considered to meet this demand. The redevelopment of graduate and family housing areas may provide an opportunity to integrate faculty and staff housing into the area as an additional funding stream.

- **Provide opportunity for Conference Services to increase the number of conference attendees at CU.** The greatest need for Conference Services is space to accommodate larger conference gatherings. Some of this demand can be met in conjunction with developing spaces for other HDS needs. As programs develop near housing facilities, consideration should be given to include larger meeting spaces that could be used for conference needs.

2. Undergraduate Student Housing

Housing & Dining Services provides students with living/learning communities that are supporting the intent of the Flagship 2030 residential colleges initiative. A key to the success of these programs is providing spaces and re-creating a culture that is attractive to non-first-year students. Rebuilding the culture for these on-campus students will take time to build momentum.

a. Living/Learning Programs (Residential Colleges/RAPs)

The creation of multi-year residential colleges (RCs) builds on the success of the Residential Academic Programs (RAPs), programs designed specifically to help first-year students make the transitions to university life. The RAPs are academic programs located within the residence halls. They offer standard courses in small class sizes, opportunities for personal interaction with faculty who have offices within the hall, and an array of social and cultural events. Their goal is to bring students into the intellectual life of the university community while providing the support and intimacy of a small school. The RCs as envisioned will take the current RAP model a step further by expanding the student participation to second-year students and beyond, and provide the opportunity to have a Faculty-in-Residence (FIR) apartment for a live-in faculty member at each residence hall that hosts a RC.

The intent is to more fully engage students as active learners in a residential environment that supports their intellectual and personal growth. The residential campus model will address issues of academic standards, retention, personal responsibility, and campus climate and diversity, as well as enhance the faculty-student relationship, all matters of importance for the University

of Colorado Boulder.

In order to support and encourage the success of this residential academic model, housing facilities will need to dedicate space to support facilities for these programs. As a minimum, classroom and faculty office spaces should be provided within each of the residence halls to promote student learning experiences. Faculty-in-residence apartments should be considered for most residence halls in support of the Residential College initiative.

b. Existing Residence Halls

There are two drivers for the improvements to existing buildings. The first is the need for general improvements due to the age of the buildings and systems. Current deficiencies identified in a facilities audit total approximately \$90 million for the residence halls. Building renovation has the ability to reduce operational and maintenance costs of the facilities by installing new building systems, enhancing finishes, providing improvements to the building thermal envelope, addressing accessibility issues, and offering additional amenities for the residents.

The second driver is the broad campus initiative toward a residential campus model, including development of residential colleges and the expansion of the current RAPs as discussed above. These programs have been shown to increase the involvement, academic performance, and satisfaction of undergraduate students, and transform the student culture. The university is committed to providing this opportunity to all incoming students. Key to a successful residential campus strategy is attracting sophomores, juniors, and seniors to live on campus in the residence halls. This will require adding amenities for social activities and study spaces to make these facilities more attractive to returning students.

Current bed inventory needs to have amenities added and also capture underutilized space in the residence halls. It is essential that amenities be added to rooms in order to attract students to continue to live on campus. Features that would attract students to remain or return to the halls include: “semi-suite” areas where a small group of students have individual or double rooms and share one bathroom with the other students in their suite, differentiation between first-year student rooms and upper-class rooms to provide more of an incentive for first-year students to return to facilities with great amenities, and larger rooms in general.

The draft Residential Campus 2020 Facilities Renovation and Renewal Plan for Housing & Dining Services identified the Kittredge Complex as the first area designated for renovation. HDS will complete the renovation of the first four residence halls in this area by August 2011, including the addition of a new wing on Smith Hall. Planning for renovation of the final buildings in the area, Kittredge West and Kittredge Commons, was started in late 2010.

c. New Residence Halls

The current projected freshmen student enrollment for fiscal year 2011 is 5,130 students with growth projected to 5,815 freshmen by 2020. The projected growth in the number of freshmen, the addition of new international student recruits, the strong desire for increasing the number of upperclassmen in the residence halls to at least 20 percent of the total occupancy, and the number of student staff (RAs) in the residence halls indicate a deficit in the number of beds to house all of the incoming and returning students in the next 10 years by approximately 800 to 1,000 beds.¹

The added bed capacity is proposed to be provided primarily by the construction of residence hall type housing. HDS prefers to focus on this type of housing with the Residence Life components that build student community. Apartment style housing for undergraduate students is not anticipated to be expanded beyond the current capacity of the Bear Creek Apartments.

d. Infrastructure Improvements

To support the residential growth and renovation of residential facilities, utility infrastructure will need development. The existing Power House does not have chilled water capacity to serve residence halls in the central campus area as they are renovated or new buildings added with cooling. Development of a new chilled water supply and distribution will be required to service the Kittredge complex and the residence halls in the area of Farrand Field.

