Baker Residence Hall
Renovation Program Plan

UCB Project Number: PR006697
April 4, 2012
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I. EXECUTIVE SUMMARY

Baker Hall was opened as a Men’s Residence Facility in 1937. The building is now a co-ed residence hall in the heart of campus, housing almost 500 students. It is a historically significant asset to the campus, having been designed by Charles Klauder. The building has not had any significant renovation work in its 75 year life except for the upgrade of some infrastructure such as fitting the building with a sprinkler system and electrical/ life safety enhancements. This program plan describes the complete renovation of the building with a vision to bring all the residential rooms up to present standards and to fully integrate the Residential Academic Program appropriately into the residence hall.

The proposed renovation is focused on the interior of the building while making minor necessary repairs to the historic exterior and improving the site design to contemporary needs. Security and student safety are the number one goals. Presently there is limited internal access control to the student resident rooms and access to the RAP spaces is via a fairly hidden stairway that mixes residential and classroom students in common corridors. The second goal is to bring new life to the finishes throughout the building and change the resident rooms to more closely match modern campus standards. The addition of more toilet facilities, both public and in semi-private suites, is also necessary to meet codes and campus standards.

The program proposes replacement of all building systems which includes the introduction of a cooling system to the building which presently does not exist. A cooling system will enhance the student experience and make the building fully suitable for summer conference use. Changing the building systems allows sustainable design goals to be integrated into the project such that the daylighting, air quality and energy performance of the building can all be improved. The Baker Hall RAP is centered on the Natural Sciences and the Environmental programs of the Liberal Arts College which makes this proposed renovation an excellent opportunity to display and foster sustainable living practices. The project design goals anticipate that much of the interior of the building will be reconfigured, primarily to integrate new room layouts into the existing residential wings, but also to integrate new building systems in a concealed manner. Baker Hall will continue to use the steam heating provided by central campus steam piping, but will abandon the antiquated radiators. It will be served by central campus chilled water piping to provide for building cooling. The exterior courtyards and other surrounding site features are proposed to be enhanced to provide more student activity in the spaces as well as better design for bicycle parking and safer service truck access to the south side of the building.

The total project budget is proposed at $41,300,000. This includes $29,564,000 of direct construction costs plus associated LEED Gold certification costs and all project related soft costs. The total gross square footage of the building will remain the same or have the potential for a slight increase for the possibility of adding exterior stairways to the building to meet life safety code requirements. The program plan process investigated room configurations and determined that at least 450 beds can be accommodated in the reconfiguration, which closely aligns with the original building capacity. The schedule anticipates design beginning in the fall of 2012 with renovation beginning in the summer of 2013 and be completed for the start of the 2014 academic year.
Participants and Process

1. Program Plan Committee
   a. Deborah Cook, Deputy Director, Housing and Dining Services
   b. Curt Huetson, Director Facilities Planning & Operations, Housing and Dining Services
   c. Steve Hecht, Assistant Director, Design and Project Group, Housing and Dining Services
   d. Heidi Roge, Project Manager, Housing and Dining Services
   e. John Fox, Associate Director, Residence Life
   f. Darna Dufour, Associate Dean for Facility Administrative Affairs, College of Arts & Sciences
   g. Wendy Lembeck, Buildings Manager, College of Arts & Sciences
   h. Cindy Carey, RAP Director
   i. Tom Goodhew, Facilities Architect & Planner, CU Facilities Management

2. Programming Planning Team
   a. Clayton Cole, Principal, SLATERPAULL Architects
   b. Len Segel, Staff Architect, SLATERPAULL Architects

3. Consultant Planners
   a. Martin Martin, structural engineering analysis
   b. Cator Ruma & Associates, Mechanical and Electrical analysis
   c. CIVITAS, landscape architectural analysis
   d. Ambient energy, LEED and Sustainable Design analysis
   e. Cumming Corporation, Cost Estimating Consultants

Process

1. The Program Planning team and consultants met 8 times
   a. Early meetings involved determining the programmatic goals and requirements
   b. Later meetings involved extensive ‘fit studies’ to determine if the programmatic goals could reasonably be expected to fit within the existing building

2. Additional meetings
   a. Meetings were held with campus facility engineers
   b. Meetings were held with campus facility code personnel
   c. Meetings were held directly with RAP personnel
II. GOALS AND OBJECTIVES

Residence Life: Housing & Dining Services Goals

Baker Hall is one of the oldest residences on campus and is due for a significant renovation. Based on the Flagship 2030 Strategic Plan there is an emphasis to provide a multi-year, high quality residential experience for students at CU. This requires improving the physical conditions in Baker Hall to attract upperclassmen. This would be the first residence hall on the central campus to be fully renovated. As such, the Baker Hall design will set many standards for the neighboring residence halls.

Part of the success of the residential experience at CU is the inclusion of the Residential Academic Program (RAP). RAP requires that students living in a given residence hall share academic experiences offered in the building. The inclusion of RAP classrooms and easy access to faculty within the Baker Residence Hall makes living on campus highly desirable for many students. This Program Plan has been developed with the full participation of key members of the Department of Housing & Dining Services and the Baker RAP. They clearly articulated several project goals that need to be achieved in order to accomplish a successful renovation of Baker Hall. The overall intent of the Program Plan is to define the needs and quality of the interior spaces, plus any necessary improvements to the exterior in such a way as to give the building long term usefulness. Specific programmatic goals are as follows;

1. Improved security - 24-hour welcome and security desk which overlooks the main entrance and common spaces.
2. Maximize the number of beds in balance with the desirable room types to both increase student satisfaction and provide optimum cash flow.
3. Address life safety and accessibility issues - manage the floor level changes on the ground, 1st, and 3rd floors, update the fire escapes, improve restroom accessibility, and update the fire alarm systems.

4. Improve the finishes in the residences, the hallways and the community spaces.

5. Historic building – respect the historic character of this architecturally significant building. The exterior is intact. Modifications, such as additions, will require careful evaluation. There are some historic elements inside that should be respected. This character is appreciated by the students and might set the tone for interior detailing of the renovation.

6. Integrate sustainable design into the renovations - increase daylighting, salvage reusable materials, high indoor air quality, possible use of solar panels, increase energy performance of the building shell (walls and roof), and a new energy management system. Among the goals is to achieve a LEED Gold or better certification with a 38 kbtu/st/yr goal. It is worth noting that Baker students have led the campus in sustainability efforts and they would like to retain their water filtration system. Last year it saved the equivalent of 90,000 plastic bottles.

7. New building systems - Design new mechanical systems, (HVAC, Plumbing and Electrical). Housing & Dining Services would like to improve the usefulness of Baker in the summer months to serve the conferences and camps that take place on campus. To do so encourages the installation of a cooling system.

8. New building amenities:
   a. There is a desire to create a large shared community “great room” which could serve many purposes including being a central living room, a point of arrival, a gathering point for residents
and RAP meetings, and informal entertainment (movies, music)

b. The old laundry room should be replaced with a new and more energy efficient operation which can be centralized or distributed.

c. A student break area should be provided which could have a community kitchen, as is being provided in the newest residence halls

d. A food vending area for students

e. Provide study lounges on each floor

f. Improve vertical circulation presently provided by only one small elevator

g. Replace the old mail distribution room with a new and improved one

h. Provide a minimal storage room for student belongings

i. Build new restrooms up to present CU standards

j. Provide at least two gender neutral restrooms on each floor (accessible)

k. Provide a sink niche in the residential pods on each floor for washing student items.

l. Improve the surrounding landscape areas, including the bicycle parking area, using native and xeric/low or no water alternatives

9. Project phasing: The intention is to construct all of the improvements outlined in this Program Plan in one phase. The University intends to not occupy the building starting in the summer of 2013 so that renovation can commence.

10. Improve facilities of the Baker Residential Academic Program.
Residential Academic Program Goals

The *Residential Campus 2020 Plan* anticipates an increasingly important role for the Residential Academic Programs at the University. The Baker Residential Academic Program (BRAP) is part of the overall University system to integrate education into the residence halls. It is designed to provide freshman year students with the supportive community of a small school within a large university. They have proven to foster meaningful interactions between students and faculty. The RAP offers seminar-style courses focusing on one core academic area of interest. The emphasis of the BRAP is Natural Sciences and the Environment. This program is ideal for students interested in careers working on environmental problems, such as sustainable use of our resources, science teaching and health sciences. Many of the students major in Biology, Environmental Studies, Chemistry, Geography, Geology, Anthropology, and Astronomy.

The BRAP facilities were previously established in the Baker building and are located on the second floor. The three classrooms are sized to serve about 25 students each and can be used night and day. There is a group of faculty and administrators specifically assigned to this program. Their present location in Baker Hall is cramped and diminishes the opportunities for conversation beyond the classroom. The Program calls for the inclusion of an apartment for one of the BRAP Faculty-in-Residence and their family inside Baker Hall. The success of the BRAP is inexorably tied to the success of the residence hall experience.

There are several design goals for the BRAP:

a. Provide acoustically isolated classroom environments. Currently the classrooms are located on the south side of the building facing Farrand Field where the CU Marching band practices cause distractions during the months of August, September and October.

b. Locate the BRAP where it will be a visible and integral part of the residence hall.

c. Provide easy access on the public side of the security doors to the BRAP spaces for both residents and non-residents. The majority of the BRAP class-attendees live in Baker Hall, but not all. So it’s important to provide ways for non-Baker residents to have easy access into the facilities without crossing into the Baker residential spaces.

d. The instructors and director need private offices while the lecturers can be in an open office work space.

e. It is ideal if the classrooms are located near the faculty and admin spaces, though not necessarily immediately adjacent to them.

f. The offices of the BRAP Director and the Baker Residential Hall Director should be near each other, and adjacent to the front desk.
Program Plan: Section II

Baker Hall Renovation

UCB Project Number PR006697

Relationship to the Facilities Master Plan

The university has established many goals for the growth of the physical facilities on campus. These are outlined in the 2011 Campus Master Plan. The Program Plan for Baker Hall relates to this master plan in the following sections and ways:

1. Long Term Development - Balance the need to have sustained growth for the health of the university with the maintenance of the existing pedestrian friendly character of the campus. Improve the appeal, usefulness and long-term viability of the Baker Residence Hall.

2. Renovations - By 2015 more than 62% of the buildings on campus will be older than 50 years, yet the programs within these buildings must fulfill the needs of the 21st century and beyond. Many of the systems in Baker Hall are at or near the end of their useful life and will need to be replaced. The improvements proposed for Baker Hall fit into the university goals to create a residential experience designed for the future.