The Williams Village Heating Plant has capacity to serve additional growth but equipment is aging and may require replacement within the 10-year planning period. Development of housing east of Bear Creek will require development of roadways and utility services to support the new housing.

Redevelopment of the area north of Boulder Creek will require significant infrastructure work. New heating and cooling systems for the district will need to be provided. A significant driver for redevelopment of the area is the need for flood mitigation that requires overbank excavation and fill of development areas. New utility infrastructure will be required for much of the area depending on the final building layout and density of the redevelopment.

3. Graduate/Family Housing

Private sector development has historically provided a significant stock of apartment housing for CU-Boulder students, faculty, and staff. It is possible that the demand for non-freshmen single student, faculty, and staff apartments could be handled through private sector development in Boulder County and the surrounding communities. A significant concern is the limited availability of land close to campus for private sector residential development and the impact that private development may have on transportation infrastructure

1. Residential Campus 2020 required that up to 30 percent of the residents be upperclassmen.

and community sustainability goals.

Growth pressure and housing affordability have pushed students, faculty, and staff to find private sector housing farther from campus throughout Boulder County and the northern metropolitan area. The push of campus affiliates away from campus and the resulting issues of commuting to campus are in conflict with campus sustainability goals. Providing additional housing close to campus through public-private partnership can address sustainability concerns and help build a stronger campus community.

Graduate/family housing does meet a specific need not provided typically in the private sector with lease terms directed specifically at the academic calendar, below market rates, with locations very close to campus. In addition, family housing programs help to develop a strong sense of community for student residents and provide programs designed to support unique cultural needs of international students.

One of Housing & Dining Service’s goals is apartment housing stock that is designed to establish an overall community identity for campus housing and allow development of sub-communities within the larger community. The intent is to provide an environment that will foster social and academic growth of students during their academic careers. Developing communities in the range of 200–300 apartments, each with unique identity, will allow for developing a sense of community that should foster social growth and provide a sense of security for the residents.

a. Existing Graduate/Family Housing

The area along Boulder Creek is the core of the university’s Apartment Life and Child Services programs. This housing program serves graduate and undergraduate students, faculty, staff, post doctoral candidates, and visiting scholars/faculty. Along Boulder Creek between 17th and Folsom Streets (about nine blocks), 595 units are available through the Family Housing program. Housing stock in this area is 40–70 years old and needs to be replaced during the planning period.

An additional 228 apartment units are available at Smiley Court, in the East Campus area. Of the 810 total family housing units, 50 (6 percent) are studio, 299 (37 percent) are one-bedroom, 433 (54 percent) are two-bedroom, 27 (3 percent) are three bedroom and, 1 (less than one percent) has four bedrooms. While this housing is commonly referred to as “family housing,” current records indicate 34 percent of the units contain single student occupants, 25 percent house families without children, and 24 percent have families with children. Rental rates are targeted to be around 80 percent of the typical market rate for the Boulder area. Residents of the units appreciate the low rents, and accept the somewhat sub-standard apartment units because of their convenience to campus and a strong sense of community. The current graduate/family housing community at

CU-Boulder is the largest multicultural community not only on campus, but in Boulder County.

Desire to develop the East Campus may place pressure to relocate the Smiley Court housing near the end of the current planning period. Built in the mid-1960s, Smiley Court facilities are considered to be the better of the housing stock currently in the family housing portfolio and are a low priority for significant refurbishment or replacement by HDS.

b. New Graduate/Family Housing

In the Williams Village area, the Master Site Development Plan provides for 200 townhome/apartment-style housing units east of Bear Creek. This low/medium density housing may be developed and used to fulfill some replacement needs of some of the graduate/family housing stock.

The development of the Williams Village Phase III units would allow for a similar number of units in the North Boulder Creek area to be demolished and for redevelopment to begin. During the redevelopment of the North Boulder Creek area, approximately 400 units would need to be maintained for graduate/family housing. Redevelopment of the area at an increased density would allow for expansion of the graduate/family housing stock and additional housing for faculty, staff, and alumni in market-rate units or other affordable housing development.

4. Proposed Student Housing

a. Undergraduate

Housing & Dining Services had an inventory of 5,960 beds for undergraduate students in the residence halls in fiscal year 2010. There are a number of current construction projects that will impact the availability of beds on campus. It is projected that by fall of 2011, HDS will have as many as 7,092 beds to house undergraduate students. During the next 10 years, HDS plans to continue its renovation of the existing residence halls and build new facilities. As a result, the undergraduate student bed inventory may fluctuate over the next 10 years as much as 5-7 percent, depending on schedules for renovations of existing facilities and construction of new facilities.

Options may include:

- **Development of a new undergraduate residence community to allow for a critical mass of about 1,500 students.** This could consist of three buildings with 500 beds each and supporting dining and recreational facilities on East Campus or north of Boulder Creek. This approach could require up to 18 percent of the usable land at East Campus for non academic/research purposes. Developing an undergraduate housing community for 1,500 students on the East Campus would provide an opportunity to create a new residential college that, unlike Williams Village,

would have students and instructors living adjacent to academic buildings, classrooms, and offices. Properly designed, and with good transportation connections to the Main Campus, these communities could flourish and stimulate the development of other residential colleges.

- **Develop additional housing capacity through infill and redevelopment of lower density parcels on the Main Campus.** This approach would build new residence halls in open space and parking areas; replace non-residence hall facilities that are beyond their economically useful life; or replace smaller facilities on the Main Campus, Kittredge Complex, and Williams Village. This approach may offer some economic benefits in the use of existing infrastructure and the potential for diversity of scale in the buildings, but could also impact quality of life if new structures strain existing services, eliminate too much parking or green space, or are not integrated with existing undergraduate communities.

Development of additional student housing will need to include both indoor and outdoor recreational space, parking areas, and other program spaces to support student life activities in close proximity to the new housing. These amenities are crucial to the support of creating a quality life experience for the residents of the campus.

b. Graduate and Family

Graduate and family housing apartments at CU-Boulder are beyond their useful life and at least a portion needs to be replaced within the next 10 years. As of 2010, there is no demand to justify construction of additional units. If, however, new facilities were constructed with better finishes and amenities (in line with what is available in the private sector) demand would likely increase.

The current projections of graduate enrollment by the end of the planning period with the goal for housing 20 percent of graduate students would indicate a need to provide graduate housing for 1,150 to 1,200 graduate students. Following an historic average of 1.15 graduate students per unit, this would indicate a need for 1,000 to 1,090 apartments required for graduate student housing.

Currently all of the family housing stock is developed at a similar density and is priced based on unit type, with no price variation for location, site amenities, etc. The market has some flexibility to accept more price variation with some of the units being priced at market rates. Also, the market might accept a portion of the graduate housing that could be developed at much higher densities to provide more affordable units. Developing graduate housing at more urban densities could be successful if close access to complimentary services and support facilities is available to the population and would not require dependence on personal vehicles. HDS would like to develop communities ranging from 200 to 300 apartment units, each with differing character

and amenities. Offering a range of housing densities and locations provides options and choices that currently do not exist on campus for such a diverse market.

With an increase in recruitment of international students, some consideration should be given to the cultural needs of these students as new housing is developed. In addition to offering programs to acclimate new students to the local culture, varying housing types could provide attractive amenities. Developing physical spaces that facilitate and enhance interaction along with providing a range of spaces to facilitate community building and other educational activities will have a positive impact on all residents (students, partners and spouses, children, faculty, and staff) coming from throughout the United States and from across the world. Also, turnover may be reduced as international students often stay in Boulder year round, rather than return home for holidays and academic breaks.