3. Main Campus Density - Higher density is a beneficial goal for the central campus. However, recent studies show that the central campus is nearing its limit of density. Further encroachment into open spaces is not preferable. The area around Farrand Field is already nearing capacity for all of the services, pedestrian paths, bicycle parking, etc. Therefore improvements to Baker Hall should focus on the interior of the building and look at ways to reduce the demand on the utilities in that area.

4. Architectural Character - Baker Hall is a notable work of architectural design on the CU Campus. It is a quintessential example of the “Tuscan Vernacular” style developed for CU by the architectural firm of Charles Klauder from Philadelphia. Klauder created the overall masterplan for the University, in addition to designing 15 remarkable buildings at CU-Boulder. His unique “University of Colorado Style” was based in part on the villages of Tuscany and on other architectural elements he found in Florence. It has been adopted as the stylistic ‘road map’ for all other buildings on the central campus. Renovations to Baker must be very sensitive to the architectural character of the building.

5. RAP classrooms in the Residence Halls alleviates demand for additional central classroom space. The classroom space in residence halls is better utilized throughout the day, with a combination of sharing academic activities with Residence Life programs. Approximately 15% of freshman credit hours are taught in the RAP format. A campus goal is to achieve 15% of undergraduate credit hours in the RAP environment.
6. Historic Relevance - Baker Hall was named after former CU president James H. Baker who served in that role from 1892 to 1914. The building was originally designed by Charles Klauder with local architect Glenn H. Huntington, as a men's residence hall in 1937. During World War II, Baker Hall served as a dorm for US servicemen. They were at CU to learn foreign languages, such as Japanese. After their training was complete, they were reassigned to either the Pacific or European theaters of war.

7. Fire and Life Safety - The Facilities Master Plan requires that existing buildings meet or exceed the requirements of applicable fire and life safety codes. A preliminary code review was done during the process of this Program Plan. There was a conversation with the CU Code Official and several items were identified that will need remediation. Refer to Section V. DESIGN REQUIREMENTS / Building Codes, to see these explained in detail.

8. Accessibility - The Facilities Master Plan reiterates that the University of Colorado is committed to making all of its programs physically accessible for all persons. Accessibility provisions are part of all renovation projects and Baker Hall should not be an exception. A preliminary accessibility code review was done during the process of this Program Plan. There was a conversation with the CU Code Official and several items were identified that will need remediation. Refer to Section V. DESIGN REQUIREMENTS / Building Codes, to see these explained in detail.
9. Circulation - To paraphrase the Facilities Master Plan, the circulation network of campus ties the community to its day-to-day activities. Baker is fortunate to be well served by pedestrian, bicycle and service vehicles in a safe and legible manner. The primary improvements proposed by this Program Plan are:
   a. Create a better access / entry point into the building from the south.
   b. Improve the pedestrian experience at the new south entry by moving trash bins and pickup across Baker Drive, next to the existing maintenance building.
   c. Reduce the clutter of the bicycle parking on the east side of Baker. This east bicycle parking area also serves Libby Hall located east of Baker Hall. The new plan should consider redistributing parking around all sides of the building.
   d. Increase the number of bike parking spaces to accommodate the anticipated increase in the number of bicycles being used by students and staff.

10. Parking - The Facilities Master Plan explains that the major parking areas for the University are to be located on the periphery of the campus. Interior areas are to have a relatively few number of short term, loading and accessible spaces. The latter describes the conditions for parking around Baker Hall with its very central and internal location on campus. Given how precious are the relatively few parking spaces, they should be protected. Few, if any spaces can be eliminated as they are necessary for faculty and University Service vehicles.

11. Outdoor Areas and Landscape - The University makes use of the landscape as a final detail to anchor buildings and knit them together. The spaces between buildings are memorable. Baker Hall has four strongly identifiable outdoor courtyard spaces. This program Plan imagines improvements to the exterior in the following ways:
   a. Create a pedestrian-friendly plaza at the new south entrance to take advantage of its location next to Farrand Field and the solar advantage of this courtyard.
   b. Upgrade the existing maintenance garage which is located just to the south of Baker.
   c. Improve the usability of the courtyards for play and social activities.
   d. Improve bicycle parking around the building.
   e. Screen the service areas from view.
12. Environmental Management - The Facilities Master Plan outlines 5 areas that are key in order to improve the natural environment at the University. These are listed with the ideas for the renovation to Baker Hall, included the following:

   a. Outdoor air quality – The intention of this Program Plan for the renovation of Baker hall is to encourage the increased use of non-vehicular transportation around the building so as to reduce the amount of harmful exhaust emissions.

   b. Indoor air quality – New mechanical systems and room finishes for Baker Hall should increase the amount of natural ventilation and encourage the use of materials with no volatile organic compound (VOC) emissions.

   c. Water Quality – Improve the water quality of storm runoff by reducing the amount of potential pollutants coming out of Baker Hall. By doing this, local streams, including the nearby Boulder Creek watershed, will be protected.

   d. Flood mitigation – There are no restrictions regarding the flows of flood waters relevant to this Program Plan.

   e. Hazardous materials – CU has already surveyed Baker Hall to identify areas of hazardous materials. These will be removed by the University or a general contractor prior to any new construction.

13. Transportation

   a. There will not be a need to reassess the transportation serving this residence hall since the number of students it is to serve is not envisioned to increase. See the Campus Transportation Master Plan.

   b. Campus bus service creates a wide network of connections to the CU community outside of the central campus residential area.

14. Utilities Planning and Management - The Facilities Master Plan explains how the University is served by a variety of utilities that are essential to campus operations. The proposed renovations of Baker Hall will take advantage of these utility systems as follows:

   a. Heat – Baker will continue to tap into the district steam heating system, but will not re-use the existing radiators.

   b. Power – Baker will continue to use electrical power from its existing source. Service to the building will need to be increased.

   c. Natural Gas – Baker will not require natural gas for any of the needs of the building.

   d. Cooling – This Program Plan proposes adding an air conditioning system to Baker Hall. It will be served from the new chilled water plant being developed.

   e. Water – Baker will continue to receive domestic water from the City of Boulder.

   f. Plant irrigation – The landscape around Baker Hall will continue to be served by raw ditch water from local irrigation ditches.

   g. Sanitary sewers - Baker will continue to be served by University sewer lines connecting to
City owned lines. Since the use of the building is not changing and the numbers of residents isn’t going to increase, the sewer lines should not change.

h. Communications – CU has its own telephone system that will continue to serve Baker Hall. Also a computer data communication network, connected to the world wide web, will serve Baker Hall. The renovation should add a full wireless coverage system for service from all parts of the building, as this is very important to academic teaching techniques. The project should also consider a cell phone signal enhancement system.

i. Sustainability – the goal of the renovation of Baker Hall is to reduce the amount of energy, water and sewerage needs of the facility. Resource conservation is an important mission of Baker Hall. Refer to Section V. DESIGN REQUIREMENTS / Sustainability to see this explained in detail.
III. FACTUAL DATA

Current Building Use

Baker Hall is centrally located in the heart of the CU-Boulder campus next to Farrand Field and Helen Fischer Field. It opened in 1937 as a men’s dormitory with an original capacity of 444 beds. The building is named after James H. Baker, the third CU President from 1892 to 1913. He was credited with building the University of Colorado into a full-fledged university with the addition of several schools and colleges established during his administration, including the School of Law, School of Engineering, School of Music and CU Graduate School. Currently it houses just under 500 coed students in a variety of room types: singles, doubles, triples and quads. There also is a Residential Academic Program in the building, which was placed in the location of the original residence hall dining rooms on the second floor. This RAP program emphasizes natural sciences and the environment for students in the College of Arts and Sciences. The overall building has 113,649 gross square feet of floor space spread out on five levels with the following existing uses on each floor:

1. The lowest level is partially submerged into the ground with very limited direct access to it. It houses student residences in the east and west wings. The central portion contains the steam mechanical room, electrical switch gear room, several maintenance staff rooms, a student lounge, a student classroom, a game room and a student laundry room.
2. The next level up is the main entrance floor with an entry door facing north towards Helen Fischer Field. It houses student residences in the east and west wings. The central portion contains the residence hall administration spaces, a student sitting area, a student mail room, a kitchen for students, a maintenance repair room, a staff lounge, a student classroom / study lounge, linen storage room, and a demonstration 'model' student bedroom.

![Diagram of the main entrance floor]

3. The second floor (third level) houses student residences in the east and west wings. The central portion contains a mix of spaces. Student residences run along the north side of this space. The south side is the location of the Baker RAP. The central area of this floor was originally designed as four dining rooms for the residents. The ceilings are tall, there are some nice plaster, pilaster and crown molding details and some arch-topped, wood-paneled doors. Today, dining service for Farrand Quad residents is provided in Farrand Hall, Libby Hall, and the Center for Community.

![Diagram of the second floor level]
4. The third floor (fourth level) is smaller in size than the floors below because this is where the architectural shape begins to step back in form towards the center of the building. There are only student residences on this floor….no community uses.

5. The fourth floor (fifth level) houses student residences in a further reduced floor area. There is an apartment for the Hall Director here as well. There are four remarkably nice corner rooms that once served as meeting spaces. They have sandstone floors, a vaulted ceiling with exposed rafters, large areas of windows and a stone fireplace. Currently one continues to be used in that manner. Two of them have been converted to student residences and the fourth is a part of the Hall Director’s apartment.
Assessment of Functionality and Efficiency

Currently Baker Hall has among the lowest Facilities Condition Index of any undergraduate housing facility. It is an old building in need of renovation. Some of the primary issues are:

Security and Safety Shortcomings:
- There is no supervision of the building entry and exits
- The classrooms share a corridor with student resident rooms
- The RAP faculty and staff share student commons restrooms
- Some residential rooms have access to roof areas and should not

Statistics:
- There is approximately 230 gross square foot of building per resident bed. This is below new campus standards averaging 255 sf.
- A typical double room contains 195 sf. This is close to the present design standard of 190 sf.
- A typical single room contains somewhere between 133 and 144 sf. The present standard is 155 sf.
- There is only 4,889 sf for all of the toilet rooms in the building. Present standards will require approximately 8,200 sf.
- The present net assignable square footage is 73,788 sf. This Program Plan anticipates an improvement in efficiency to 78,854 sf.

1. Lack of daylight into the north facing rooms on the ground level. The grade is high and the window wells are deep.
2. Some window wells leak rain water into occupied spaces.

3. Outdated finishes in all of the interior spaces.

4. The lower level of the building is a fully occupied residential area that looks and feels like a basement.

5. The restrooms are a hodgepodge of finishes and do not meet handicap accessibility codes.

6. There are floor level changes on the ground, 1st and 3rd floors that have ramps with excessive slopes.

7. The classically detailed north courtyard is a terrific arrival sequence to the main north entrance, but there is not a corresponding interior space that is welcoming or memorable.

Outdated community bathrooms
8. The entry lobby is small and dark with no sense of any design character that identifies the Baker ‘lifestyle’.

9. There is not a central common space that can serve an assembly of more than 20 people.

10. All windows are poorly functioning… they leak cold air, are single pane, and don’t operate well.

11. The steam heat system doesn’t operate well and there is no air conditioning in the building.

12. The fire escapes currently installed from the third floor toilet room windows are not safe and are problematic in design.

13. Several residential hallways have level changes with inadequate ramps.
14. There are not enough study lounges to serve the residential areas and some that exist are poorly located.

15. Noise from the CU marching band has significant negative impacts on Baker hall, especially the RAP.

16. The entire building has exposed conduit and pipes.
Historic Features Condition Assessment

Baker Hall was named after a former CU President and is centrally located in the heart of campus. It was originally designed by Charles Klauder and G.H. Huntington as a men's residence hall in 1937. Klauder, an architect from Philadelphia, created the overall masterplan for the University in addition to designing 15 remarkable buildings at CU-Boulder. His unique "University of Colorado Style" was based in part on the villages of Tuscany and on other architectural elements he found in Florence. It has been adopted as the stylistic 'road map' for all other buildings on the central campus.

Klauder had a great influence on college architecture outside of Boulder. His firm made significant architectural contributions to the campuses of Princeton, Penn State, University of Pennsylvania, University of Pittsburgh, Wellesley, Cornell, Yale and at the University of Denver. Huntington was a Boulder architect who was responsible for the design of structures like the Boulder County Court House, Boulder High School and the Boulder Central Park Band shell.

Baker Hall is a very attractive building that stands out in part because there are many beautiful details that are original to the design of this building. The walls are a rich combination of local sandstone with limestone accents around windows, at doors and at roof eaves. The roof is a variegated mixture of clay tiles.

For this Program Plan, tours of Baker Hall were conducted to evaluate the historic aspects of the exterior and interior of the building. Materials were noted and assessed. Overall, the building is in good condition. The exterior has retained much of its original character, both in the overall design and the materials. The interior has not significantly changed except for removal of the kitchens and repurposing of the dining space for the RAP program. The following is a list of initial observations regarding items on the interior and exterior of the building which will be addressed further in the program plan for the building.
1. Exterior: The exterior appearance of the building should be respected and preserved because it is almost completely intact from the original design by architects Klauder and Huntington. The materials are historic and are character-defining features of the building. Though additions to the exterior are discouraged, if done they should be composed with sensitivity to the original design of the building while being clearly delineated as a new section of the structure. Any replacement materials should match the existing materials as closely as possible. The windows are typically beyond their useful life. Replacement with historically appropriate windows is anticipated. Limited areas of repointing of the masonry walls are required, most are behind gutters and downspouts. Exterior stone stairs on the site require repointing, and in some cases re-laying. Many of the limestone projecting courses require cleaning and some repointing. Original historic light fixtures need repair. Some roof tiles are damaged and will require replacement.

2. Interior: The character-defining features of the interior spaces should be preserved wherever possible. The fourth floor lounges are perhaps the most intact historical spaces in the building. It would be ideal if they were more conveniently located to residents of the building so that more people could appreciate them. The original dining rooms on the second floor have also retained much of their original character, which should be preserved, even with programmatic changes to the spaces. Though it is likely that changes will
be proposed for the first floor entrance area, as a part of the arrival and security improvements, modifications should be designed to be sensitive to the historic character of the space. The stairs throughout the building have retained historic railings, though most are not tall enough to meet code requirements.
IV. FACILITY RESPONSE

Project Description

The Department of Housing & Dining Services currently operates the Baker Residence Hall. Also included on the premises is a Residential Academic Program operated by the College of Arts and Sciences. A small, free-standing garage building exists to the south of Baker Hall. All of these functions are to remain but in substantially improved facilities. Renovation of almost all of the interior spaces is envisioned to create environments that can serve until the 22nd century.

PROGRAMMATIC NEEDS

1. A 24-hour receptionist desk and control point.

2. Student residences… singles, doubles, triples, quads and suites (a pair of rooms sharing a restroom).
   a. During the process of preparing this Program Plan, various room-type mixes and layouts were studied to determine the maximum number of beds that could be placed within the existing building, given the new Programmatic needs.
   b. 450 beds was determined to be the best goal for University Planning purposes. It is not the intent of this report to design an exact layout, but the Programming Team feels comfortable that the final design can accommodate at least 450 beds. This bed count, although lower than the existing count of 493, is close to the original design capacity of 444. The proposed goal will improve the livability of the facility.
3. Student shared community restrooms, unisex restrooms, study lounges, laundry room, break area, vending area and great rooms (a large gathering and living room spaces), plus storage.

4. Residence Hall management offices.

5. Residential Academic Program Spaces
   a. One (1) Director's Office – 200 sq. ft.
   b. One (1) Associate Director Office – 120 sq. ft.
   c. One (1) Program Assistant Office – 120 sq. ft.
   d. Four (4) private faculty offices for rostered faculty – 120 sq. ft.
   e. One (1) shared lecturer office that can accommodate confidential meeting with students. – 120 sq. ft.
   f. Four (4) shared open office cubicles for instructors and for graduate students associated with the RAP. Baker hires 14 - 15 lecturers per semester. All of these lecturers need a place to store their coat, backpack, etc. while they are in the classroom, and all need to hold office hours in the building every week. – 75 sq. ft. each
   g. Waiting area for students outside of faculty offices. – 80 sq. ft.
   h. Three (3) classrooms that accommodate up to 25 students each with movable seating; 450 sq. ft. each with standard A/V equipment
   i. One (1) RAP workroom for photocopier and faculty mailboxes – 150 sq. ft.
   j. One (1) RAP storage room. Baker does a lot of fieldtrips and has a large quantity of camping/climbing/hiking gear that needs to be stored. – 190 sq. ft.
   k. One (1) large common area or lounge that can be used to hold meetings of at least 100 students. This space requirement can be accommodated in the Residents Common Great Room.
   l. One (1) faculty in-residence apartment – 1,300 sq. ft.

A complete list of proposed spaces is listed on the following page:
## Program Plan: Section IV  
### Baker Hall Renovation

| Program: Program Plan - Section IV  
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<table>
<thead>
<tr>
<th>Baker Residence Hall - Proposed Programmatic Needs</th>
<th>Finalized 2/23/2012</th>
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<table>
<thead>
<tr>
<th><strong>Student Residences</strong></th>
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<tr>
<td>Bed/unit</td>
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<tr>
<td>Single; Community Bath (RA)</td>
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<td>Single; Community Bath</td>
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<td>Double; Community Bath</td>
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<td>Quad; Community Bath</td>
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<tr>
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<td>Sink, Shower (1/each)</td>
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<td>Community Great Room</td>
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| **Total ASF** | 79,484 af | 100.0% |

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| **Total Gross SF** | 113,669 af | 100.0% Existing Building SF |

| **Existing Auxiliary Storage Building** | 500 | 500 | |
| **Total Project SF** | 114,134 | See Item C (2) of Capital Construction Request |
| New fire escapes or stairs | 4 | 375 | 1,500 | See Item C (2) of Capital Construction Request |
| **Total completed project SF** | 116,034 |  

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Renovation Description

- Ground Floor (1st level): This level needs to have some of the greatest changes in the entire building to eliminate the ‘basement’ feel. All of the residential rooms along the north side of the building should have improved daylight, possibly with the construction of larger windows wells. The central portion of the floor should also be provided with increased amounts of daylight, possibly by creating a new south entrance to this level. The south area outside of the building could be excavated and a new main entrance to Baker Hall constructed with lots of south-facing windows. A new main stair from this level to the one above might be an ideal solution to create a clear connection to the first floor for security control. Some of the Baker residential community spaces and/or the BRAP spaces might be accommodated in this central area. New mechanical systems for the building will be needed if air conditioning is to be provided, and will require increased space on this lowest level.
- First Floor (2nd level): The next level would best be described as the ‘main’ level and therefore might have an improved entry arrival ‘experience’. The community ‘Great Room’ could be located in the central area and be immediately visible from the entry. The greeting / security desk will need to occupy a central position in or near this space. Offices for the management of the residence hall and/or the BRAP functions might be located in this central portion. Like the lower level, the residences should be improved to optimize layouts and finishes. It may be desirable to locate the Hall Director apartment or the RAP Faculty Advisor apartment in one of the residential wings of this floor because of the convenience of a private entrance from nearby parking.
• Second Floor (3rd level): The optimal bed count will probably be obtained by having this entire floor devoted to residential uses. The residences in the four wings should be improved to optimize layouts and finishes. The central area of the floor could be suites or larger residential units, providing a unique set of rooms because of the high ceilings on this floor. An alternative option would keep the RAP located on the second floor. A loss of some beds would need to be accommodated elsewhere and public access to the RAP space would need to be separated from the private and secure residential spaces.

• Third Floor (4th level): The optimal layout will probably have this entire floor devoted to residential uses. The residences should be improved to optimize layouts and finishes.
• Fourth Floor (5th level): This is the smallest floor plate which presently houses student residences and the Hall Director’s apartment. This floor might possibly stay the way it is with only improvements to the finishes. Or the RAP Faculty Advisor apartment could be added on this level. This floor has luxurious corner study/meeting spaces, two of which are serving as four-person resident rooms. It would be desirable to leave at least one of the study rooms in place.
New Construction Description

This Program Plan does not anticipate any significant new building additions to Baker Hall.