The current projection for the graduate student growth demonstrates a need for approximately 1,000 graduate and family apartments at CU-Boulder. HDS plans to address the need to replace its aging buildings by the following suggested 20 to 30 year development sequence for graduate and family apartments:

- Construct new graduate and family housing facilities at Williams Village or underdeveloped areas north of Boulder Creek: approximately 200 units.
- Develop a phased sequence for demolition and replacement of obsolete graduate and family housing facilities North of Boulder Creek—including Newton Court—while maintaining a minimum of 400 units in the area during redevelopment.
- Construct new graduate and family housing facilities to return to current capacities the graduate and family housing North of Boulder Creek, with the goal of 600–700 units.
- Construct new graduate and family housing facilities on the East Campus: approximately 200 units.
- Demolish old graduate and family housing facilities at Smiley Court: approximate loss of 228 units.

HDS believes that building graduate and family housing facilities with close access to campus and the amenities of the Boulder community will cover the needs of various graduate and family students at CU-Boulder. New facilities at Williams Village could introduce a “calming” effect to that community and utilize available space. Facilities on the East Campus could support the research component by providing housing to the graduate and research assistants near their work environment. New housing north of the Boulder Creek would provide easy access to the Main Campus.

HDS does not currently have the resources available to support the redevelopment of graduate and family housing. Third party investors may be required to fund the construction of these buildings. HDS intends to manage these buildings to provide the support that is required by

graduate students and their families.

c. Faculty and Staff Housing

Current faculty and staff housing programs are limited. Excess capacity units in family housing facilities are available to faculty and staff on a space available basis. Faculty and staff currently occupy around 12 percent of the family housing units. Expansion of this program is currently not seen as a high priority, especially if it would direct funding away from other student housing needs. Redevelopment of graduate/family housing stock may allow increases in density; faculty and staff may be an appropriate target market to absorb increased capacity.

As a strategic measure for the university, providing cost effective housing for faculty and staff close to campus is seen as a benefit for recruitment and retention of qualified faculty and a positive measure to develop a sustainable campus and help achieve the President’s Climate Action Initiative.

The redevelopment of the area north of Boulder Creek has potential to create partnerships within the university community as well as with the city of Boulder, Boulder Valley School District (BVSD), Naropa University, the private development community, and other affordable housing providers. Within the university, HDS development of new housing units could include academic spaces for faculty offices and classrooms, particularly on the ground level of new residential facilities. Student recreation spaces along with changes to the intercollegiate athletics area should be considered for the development of the floodways. Partnerships with the city of Boulder, urban drainage, and flood control should be used to coordinate floodway improvements and improvements to pedestrian and vehicular corridors. There continues to be an expressed need for the region to have a conference center that serves the city of Boulder and the university. Partnerships between the city, university, and possibly private developers need to be explored. Development of alumni housing could be an additional private partnership opportunity to help subsidize affordable housing for student, faculty, and staff.

5. Dining Facilities

All students in residence halls can purchase meal plans that allow them to eat in any of the housing dining centers on campus. Significant improvements have been made to the dining centers on the Main Campus over the past 10 years. The most significant was the opening of the Center for Community (C4C) dining center in the fall of 2010. The C4C project was designed to provide state-of-the-art dining facilities to the campus and create central kitchen and storage for HDS dining operations. C4C replaces the outdated food facilities at Kittredge Commons.

Over the next 10 years, the Darley Commons dining facility will require renovation or replacement. This facil-

ity is nearly 50 years old and the building configuration would make it difficult to convert to a food court system, the current preference. The opening of the new Williams Village North residence hall in 2011 will place Darley Commons at capacity. If more residence hall beds are added to Williams Village, an expanded dining center may be required.

Development of undergraduate housing on the East Campus or north of Boulder Creek would require new dining facilities. Should expansion of undergraduate housing be done through infill and redevelopment of the Main Campus area, it is likely that modifications will be required to increase capacity of existing dining facilities to accommodate the increase in housing.

6. Conference Services

a. Lodging

CU Conference Services (CUCS) utilizes student housing and classroom spaces in residence halls and academic buildings during the summer months. Currently CUCS hosts approximately 120 conferences per year. Revenues generated through these conferences help to lower room and board rates for students the rest of the year. Improved housing facilities offer the opportunity to bring new conference groups to campus. Critical considerations in site selections for conference organizers include air-conditioning, availability of some private baths, and meeting spaces that are close to housing locations. The development of semi-suites in renovations to attract upper-division students will also support the needs of conference groups. Air-conditioned buildings in the Kittredge and Williams Village complexes will support conference needs as well.