- There will be minor new construction if a south entry plaza with stairs and accessible ramp walkways is desired.
- This Program Plan suggests that the existing marginal fire escapes be reconstructed to full, open exterior stairways. As an alternative, new enclosed stairways could be added to the exterior of Baker Hall in four locations.
- For more detail about this outside improvements refer to the next section, V - Design Requirements.
- Also refer to the Section V - Alternative Solutions, which describes other possible additions to the building that were considered but deemed inappropriate.
V. DESIGN REQUIREMENTS

Design Requirements - General

1. The Baker Hall project has three essential design requirements
   a. Student Safety
      i. The number one priority of the integration of the Residential and RAP functions into the building must be the safety of the residents. The design should create a way for all persons to enter the common elements of the interior from a single point, or in a way that a single control point immediately within the building allows for visual control of all persons.
      ii. Residents should only be able to proceed to their rooms through controlled doors off of the common spaces, which need to be visible from the control desk.
      iii. RAP students should be able to proceed to the academic areas of the building without entering the secure residential zones.
   b. Maintain the historic character of the Klauder-designed building. Exterior changes to the building will need to be extremely well designed and crafted. Such design changes may require approval of the Design Review Board (DRB) and the Campus Historic Resource Advisory Committee (HRAC). The character of the courtyards, walkways, and approaches to the building from adjacent site features should be maintained, as should the solar access to the building.
i. Follow the Architectural Design Guidelines of the University for any potential exterior changes. Full replacement of windows is anticipated.

ii. The primary entrance to the existing Baker Hall is via a formal courtyard on the North side of the building. This entry was dominant in the early days of the residence hall, but the campus has now grown extensively to the South. A minor entry exists on the South, but consideration should be given to enhancing this approach and entry to the building. The primary dining facility for Baker Hall residents is to the South.

iii. The South side of the building has historically been the service side of the building. Enhancing the South entry will require careful placement and shielding of the necessary service functions.

c. Upgrade the interior of the building to include the design of a modern set of residential rooms with its related Residential Academic Program spaces. The functional layout should recognize the distinction between these two essential elements of the building, while interconnecting their common goals.

i. Common areas of the proposed program requirements include areas that may create traffic and conversation noise. Such areas should be isolated from the RAP functions.

ii. A Great Room is called for in the program. While this is a public common space, its location requires some degree of isolation from the common circulation areas to allow for quiet use of the space or organized assembly within the space for lectures and use by the BRAP.

iii. Baker Hall was originally designed with a lower level of residence rooms and utility functions. This level has all the unappealing features of an old basement. Considerable design effort is needed to bring light and excitement to this level.

iv. The main level of Baker Hall was not designed with a ‘living room’ area upon entering the building. Relatively narrow corridors and ramps lead to the residential areas. The present design does not support the central control philosophy of student safety mentioned above.

v. The second level of the residence hall was originally large student dining rooms. These rooms have since been sub-divided into classrooms and residence rooms. Recovering the grandeur of the high-ceiling dining rooms was considered during programming, but caused the resident bed count to be reduced when these spaces were programmed as common spaces. Further design study of this area might yield new solutions.

vi. The third level of Baker Hall has residence rooms in a configuration that violates the present-day fire safety codes for exiting the building. This design issue needs to be resolved. See Section V – Building Codes for further discussion of this issue.

vii. The fourth, or top level of Baker Hall was originally designed with four vaulted-ceiling lounges. One of these lounges has been subsequently converted to the Residence Hall Director’s apartment. Creative use of these rooms with excellent campus views should be considered.
Site Requirements

The landscape architect participated in meetings with the Steering Committee and met with the CU Campus Landscape Architect. Ideas concerning the site improvements were presented and are documented as follows.

1. Context
   a. Baker Hall was designed by Charles Klauder in 1936 as a men’s dormitory. It was the first building developed on the east side of railroad tracks that brought coal to the power plant. It initiated development of the Farrand Field precinct and quadrangle edged by Farrand, Libby, Cheyenne-Arapaho, and Willard Halls.
   b. Today the Farrand Field precinct is a richly textured sector of the campus. It is a center of student activity and circulation - close to Norlin Quadrangle, the Engineering Campus, the University Memorial Center, Center for Community, Folsom Field and the Coors Event Center. Baker offers some of the closest housing to the core of the Main Campus. Situated between two significant open spaces - Farrand Field and Helen Fischer Field - Baker Hall has excellent access to informal play and open spaces that attract students from all parts of campus.
   c. Baker Hall is at the center of activity on home football game days due to its close proximity to Folsom Field. Baker Drive is a popular tailgating area, Fischer Field is typically filled with tents and the north-south walkway between Baker and Libby provides space for tractor-trailer parking associated with events.

2. Parking and Vehicular Circulation
   a. Vehicular parking near Baker Hall is limited to on-street parking on Wardenburg Drive and Baker Drive, and the 360 lot to the north east. Baker Drive parking is particularly active during home football games. Pedestrian movement on the south side of Baker Hall is impacted by automobile traffic accessing parking on Baker Drive and service vehicle traffic accessing the existing maintenance building on Baker Drive, and loading docks at Baker, Imig Music, JILA and Environmental Design.
   b. New covered and secure parking for service vehicles and utility vehicles that currently park in the south courtyard of Baker Hall, and at the maintenance building on the south side of Baker Drive, should be developed in a location to be determined, potentially along the corridor between Baker and Libby Halls. Pedestrian conflicts with service vehicles can be reduced if the parking is east of the south courtyard. The use of electric service vehicles is encouraged to preclude the need for gas-powered trucks on campus.
   c. Current parking counts should be maintained, if possible
      i. 50 faculty/staff permit-only stalls
      ii. 3 service vehicle stalls
      iii. 1 EGO car-share stall
3. Pedestrian and Bicycle Circulation

a. Pedestrians and bicycles flow past Baker Hall on all sides. Reconfiguration of the corridor between Baker and Libby to relocate bicycle racks will improve movement and access during normal school conditions and better accommodate activities during events, move-in, and home football games. It is estimated that 340 spaces in the vicinity of Baker Hall and 90 near Libby Hall are needed. Approximately 20% should consider being covered.

b. Bicycle parking is currently concentrated on the paved corridor between Baker Hall and Libby Hall. Reconfiguration of this area could open the corridor to movement and distribute bicycle parking on the east and west sides of the corridor providing a minimum of 340 spaces in the vicinity of Baker Hall and 90 near Libby Hall. The corridor could be narrowed to align with the concrete walkway at the east end of Benson Earth Sciences and surfaced with scored concrete or unit pavers to establish a pedestrian character. The reduced width of the corridor would allow space for bicycle parking on each side, with a larger group to the west near Baker. The design should try to avoid large expanses of bicycles in a congested lot.

c. Generally, bicycle parking should be in single rows of racks but the depth of space between the east courtyard and the edge of Libby will allow for multiple rows with adequate space for access and movement. Bicycle parking areas should be defined by a flush concrete band,
and surfaced with gravel. Try to use edge treatments that separate the bicycles from the residence halls and from the corridor such as low hedges. 20% of the bicycle parking along the corridor could be covered. Additional bicycle parking could be installed along the north Baker walkway, along the walk between Baker and JILA, and on the south side of Baker Drive adjacent to Farrand Field. Bicycle parking adjacent to Farrand Field could also be covered.

d. The program originally called for a central mail and package facility to be located in the renovated Baker Hall. This would have increased bicycle and pedestrian traffic to the south side of Baker and probably would have required significant bicycle parking at the south entrance. This program requirement was eliminated.

4. Site Organization and Existing Conditions

   a. The massing of Baker Hall defines four distinct courtyards, oriented to the cardinal directions. A sandstone arcade that is integral with the building distinguishes the north courtyard, and a four-foot tall hedge encloses the east courtyard. The west courtyard is uniquely recessed
about 3’ below the exterior grade, and is separated by a sandstone wall and stairs. The existing landscape condition of these three courtyards is similar, with a turf grass ground plane and an occasional deciduous canopy tree. While these three spaces are comfortably proportioned, the existing condition of each is not inviting or conducive to lingering or social activities within them.

b. The south courtyard is currently a servicing and loading area, sloping fairly steeply up from the street. Trash and recycling containers, and frequent maintenance GUV vehicles are parked in this area. Reconfiguration of this area is recommended.

5. Microclimate

a. Building orientation and massing, location of adjacent buildings, and ground plane elevation create distinct microclimatic conditions in each of the four courtyards. Such localized conditions should contribute to the location of seating, open space, and plant material to improve comfort and to encourage year-round use of each of the courtyards.

6. Safety and security for students and faculty: is of primary importance. Lighting of walks, courtyards, and
entrances should be even and consistent, allowing the entire space to be visible. Existing spotlights at entrances could be replaced with appropriate, indirect sources that would provide adequate light and be more welcoming. Plantings should not create places that are not visible. Avoid casting shadows close to the building.

7. Views, Noise and Biophilia. Views from, and daylight into residential rooms, offer an opportunity for students to gain some visual connection with nature. It is also important that rooms have some degree of privacy, particularly those in the courtyards. Deciduous trees in each courtyard will provide a ‘veil’ of vegetation to partially screen views into student rooms, while providing a view to the landscape.

a. In the north courtyard of the building, window wells at ground level rooms could be expanded and connected as a continuous ‘landscaped trench’, improving daylight access to the rooms. They could be constructed of sandstone clad walls to preserve space in the courtyard, with some vine and perennial planting to veil views into the rooms. On the north side of the building, the well can be a continuous landscape slope laid back from the windows and planted with perennials and groundcovers.

b. Some student rooms, particularly on the south side of the building, may be impacted by noise and other activities. Recycling, trash collection, and campus maintenance vehicles are a regular source of noise. They should be moved away from the immediate vicinity of the building to the south side of Baker Drive. In addition, the marching band practices on Farrand Field and can have a significant impact to rooms on the south side of the building. Home football game tailgating and other events may be a further distraction for students in Baker Hall. Sound attenuation in the building improvements, particularly in window design, should be considered.

c. The landscaping of the courtyards should consider a multi-sensory experience, providing views, sounds, scents, and tactile opportunities to engage with nature. Visual access to landscape should be a consideration from all student rooms, as should physical access to nature in the courtyards. Opportunities to sit, socialize and study in sunlight or shade should be provided in each courtyard. The landscape should provide a diversity of plant communities, integrating plant materials that are native or naturalized, fruit-bearing, provide bird habitat and food are encouraged.
8. Entrances, Circulation, and Accessibility

a. Baker Hall is centrally located with excellent access to academic facilities, common amenity facilities, and open spaces. Building entrances will be from the north and south, and both should provide convenient and accessible circulation. The east and west doors will provide exiting only.

b. This Program Plan suggests that the existing north entrance and an enhanced south entrance be of equal importance to the building. Farrand Field, many of the main campus community spaces, the Residential Academic Program facilities and the residences can be well served by a south entrance. Enhancement of the south courtyard to accommodate entry, an accessible route, and social space could extend across Baker Drive. The entrance plaza area could maximize preservation of useable open space in the south courtyard. To accommodate increased pedestrian traffic, Baker Drive might be raised to the top of curb elevation for the width of the courtyard to establish a pedestrian character to the area and encourage vehicle traffic to slow and defer to pedestrian movement. The design of the ‘raised table’ would reduce the existing steep slopes on the street and improve pedestrian safety by extending the courtyard character to the south side of Baker Drive and integrate the maintenance building within the pedestrian zone.
c. A similar treatment could be developed at the corridor between Baker and Libby at the crossing of Baker Drive. This is a primary connector between the Farrand Field residential precinct and the center of campus that accommodates significant bicycle and pedestrian traffic. A raised table with a textured surface similar to the corridor walkway will slow vehicular movement and enhance pedestrian safety.

d. The north entrance will also serve significant volumes of students entering and exiting, as a major entrance facing towards Norlin Library, the Recreation Center and Folsom Field. New sloping walks should be considered from the north side walkway, at a diagonal, to arrive at the plaza outside the arcade. Ramps at the arcade and in the north courtyard will provided adequate accessible grade change to reach the door elevation.

9. Service and Functionality

a. A single-story, sandstone clad building of 885 sf exists on the south side of Baker Drive, south of Baker Hall. It is used for storage of maintenance equipment and houses an emergency generator. The building is a unique element on campus and offers potential of a more engaging use. As a maintenance facility it attracts service vehicle traffic, parking and noise in an active student zone, and such conflicts will increase as the south courtyard of Baker Hall is reconfigured as an important entrance to Baker Hall. The south side of Baker Hall is the
only possible location for the building service functions. The design requirement for this area is to minimize the impact of the service requirements on the building users and try to visually hide the elements required. There are problems with rain and snow melt water infiltrating the storage building that must be solved.

b. Baker dock is currently one of the hardest places to service on campus; the combination of physical limitations and limited service times (to work around class schedules) makes it a challenge. At times, trucks have to back up all the way from Libby. Ideally, trucks can drive all the way to Music dock to turn around and service Baker head on. Based on our current limitations and the apparent desire to make the south entrance more inviting and pedestrian friendly, the trash, recycling, and composting enclosure might best be located as far from the south dock as possible.

c. Alternative uses of the storage building could be studied. The unique location and character of the building suggest a shared use for student benefit. Recycling and trash dumpsters and other service uses that clutter the south courtyard could be relocated to new enclosures adjacent to the building.

d. New location options for the maintenance functions could be explored and might be integrated with covered bicycle parking. If located east of the south courtyard, pedestrian-vehicle conflicts may be reduced. Maintenance equipment and covered vehicle parking adequate for 2 grounds utility vehicles and approximately 400 square feet (an increase of 120 square feet) of secure, covered and fenced space is required.
e. The design of the service area should carefully consider the location of recycling enclosures and truck access to these enclosures.

10. Landscaping of Social Spaces

a. The four courtyards are the primary outdoor social spaces associated with Baker Hall. The unique orientation, microclimate, function, and architecture of each courtyard suggest a distinct approach to defining activities, character, and materials in each space. The design of each courtyard should build upon the unique orientation and character, and integrate appropriate interpretive and educational components to be developed in association with the natural science and environment focus of the Residential Academic Program. Elements such as bird cover/habitat and feeders, fruit-bearing trees, shrubs and groundcovers can encourage a casual engagement with nature, while specific elements such as native plant communities, storm-water drainage treatment, and water conservation can provide specific learning opportunities within the landscape of Baker Hall.

b. West Courtyard is cool and recessed space about four feet below the adjacent surface. The expansion of JILA reinforces a sense of quiet seclusion and enclosure on all four sides. It will
be quiet and shady, with the only minimal through traffic from students on the ground level exiting the building. Snow will tend to remain for longer periods due to the sun-protected orientation. West courtyard activities are primarily anticipated to be quiet reading, study, and observation of nature.

i. Landscape - The enclosed and shady space will encourage planting shade tolerant species with evergreen characteristics such as English Ivy and Mahonia spp. Plants bearing edible fruit that attract birds and perhaps a feeder would animate and bring lively sound into the space.

c. East Courtyard will capture early morning sun and the north portion will receive good sun exposure into the afternoon, throughout the year. Through traffic is anticipated to be greater than the west courtyard due to the more abundant bicycle parking here along the corridor between Baker and Libby. The sunny condition suggests a turf area for sitting, sunning, socializing, and informal play.
i. Landscape - Sun exposed edges allow for planting of native grasses, shrubs and trees that can integrate interpretive information about Colorado upland life zones. Existing deciduous trees should be selectively preserved and protected, and additional large deciduous trees integrated to screen student rooms.

d. North Courtyard is a special place defined by the enclosing arcade. The orientation toward Norlin Library and the active walkway south of Helen Fischer Field suggests that it will be an active entrance and a primary place to meet friends, socialize, and gather in small groups.
Program Plan: Section V  
Baker Hall Renovation

i.  Window wells in the north courtyard and along the north façade of the building currently are very small and deep, limiting light into the garden level rooms and making maintenance difficult. Replacing the wells with a continuous window recess in the courtyard will increase daylight to the lower rooms and allow debris that enters the wells to be easily removed.

ii.  Landscape - The stone arcade establishes a more ordered character to this space suggesting the potential to integrate some hard pavement, potentially with porous pavers to allow for drainage permeability. Fixed and moveable seating will encourage groups of a variety of sizes to gather. Bosques of single stem ornamental trees would provide order, a human scale and a “ceiling” to the space while defining a loose series of “rooms” and provide a sense of separation from overlooking residential rooms.

e.  South Courtyard will become an important Baker hall entrance. The entrance should be an accessible route. The entire courtyard could be recessed to create a generous space a few feet below street level with a stepped or landscaped slope to the entrance. The street could be raised to reduce the grade differential between level one and the street, thus reducing the length of ramp and number of steps necessary to access the entry. Care should be taken to design proper drainage from this entrance.
i. A generous stair could connect the building entry with street level to accommodate student movement. Broad stair walls would facilitate sitting. The character of the courtyard should extend across Baker Drive to expand the pedestrian nature of the space. Developing this area as a table at top of curb height will further reinforce the priority of the pedestrians and encourage passing vehicles to slow through the area.

ii. The sun drenched south courtyard will be a great social space; a place to gather and meet friends. Low walls associated with stairs near the entrance could be broad and designed for sitting. Paving on the entrance level would allow for flexible movement and accommodate tables and chairs.

iii. Landscape - The southern courtyard is the smallest of the four and needs to accommodate a slope transition from Baker Drive. The existing deciduous tree should be protected and preserved, and potentially additional trees integrated to provide shade. Generally the plant materials should be native and water conserving.
Utilities

1. Water
   a. The Baker Hall renovation will not require any change to the domestic or fire sprinkler water service that presently exists.

2. Sanitary
   a. The Baker Hall renovation will not require any change to the sanitary sewer system presently serving the building

3. Storm
   a. The building has gutters which flow into roof drains and down spouts that discharge onto the ground.
   b. Where window wells exist, or where enlarged, appropriate storm water drainage design will be required.
   c. Roof drain water flows along the ground to campus storm system inlets. Improvements may be required to improve storm water flow away from the building or more positive collection of roof drain discharge may be required.
   d. Where feasible and appropriate, roof drains and surface drainage should be integrated with bioswales as a functional and educational component of the landscape.

4. Steam
   a. Baker Hall will continue to get its heating from the campus steam loop system.
   b. No exterior changes to the steam piping are required.
   c. The south steam tunnel that exits the building needs to be maintained as it carries steam to Cheyenne Arapaho Hall under Farrand Field.
   d. The interior steam converters will remain in their existing location and configuration.
   e. Improve access to the west steam tunnel.

5. Chilled Water
   a. Baker Hall is not presently served by chilled water and has no air conditioning system
   b. The proposed renovation is anticipated to include new chilled water service from the new campus central plant project that is presently under construction.
   c. It is anticipated that the new line will come from the south. A direct bury of the line is likely.

6. Grading Changes
   a. No major grading changes are anticipated as part of the Baker Hall renovation
   b. Changes to the existing grade are recommended on the north side of the building to create a continuous sloped and landscaped area well at the lower level resident room windows to bring in additional light and increase the view and natural ventilation potential
c. In addition, new and enlarged area wells are proposed along the walls of the north courtyard. This enlargement will facilitate increased natural light and natural ventilation to the lower level functions in the center of the building.

d. Changes to the grades in the south courtyard are necessary to facilitate building entry, ramps, and stairs and to create usable social space associated with the building entrance.

e. In Baker Drive near the south courtyard, it is recommended that the street crossing be raised to top of curb height to reduce cross slope and facilitate pedestrian safety and connectivity. A similar treatment is recommended at the intersection of the corridor between Baker and Libby Halls and Baker Drive.

7. IT

a. The existing IDF rooms currently used for the structured cabling systems are undersized. Therefore a number of new Telecommunications Rooms (TRs) are required with the exception of the MDF which can remain as is. The rooms shall be located per the TIA standards as well as the current CU standards. In general, it is expected that a TR will be required on the 1b level opposite the current MDF location. In addition, two TRs are needed on floors one, two, and three. Finally, a smaller TR is required on level four. All rooms should be stacked above each other as well as above the MDF and new TR on the basement level to allow for multiple 4” riser conduits to run between the rooms for backbone cabling and other miscellaneous cabling. As a minimum, each room shall be 10’x11’ with the exception of the fourth level TR which can be 10’x9’. Each room shall have a door swinging out and shall have a card reader connected to the CU access control system. As per both TIA standards as well as CU standards, these rooms cannot be shared with any other building systems nor can any other system not directly supporting these rooms reside inside the room including plumbing, mechanical ductwork, or electrical equipment. In addition, these rooms cannot be used for storage or janitorial use. Finally, all TRs must not be located next to rooms that can generate EMI such as electrical rooms and elevator control rooms nor reside under any room that contains water such as a restroom. Each TR will require the appropriate cooling to ensure equipment inside the TRs remain within the manufacturer’s requirements. All TRs shall have power to support the equipment racks while the MDF equipment specifically shall be on emergency generator power.

b. The existing horizontal cabling consists of a combination of Cat 3 and Cat 5e cabling which does not meet the current CU standards. In addition, the backbone cabling between the existing IDF rooms will need to be demolished given that most of the existing rooms will not remain. Therefore, a new structured cabling system is required and shall consist of both horizontal as well as backbone cabling. Both shall meet the current CU standards for cabling approved manufacturers and termination types as well as outlet locations, quantities, and cable drops. In general the horizontal cabling shall consist of Cat 5e cabling while the backbone shall be a combination of high pair count Cat 3 copper cable and both multimode and singlemode fiber cable. In addition, cabling pathways including conduits, backboxes, cable trays, j-hooks, and other cable supports shall meet CU standards. The cabling shall be terminated in free standing equipment racks in the TRs on patch panels using the cable management and panel configurations set out by the CU standards. The existing incoming services cabling from Century Link as well as campus backbone does not require relocation and can remain as is.
Structural Narrative

Several potential modifications to the Baker Hall residence hall will require minor changes to the building. All of the recommendations in this Program Plan can be accommodated structurally. The structural consultant performed a general overview of the building and the structural drawings, as well as commented on the proposed modifications being considered.