Chief among those improvements is the addition of individual room temperature controls with air conditioning, which is highly desirable to students and has the benefit of allowing the buildings to be used for summer conference activities. Renovated bed space by itself is insufficient to significantly increase conference revenue; the key is additional and appropriate meeting space.

b. Multi-Purpose Spaces

Adequate meeting space is a critical component to attracting new conference business. Williams Village is currently the only housing area to offer air-conditioned rooms. In a complex with 1,100 beds, there are six meeting rooms. One has a capacity of 80, four have a capacity of 40, and one has a capacity of 20. Conferences are not willing to incur the extra expense of bus-ing participants to the Main Campus. To attract groups of 150 to 200, larger flexible multipurpose spaces are needed to allow for plenary and breakout sessions. Audio-visual capabilities and air-conditioning would also be required. Classrooms with similar capacities must also be considered in the renovations of current residence hall space.

Redevelopment of Kittredge and Darley Commons

should include plans for large multi-purpose spaces that can be used to support conference needs and the needs of the Residential Academic Programs. Another possibility in the Williams Village area would be to build a multipurpose community center as part of construction of graduate and family housing units that could also serve the community at large. This space could have laundry, mail, study, and recreation spaces to serve the community. Flexible design of these spaces could accommodate family housing events and programs, residential college events and larger lectures, and conferences.

7. Housing Support Facilities

a. Administrative

HDS central administration offices have recently been relocated to the new Center for Community. With this move, no significant additional administrative needs are projected. The redevelopment of family housing should consider providing office space for administration of the graduate/family housing programs. Renovations of existing residence halls and development of new residence halls should consider administrative needs of Residence Life programs in each community including the addition of a 24/7 front desk and office space areas for counseling of students.

b. Conference Services

New administrative offices for CUCS will be provided with the opening of the new Williams Village North residence hall. Additional facilities are not anticipated for the office and administrative functions of this group. With the development of additional multi-purpose spaces for Residence Life use, consideration of CUCS should be made including providing storage space for equipment and materials related to the conference needs.

c. Operations and Maintenance

Maintenance and service centers are located in two structures on the East Campus, most of it (31,500 assignable square feet) in the Housing System Maintenance Center (HSMC). The Housing Systems Service Center (HSSC) is 36,609 assignable square feet that are currently underutilized. Consideration should be given to relocating HDS maintenance activities from this facility and make it available for use by other campus entities. Several other service buildings are located in housing areas to provide grounds and maintenance support.

Since the HSMC is relatively new, maintenance facilities for the Department of Housing & Dining Services are adequate, but some may need to relocate or add space as additional housing is developed and the service center area develops north of Boulder Creek on East Campus. Growth needs could either be met through better utilization of space at HSSC or an addition to HSMC to combine functions at HSSC with the expanded space need.

Renovations and new building development should

consider office and staff break rooms, storage and support spaces for operations, and maintenance services dedicated to each community.

d. Housing-Information Technology

HDS operates and maintains its own computer network and servers to support student residents and the administrative and operations staff. The operations and server facilities are currently located in the Kittredge Commons facility and will require relocation to accommodate the planned replacement of Kittredge Commons. Server needs could be combined with other campus IT needs and offices relocated to East Campus, in close proximity to HSMC. This computer network data center of servers and distribution cabling requires a stable environment and an ongoing program of improvements to maintain current with technology and meet the capacity demands of the growing HDS business needs and overall IT systems.

8. Residential Capital Improvements

The Department of Housing & Dining Services (HDS) completed a comprehensive review of current facilities and outlined priority for renovations in order to support the development of the Residential Campus 2020 concept. Additional bed spaces will need to be added during the next 10 years to accommodate the increase in non-freshman students, particularly sophomores who choose to participate in these programs. The current renovation plan includes improving and adding recreational, community, faculty office, classroom, seminar, and tutoring spaces, as well as group and private study spaces. These improvements will result in an integration of academics and Residence Life within the residential living space.