1. General observations:

   a. Based upon a walk-about tour of Baker Hall, the structural consultant did not uncover any areas of structural distress or deterioration that would require near term structural repair. For a building of its age, the base building structure is in fairly good condition, and in fact, does not appear to have experienced the foundation settlement somewhat common with nearby residence halls in the ‘Quad’, Libby and Farrand.

   b. The structural consultant also interviewed the Campus Civil Engineer to inquire if Facilities Management staff was aware of any structural distress or deterioration and they confirmed they were not aware of any structural issues.

   c. Built integrally within the lower basement level is a sub-basement trench (36” deep) that is part of the campus utility distribution system, often referred to as the ‘steam tunnel system’. The sub-basement trench is covered with a concrete slab at the same elevation as the basement level slab and accessed in two locations via access hatches inside the building. Future remodels or additions will need to coordinate with the location of the utility trench which is an extension of Tunnel-5. The 4” thick lid over the trench has limited point load capacity for construction equipment live loads.

2. Specific comments on proposed modifications:

   a. It is structurally feasible to cut new floor openings in the Main Level floor slab near the north entry to provide a more open circulation between the main level and the basement (garden level). Such openings would be optimally positioned in the 6 inch thick slab between the concrete beams that are placed on the column lines. It would also be possible to remove larger sections of slab, including the supporting floor beams, provided the columns remain in place. Stability of the columns would be addressed by future structural engineer and strengthened if required to remain stable for the increased unsupported column length.

   b. It is similarly feasible to remove portions of the second floor slab above the north entry to provide a more open circulation between levels. Openings at the second floor would have to offset from those at the first floor so that the unbraced column lengths would not exceed two levels. Although the columns could be strengthened to be unbraced for three levels, it would likely not be cost effective to achieve.

   c. It is feasible to cut new floor openings to relocate the existing elevator and stair to new positions within the lobby space.

   d. It is feasible to construct a new building addition to the south of the loading dock provided the existing utility tunnel location that exits outside the building southwest of the dock is considered.
e. It is feasible to place new mechanical units weighing roughly 500 lbs each within the attic volume under the sloping wood roof framing and placed on the concrete attic floor slabs. Small attic floor openings may be cut into the floor slab to run ductwork from the ceilings into the attic mechanical units. Minimum required clearances for the mechanical units could be a controlling factor in the limited attic volume.

3. It is feasible to widen existing exterior window openings at the garden level if properly strengthened to support the loads from the load-bearing exterior wall above the opening.
Mechanical and Electrical Requirements

The mechanical and electrical consultant has investigated the existing building systems as well as the existing drawings. Their findings and recommendations are as follows.

1. Mechanical Systems
   a. The mechanical systems should be designed and constructed in accordance with the UCB Building and Construction Standards. The University requires that the building performs per the sustainable narrative contained within this Program Plan. Measures shall be taken during the design phase, including energy modeling, to substantiate that the energy performance of all building components are optimized.
   b. The mechanical systems for this project will provide heating, ventilation and air conditioning throughout the year. The mechanical systems will utilize central plant steam as the heat source (via the existing steam to hot water heat exchangers) for building heating and domestic water heating. All systems necessary for use of central plant steam and return of steam condensate to the central plant shall be included. The current steam-to-water heat exchangers (shown below) for domestic hot water are fairly new and can be kept in service. The renovated building heating system will require hot water so dual 100% capacity steam-to-water heat exchangers and pumps will need to be added for this purpose.
   c. The mechanical cooling systems will utilize central plant chilled water for cooling. Chilled water is not presently provided to Baker Hall. The new Central Plant will provide chilled water. Mechanical ventilation needs to be supplied to all residential room spaces (via fan coil units).
through ductwork from dedicated outside air handling units located in the attics throughout the building. The attics are not currently used for mechanical equipment, however it appears these attics are suitable for the project design team to make all provisions necessary to allow this to happen.

d. Both natural and mechanical ventilation should be provided. Natural ventilation will be required in all residence rooms and will be provided by operable windows. Individual climate control should be provided for each room by four-pipe fan coil units. The fan coil unit should become inoperable when the room window is open. Central exhaust systems should be provided for all housekeeping spaces and bathrooms.

e. The building has a sprinkler system installed after original building construction. The existing sprinkler piping may require modifications to meet the requirements of the new building layouts. System changes should meet the applicable UCB Building and Construction Standards document.

2. The larger, non-residential spaces on the lower floors should have VAV air handling units with direct/indirect evaporative cooling and a pre-heat coil (hot water heat with glycol) for the public and classroom spaces. Offices would probably be served by four pipe fan coil units.

3. The dedicated outside air handling units should have direct/indirect evaporative cooling, heating coils and energy recovery coils coupled with the toilet room exhaust system. Where possible use a heat wheel for energy recovery.

4. All new bathrooms should be designed for male or female use. Urinals will not be used. Plumbing fixtures should be water conserving low-flow type. Provide an entirely new plumbing distribution system.

5. Provisions for prohibiting the operation of new heating or cooling systems serving a room with an open window shall be incorporated in the building automation system (BAS). The BAS shall be compatible with the central campus automation system and be monitored by a new DDC system.
ELECTRICAL

1982 Electrical Upgrade

The original 1936 Baker Hall men's dormitory was provided with an electrical upgrade in 1982. The upgrade replaced the existing electrical service entrance to the building by providing a new 300kVA - 208Y/120V - 3 phase pad mounted utility transformer on the south side of the existing building. This transformer replaced the existing bank of three single phase transformers that had been located in the basement vault area. The new pad mount transformer was connected to the campus 13.2KV primary system located in the adjacent utility tunnel to provide power to a new 1200A fusible main distribution center (MDC). The MDC backfed the existing fusible main distribution board that served the branch distribution system throughout the building.

Emergency egress fluorescent lighting was provided throughout the building from an emergency branch panel (EM) located in the basement main electrical room. The panel was served from the main distribution center and provided nine circuits of emergency lighting.

Also included in the 1982 electrical upgrade project was replacement of the majority of existing panelboard interiors with new circuit breakers, bussing, etc. New fluorescent lighting was provided throughout the building along with new fire alarm system and devices, receptacles, switches and wiring. Existing conduit was utilized in the replacement of the existing wiring system in most cases with new surface mounted raceway installed throughout the building for the fire alarm system.

2008 Electrical Upgrade

Between the 1983 and the 2008, a 250kVA diesel generator was installed in the maintenance garage on the south side of the Baker Hall building. The generator currently serves both Libby Hall and Baker Hall. The generator system was provided with a 1000A rated automatic transfer switch located in the old transformer vault room at Baker Hall and was connected to serve the existing fusible MDC. This provided backup emergency power to the entire building.

A 2008 electrical upgrade reconfigured the emergency system by connecting the existing 1000A rated automatic transfer switch to a new 400A - 208Y/120V - 3 phase emergency main distribution center (EMDC). The EMDC was provided with a main 400A circuit breaker, a 200A circuit breaker to feed an existing panel in the maintenance garage, a 60A circuit breaker to feed the existing emergency panel EM and spaces for approximately four future circuit breakers. The existing 1000A automatic transfer switch was also tapped to serve a new 125A automatic transfer switch that was connected to an existing mechanical equipment panel located in the basement at Baker Hall.
Renovation Project Recommendations:

POWER:

Service Entrance: The existing service entrance transformer is anticipated to be removed and a new 300-500kVA - 208Y/120V pad mounted transformer provided in a new location. ‘Right sizing’ of the transformer to maximize efficiencies will be targeted once the building load is determined during design. The exact location will be dependent on how the south building entry area and the lower two levels are reconfigured for the new functional space requirements. The new transformer will be reconnected to the existing campus underground primary electrical system. The length of the secondary feeders from the transformer to the main switchboard should be limited as much as possible to minimize cost.

A new main electrical room will be provided to house the main service rated switchboard and distribution equipment. The main electrical room is anticipated to require approximately 100-120 square feet and will be located on the lower level in close proximity to the service transformer. An exit located at each end of the room with panic hardware on the doors will be necessary to accommodate code required exiting requirements. Exit doors will be required to swing outward towards the path of egress.

The new main service switchboard is anticipated to be rated at 2000A - 208/120V - 3 phase and be provided with fully rated copper bussing with a main and branch molded case circuit breakers. The main circuit breaker will be provided with ground fault protection. The switchboard will be rated to accommodate the available fault current and be provided with surge and transient protection. Integral digital metering for the main service as well as CU standard utility metering will be provided. Individual branch feeder circuit breaker metering is not anticipated.

Feeder branch breakers in the main switchboard are anticipated to feed; a distribution board to accommodate the individual branch panelboard feeders, mechanical equipment requiring larger size breakers, elevators and the normal side of transfer switches for the emergency system. The main circuit breaker and the branch feeder breakers will be 100% rated.

DISTRIBUTION:

Existing branch panelboards within the building are anticipated to be removed and replaced with new 42 and 84 circuit panelboards for the individual locations with new panels being located within the core areas to meet the new functional space electrical requirements. Existing chase areas in each of the wings of the building that are currently used to house the individual floor panelboards are anticipated to be reused for installation of new conduit risers and feed through panelboards. Conduit risers to mechanical equipment panels located in the attic spaces within the individual wings would be routed through existing and new chase areas. Mechanical equipment located in the lower level which does not require large circuit breaker protection would be connected through a dedicated panelboard located within the mechanical space.

New receptacles would be provided throughout the building and would be configured to suit the individual area requirements. ‘Dispatchable load’ control is anticipated for various receptacles throughout the building that serve general areas. These receptacles would not be required to be active during off hours and could be coor-
Program Plan: Section V

Baker Hall Renovation

Coordinated with CU to determine which devices will be on this system. The dispatchable load receptacles would be connected to automatic time control equipment similar to the automatic control being provided for the lighting system.

Individual resident hall sleeping rooms are anticipated to have two circuits per room. One circuit will be active at all times and would be dedicated for equipment or devices that cannot be shut down. Refrigerators, microwave, etc., are examples of loads that would be connected to the full time active devices. The other circuit would serve general device loads that could be shut down through the dispatchable load controls. A few options are available for control of the receptacle loads and could be configured to control room lighting in a similar manner, as follows:

- Automatically controlled on a regular time schedule with override switches provided in the individual areas.
- Connected through a ‘phantom switch’ in the room to deactivate these devices. Receptacle and switch coverplates would be provided as different colors or labeled to identify the two different circuit connections in each room.
- Automatic “off” control by use of vacancy sensors in each room could be considered. This would require the occupant to manually switch the lights and receptacles ‘on’ but would automatically turn them ‘off’ when the room is vacated. The manual control switches would be momentary button or touch bolt type.
- Additional energy conservation technologies, such as card keys, could be used during the building design.

EMERGENCY SYSTEM:

The existing 250kVA generator and generator panel located in the garage directly south of Baker Hall is anticipated to remain. The generator will most likely remain connected to Libby Hall as well as provide emergency and stand-by power to the remodeled Baker Hall. It appears that the two elevators proposed in Baker Hall might be required to be on emergency power to meet expanded egress requirements for the remodeled building. Therefore, the exact generator loads will need to be verified for both buildings prior to any final design of the system. Some non-legally required loads currently connected to the generator may need to be shed or removed from the system to accommodate the added elevator loads. The panelboard located in the garage area will remain since it serves the generator block heater, battery charger and other miscellaneous generator accessories.

The emergency system would require the relocation of the existing automatic transfer switches. One transfer switch for the legally required life safety loads (egress emergency lighting, fire alarm, etc.) and the non-legally required standby loads (mechanical equipment). A new 400A transfer switch with elevator pre-signal is anticipated to serve the two elevators. The non-legally required standby loads could then be shed from the system if the overall load on the generator is too high. The existing garage generator panel will need to be reconfigured during any construction to allow the loads to the generator accessories to remain in service. Also, some existing lighting circuits to Farrand Field and the exterior stage area currently fed from the mechanical equipment panel in the basement will need to be reconfigured and temporarily fed during construction to maintain service to these lights. These loads do not need to be on the emergency generator.

A new emergency electrical room is proposed in the lower level of Baker Hall to house the relocated generator distribution board (EMDC), two relocated transfer switches and a new emergency branch panelboard. The
emergency electrical room would be located adjacent to the normal power main electrical room to minimize feeder lengths from the generator and the main distribution board to the transfer switches. The room is anticipated to require approximately 80-100 square feet with one exit.

If it is determined during design that the elevators in Baker Hall are not required to be on emergency power then an optional emergency source could be considered. Integral or stand alone battery units for the emergency egress lighting could be provided in lieu of generator connection. Battery system backup could also be provided for the fire alarm system and other life safety equipment needing emergency connection. This would eliminate the need to reconnect the existing generator to Baker Hall but would not eliminate the generator since it would still be necessary for Libby Hall. To eliminate the generator completely, a study of Libby Hall would be required to determine the exact loads that are currently supported by the generator. It is understood that the generator currently supplies emergency power to the egress emergency lighting in Libby and possible other life safety loads. A portable generator tap box is currently installed at Libby Hall for a portable generator connection for the service kitchen. If the generator is removed then Libby would need to be retrofitted with an alternate battery backup system for the emergency lighting and other existing life safety connections.

LIGHTING:

A full lighting replacement and upgrade is recommended for the building renovation. High efficiency fluorescent linear lighting is anticipated for the majority of the private student areas including the individual sleeping rooms. Public study, meeting and general areas including hallways, and any specialty lighting areas requiring task lighting would be best with LED type luminaires. LED linear type lighting could be considered for the private student and sleeping areas if budget and first cost can be maintained. Lighting for the restrooms and shower areas should consider designs done in recently completed projects. Targeted lighting power density levels would be less than the ASHRAE 90.1 - 2010 requirements and would be based on either the Building Area Method or the Space-by-Space Method.

Daylight sensor control of various larger public, corridors, and study/work areas should be provided in locations with exterior windows and a large daylight contribution. This would provide automatic dimming control of the luminaires to coincide with the amount of natural daylight available in the space.

An overall automatic lighting control system is anticipated for the general areas in the building. This would allow general areas to be automatically shut off during hours of little or no activity to provide energy savings. Override switches would be provided in certain areas at specific locations to allow the local lighting to be switched on for a pre-determined time period.

FIRE ALARM:

The existing Notifier 1800 system is proposed to be removed and replaced with a new Simplex or Notifier combination Fire Alarm/Mass Notification System to meet the current University of Colorado Construction Standards. The new fully addressable system complete with speaker notification in lieu of the common horn notification appliances would be capable of providing local fire alarm notification but also announcements for other emergencies on campus. New front end devices, conduit and wire should be provided for the new system to meet the latest in NFPA 72 and the CU Construction Standards. The system should be networked and con-
nected to the central campus system.

Devices with integral sounders and visual notification for ADA compliance in sleeping areas should be supervised by the building main fire alarm panel. Audio and visual notification devices should be provided in all means of egress, common areas, in each sleeping room and outside sleeping areas as defined in the latest applicable edition of the International Fire Code. Voiceover PA capacity with the ability to voice address by floor, wing and all-call should be provided and connected to the Campus Police Department. Manual pull stations are anticipated at all egress points within the building. Detection and alarm of elevator and elevator equipment rooms/shafts should be reviewed with CU Fire and Life Safety for inclusion into the fire alarm system.

Duct smoke detectors should be provided where required and be connected to the fire alarm system for automatic shutdown of mechanical units from the fire alarm control panel. Fire sprinkler tamper and flow switches should be connected to the fire alarm system for supervisory and alarm indications.
Sustainability Narrative

1. During the project design phases, sustainability consulting will be provided by the University’s consultant. The design consultant may need to engage their own sustainable design consultant to study alternative design options.

2. This narrative addresses the methods for meeting the sustainability guidelines from the 2011 Campus Master Plan, which state that the project should if possible:
   a. Be built to a minimum of LEED for New Construction Gold “Plus” rating with a focus on energy and water performance and achieve a minimum of 45 percent better than the ASHRAE standard in place at the time of construction. The specific goal for this project is anticipated to be 38,000 btuh/st/year, not including the cooling load on the central chiller plant.
   b. Consider installing visible energy monitoring devices in the building to and make information available to inform and help occupants track conservation behaviors.
   c. Plan and construct facilities that intertwine indoor space with outdoor space to capitalize on the benefits of biophilic design to promote well-being.
   d. Incorporate designs for outdoor active and passive spaces and structures that allow community members time with nature.

3. This project will be aligned with the sustainability objectives outlined in the Campus Masterplan, Flagship 2030 and the Conceptual Plan for Carbon Neutrality. The project might also consider the goals of the American Institute of Architects 2030 Challenge. The goal from the Campus Masterplan for net-zero energy facilities is outside of the project scope and is addressed via campus infrastructure. However, the project design should consider future adaptability of building systems to help toward the eventual goal of a net-zero facility.

4. By updating this quasi-historic structure, this project is sustainable by respecting the embodied energy of the existing building. It also helps to achieve the master plan goals for campus density, support alternative methods of transportation, and by helping to achieve campus plan for carbon neutrality. Additionally, the objectives of sustainability are complementary to the Residential Academic Program for natural and environmental sciences planned for Baker Hall with the building and site as a backdrop for experiencing the water and ecological systems on campus.

5. The University has demonstrated the ability to achieve the Gold-Plus rating on residence hall renovations using the LEED for New Construction (LEED-NC) version 2009 which is the basis of this design. However, the project will likely be registered under the LEED-NC version 2012 which becomes active in the fourth quarter of 2012 (LEED-NC version 2012 is at the second round of public comment at the time of this narrative).
   a. The potential updates to the LEED –NC version 2012 rating system are aligned with the University’s sustainability goals. As of the current draft, the rating system will be updated to include the following categories:
      i. Integrative Process (new category) – energy load, water, site assessment
      ii. Sustainable Building Location and Transportation infrastructure (new category)
iii. Sustainable Sites including (new credit) rainwater management
iv. Water Efficiency including (new credit) appliance and process water efficiency
v. Energy and Atmosphere including optimizing energy efficiency using a combined energy use index (EUI) based on source energy and energy cost and (new credit) demand response
vi. Materials and Resources including (new credits) life cycle assessment and avoidance of chemical of concern in building materials
vii. Indoor Environmental Quality including (new credit) acoustic performance
viii. Performance including metering, monitoring, commissioning, and reconciling projected and actual energy use (new category)
ix. Innovation
x. Regional Priority

b. The most significant change anticipated in the 2012 version of LEED-NC is the Performance category which aligns with the University’s goal to provide visible energy monitoring devices on buildings and make information available to inform and help occupants track conservation behaviors. Water and energy submeters tied to the building automation system described in the MEP narrative support this goal. At a minimum, metering should include all incoming utilities (electric, chilled water, steam, renewable energy, and water). Submeters for major energy load groups are recommended. These submeters can also supplement Measurement and Verification activities. The LEED-NC version 2012 includes installing advanced energy metering which is defined as:

i. Meters that are permanently installed, record at intervals of 1 hour or less, and transmit data to a remote location. Electrical meters shall record both consumption and demand. Whole-building electrical meters should record power factor if appropriate.

ii. Data collection system that uses a LAN, Building Automation System, wireless network, or some other similar communication infrastructure.

iii. Data storage with the capability of storing all meter data for at least 36 months.

iv. Remotely-accessible data retrieval that provides energy use management features that include, as a minimum, reporting of hourly, daily, monthly, and annual energy use data for all meters in the system.

6. With the operational feedback in place, the water and energy metering infrastructure can also be used to inform and educate the residents. It is recommended that Resident Life and the RAP provide input to how this information might be used and presented to have the greatest impact on residents.

7. The standards referenced by LEED-NC version 2012 are ASHRAE Energy Standard 90.1-2010, ASHRAE Standard 62.1-2010 Ventilation for Acceptable Indoor Air Quality, and ASHRAE Standard 55-2010 Thermal Comfort Conditions for Human Occupancy. It is recommended that even if the project uses the current LEED-NC version 2009, the project adopts the ASHRAE Standard 62.1-2010 adaptive comfort model for spaces with operable windows and the treatment of air velocity when determining comfort. This will allow
8. The strategies for energy performance will be gauged in both relative performance (comparison to ASHRAE Standard 90.1 baseline building and LEED points for EAc1 Optimize Energy Efficiency) and absolute performance via projected energy use intensity (kBTU/sf/yr metered at the building). It is recommended that the energy modeling be performed during design and verified with actual building performance after occupancy.

9. Similar residence hall renovation projects on the Boulder campus where chilled water is not provided upon occupancy are targeting an energy use intensity of approximately 38 kBTU/sf/yr without chilled water when metered at the building. It is expected that Baker Hall will be served by chilled water and result in an energy use intensity of 41 kBTU/sf/yr. This is in line with the 2030 Challenge goal of 60% reduction compared to the regional average and an ENERGY STAR score of 94 as shown below.