Based on the preceding analysis, the space deficits identified in IV.A, and the need for up-to-date facilities, many residential capital projects are needed in the next 10 years. The following list includes projects over \$2 million. Location, timing, square footage, and cost estimates for these projects are detailed in Exhibits V-A-1 and V-A-3 later in this plan. Since this is a 10-year list, several of these projects have not yet been authorized to proceed with a program plan. Some of the new buildings may be done as private developments rather than as CU-Boulder projects.

- **Central Campus Complex Renovation.** Repair and replacement of deteriorating equipment and systems. This will occur in multiple residence halls in the central campus area, starting with Baker Hall.
- **Children's Center (Childcare) New Facility.** Development of a replacement facility for the Family Housing Child Care programs.
- **Darley Commons Renovation and Replacement.** Repair and replacement of deteriorating equipment and systems, redevelopment of kitchens and dining areas, and development of multi-purpose spaces in support of academic programs and conferences

housed at Williams Village.

- **Dining/Community Center.** Creation of a new 750-seat dining center to support additional undergraduate student beds.
- **Family Housing north of Boulder Creek.** Development of a yet-to-be-determined number of apartment style housing units for families, graduate students, faculty, and/or staff. Development will include roadway and utility infrastructure to support development on the north side of Boulder Creek. In addition to housing, it is anticipated that development of athletics, recreation, academic, and other community facilities could occur in the area.
- **Kittredge Complex Renovations.** Repair and replacement of deteriorating equipment and systems. This will occur in Kittredge Commons and Kittredge West residence halls. Program plans have been started for both of these facilities.
- **Undergraduate Housing.** Development of new residence halls to accommodate up to 1,500 additional undergraduate student beds.
- **Williams Village III—**East of Bear Creek. Development of 200 apartment/townhome style housing units for families, graduate students, faculty, and/or staff. Development will include roadway and utility infrastructure to support construction on the east side of the creek.



G. Other Land Use Areas

Two other land use areas exist within the Boulder Campus—natural areas and undeveloped areas. This section briefly describes how these areas will be used and developed.

1. Natural Areas

Natural areas are portions of the campus that are preserved from development because they are unsuitable for development; are a part of a floodway mitigation plan; provide significant habitat or riparian protection; provide a buffer from undesirable noise, traffic, or use; or are a significant part of the historic heritage of the university. These spaces range from the park-like settings of Norlin Quadrangle and Varsity Lake to the constructed wetlands of the East Campus and Williams Village.

Natural areas constitute approximately 94 acres, which is 17 percent of the developed three-campus area. Exhibit IV-G-1 indicates the defined natural land use areas. Natural areas presently exist on significant portions of CU-Boulder South and the Mountain Research Station; however the land use planning has not occurred to define them.

Open space development guidelines are covered in Section V-C, Outdoor Areas Plan, which describes guidelines and standards for preserving open space as well as how new open space will be developed in areas like the East Campus and north of Boulder Creek.

2. Undeveloped Areas

Undeveloped areas are portions of the campus that are reserved for development through this plan and previous planning efforts. These areas have been established to meet any of the growth needs of the institution as defined in the previous sections.

Undeveloped areas constitute a total of 47 acres on the three developed campuses. Of these, only one acre is considered undeveloped on the Main Campus and that is a parking lot west of Broadway in the University Hill district. This lot is developed as a parking lot but has no associated use attached to it.

The bulk of the undeveloped property on the Boulder campus is located on the East Campus (36 acres) and at Williams Village (11 acres). Exhibit IV-G-2 indicates the areas of campus considered to be undeveloped. By definition, once development occurs in these areas, they would no longer be undeveloped and would move into one of the other land use categories; thus there are no projects associated with this land use.

CU-Boulder South is not considered an undeveloped land use because the entire property is being reserved as a land bank for future generations. A conceptual land use assessment conducted in 2002 indicates that up to

212 acres might be suitable for some form of development but without planning such as has been done for the three developed campuses, land use areas as used in this Master Plan cannot be assigned.

Temporary uses may occur on undeveloped land. For example, the Department of Intercollegiate Athletics has a field throwing area for shot put and hammer tosses adjacent to Potts Field. Prior to the construction of the Jennie Smoly Caruthers Biotechnology Building, there was also a running area south of the parking lot for the running track. These are considered interim uses and agreements for their placement include provisions for vacating any improvements when a higher and better use is found. Any interim use may be placed in undeveloped areas without amending this master plan.