![Target Energy Use Intensity (EUI) and ENERGY STAR Rating](image)

It is expected that the building renovation alone will achieve approximately a 35% reduction in energy cost compared to ASHRAE Standard 90.1-2007. To achieve the target of 45% energy cost reduction, the project shall identify opportunities for on-site renewable energy. The renewable energy systems may be located on Baker Hall or the site. They may also be located on another part of the campus and associated with Baker Hall.

Energy efficiency strategies that might be considered:
- Insulation – roof, wall insulation selected by orientation, type of stud
- Infiltration reduction, continuous air barrier
- Windows – dual pane, super-insulating, high performance glazing with solar heat gain coefficient tuned per orientation, operable with switch to disable HVAC, test configuration of operable window for best natural ventilation
- Lighting – low lighting power density, dual level switching, ultrasonic vacancy sensors in residence
• Rooms, LED in stairwells, 50% occupancy control for hallways
• Receptacle loads / equipment loads – ENERGY STAR, scheduled circuit
• Efficient elevators
• HVAC system – heat recovery
• Natural ventilation
• Renewable energy sources

10. The project will target water use reduction for fixtures (sinks, showers, and toilets), and appliances (laundry), and may want to consider plumbing a gray water collection system for future use. The storm water on the building and site could possibly be used in landscaping as a visible and interactive indication of the ecology of the water cycle and watershed.

11. Elements of biophilic design could be included in the building interior and exterior design. Most significantly for the interior is that the existing window wells should be reworked to provide daylight and views for the living areas on the lower level. The site design incorporates outdoor spaces and structures to allow residents time with nature and a place for community. The site design will provide more visual privacy and potentially, more acoustic privacy as well. The courtyards could be configured as habitat with landscape design sensitive to orientation and microclimate and native plant selection with consideration of wildlife food source and shelter.

LEED checklist follows this page.
# LEED for New Construction and Major Renovation 2009

**Project:** University of Colorado, Baker Hall Renovation

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**Certified 40-49 Silver 50-59 points  Gold 60-79 points  Platinum 80-110 points**

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<th>Code</th>
<th>Description</th>
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<tr>
<td>EP1</td>
<td>Fundamental Commissioning of the Building Energy Systems (P)</td>
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<tr>
<td>EP2</td>
<td>Minimum Energy Performance (P)</td>
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<td>EP3</td>
<td>Fundamental Refrigerant Management (P)</td>
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<td>AC1</td>
<td>Optimize Energy Performance (1-19)</td>
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<td>AC2</td>
<td>On-Site Renewable Energy (1-7)</td>
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<td>AC3</td>
<td>Enhanced Commissioning (2)</td>
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<tr>
<td>AC4</td>
<td>Enhanced Refrigerant Management (2)</td>
</tr>
<tr>
<td>AC5</td>
<td>Measurement &amp; Verification (3)</td>
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<tr>
<td>AC6</td>
<td>Green Power (2)</td>
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### Materials & Resources (MR) - 14 Points Available

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<td>MRC2</td>
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<td>2</td>
<td>MRC3</td>
<td>Materials Reuse (1-2)</td>
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<td>2</td>
<td>MRC4</td>
<td>Recycled Content (1-2)</td>
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<td>1</td>
<td>MRC5</td>
<td>Regional Materials (1-2)</td>
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<td>1</td>
<td>MRC6</td>
<td>Rapidly Renewable Materials, 2.5% (1)</td>
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<tr>
<td>1</td>
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<td>Certified Wood, 50% (1)</td>
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### Indoor Environmental Quality (IEQ) - 15 Points Available

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<td>Outdoor Air Delivery Monitoring (1)</td>
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<td>1</td>
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<td>Increased Ventilation (1)</td>
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<td>IEQC3.1</td>
<td>Construction IAQ Management Plan, During Construction (1)</td>
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<td>Construction IAQ Management Plan, Before Occupancy (1)</td>
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<tr>
<td>1</td>
<td>IDC1.3</td>
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<td>1</td>
<td>IDC1.5</td>
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### Regional Priority (RP) - 4 Points Available

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<th>Innovation in Design: SSc1 Site Selection</th>
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<tr>
<td>1</td>
<td>RPC1.2</td>
<td>Innovation in Design: SSc2 Development Density and Community Connectivity</td>
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<tr>
<td>1</td>
<td>RPC1.3</td>
<td>Innovation in Design: WEC3 Water Use Reduction 40%</td>
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<tr>
<td>1</td>
<td>RPC1.4</td>
<td>Innovation in Design: EAEC1 Optimize Energy Performance 44%</td>
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Building Codes

An initial investigation was done during the Program Planning. This included a meeting with the CU Building Code official. The key aspects for remediation to be resolved by the design team are the following:

1. Fire stair enclosures: Currently some student residences open onto stair landings. An argument could be made by the design team to support this continued layout in a renovation of the building.

2. Fire escapes from the third floor are compromised by their small size, dangerous ladder-type construction and access through an intervening room: The design team should look into ways to remedy these issues.

3. The existing ramps at the basement, 1st and 3rd floor levels are too steep to meet egress accessibility requirements. The design team should look into ways to remedy these issues.

4. The existing stair guard rails are too low and the vertical pickets are a little more than 4” apart: The design team should modify the guardrail height to be code compliant. There could be an argument to say that the pickets did not need to be modified so that the historic character of the railings could be maintained.

5. Elevator lobby enclosure: Elevators don’t need an enclosure unless they open onto the stair landings. In that case there would need to be a rated wall assembly separation. There could be rated doors held open on magnetic openers.

6. The existing restrooms are not compliant with accessibility codes: They should be brought into compliance.

7. Handicap accessible exits to the exterior ground level: There is only one ramp access to the building, located at the north entrance. If a new main entrance is created on the south there will need to be a handicap accessible entrance there.

8. Fire Sprinklers: The system was originally installed in 1985. The system has a 6” fire water entrance and 4” standpipe risers in stairs. Residential sprinkler heads are required to be replaced every 20 years so there is the potential of the heads, having been in service for 27 years, needing to be replaced, if that hasn’t already been done. If the system were to remain, the design team will have to verify that current water supply and system configuration can meet the current NFPA 13 requirements.

9. Fire separation between the community spaces and the residential spaces: Fire separation is required.

General Requirements are as follows:

- This project will be required to follow all of the most current building codes as adopted by the State of Colorado, including the Americans with Disabilities Act. Codes reviews and analysis will be prepared by the design team and reviewed by the campus authorities having jurisdiction.

- The University of Colorado presently uses the 2009 series of the International Building Code. This project will use this series of codes if they are still the adopted set at the start of design. It is not anticipated that the 2012 series of the International Building Code will be adopted by the start of design, however, a preliminary review of the 2012 code does not indicate that significant changes from the 2009 code will affect the design of the Baker Hall renovation.
(as adopted by the Colorado State Buildings Program as follows: Chapter 1 as amended, Chapters 2-35 and Appendices C and I)

The 2009 edition of the International Mechanical Code (IMC)
(as adopted by the Colorado State Buildings Program as follows: Chapters 2-15 and Appendix A)

(as adopted by the Colorado State Buildings Program)

The 2008 edition of the National Electrical Code (NEC)
(National Fire Protection Association Standard 70) (as adopted by the Colorado State Electrical Board)

The 2009 edition of the International Plumbing Code (IPC)
(as adopted by the Colorado Examining Board of Plumbers as follows: Chapter 1 Section 101.2, 102, 105, 107, Chapters 2-13 and Appendices B, D, E, F and G)

The 2009 edition of the International Fuel Gas Code (IFGC)
(as adopted by the Colorado Examining Board of Plumbers as follows: Chapter 1 Section 101, 102, 105, 107, Chapters 2-8 and Appendices A, B, C and D)

The National Fire Protection Association Standards (NFPA)

The 2007 edition of the ASME Boiler and Pressure Vessel Code
(as adopted by the Department of Labor and Employment/Boiler Inspection Section as follows: sections I, IV, VIII- Divisions 1 and 2 and 3, X and B31.1)

The 2007 edition of the National Boiler Inspection Code (NBIC)
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2006 edition of the Controls and Safety Devices for Automatically Fired Boilers CSD-1
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2007 edition of ASME A17.1 Safety Code for Elevators and Escalators
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The 2005 edition of ASME A17.3 Safety Code for Existing Elevators and Escalators
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by...
ASME International

The 2005 edition of ASME A18.1 Safety Standard for Platform Lifts and Stairway Chairlifts
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by
ASME International)

The current edition of the Rules and Regulations Governing the Sanitation of Food Service Establishments
(as adopted by the Department of Public Health and Environment/Colorado State Board of Health)

(as adopted by the Colorado General Assembly as follows: CRS 9-5-101, as amended, for accessible
housing)

Note: Additional codes, standards and appendices may be adopted by the state agencies and institutions in
addition to the minimum codes and standards herein adopted by State Buildings Programs.

- The 2009 edition of the IBC became effective on July 1, 2010. Consult the state electrical and plumbing
  boards and the state boiler inspector and conveyance administrator and the Division of Fire Safety
  for adoption of current editions and amendments to their codes.
- Projects should be designed and plans and specifications should be reviewed based upon the approved
codes at the time of A/E contract execution. If an agency prefers to design to a different code such as a
newer edition of a code that State Buildings Programs has not yet adopted, the agency must contact SBP for
approval and then amend the A/E contract with a revised Exhibit C, Approved State Building Codes. Please
note that the state plumbing and electrical boards enforce the editions of their codes that are in effect at the
time of permitting not design.
- The CU code review agent, or the State Buildings Programs approved agency building official, shall
  review all documents for compliance with the codes stipulated herein. The 2009 International Existing
  Building Code may be used when items of a historic nature conflict with newer codes.
- CU policy does not prohibit the application of various life safety codes as established by each agency
  for specific building types and funding requirements. NFPA 101, and other standards notwithstanding,
  approved codes will supersede where their minimum requirements are the most restrictive in specific
  situations. If a conflict arises, contact State Buildings Programs for resolution.
- It is anticipated that compliance with the federal Americans with Disabilities Act Accessibility Guidelines
  for Buildings and Facilities (ADAAG) and Colorado Revised Statutes Section 9-5-101 will be met by
  compliance with the 2009 International Building Code and ICC/ANSI A117.1. However, each project
  may have unique aspects that may require individual attention to these legislated mandates.

PEST CONTROL

The university of Colorado at Boulder has an in-house Integrated Pest Management (IPM) service that is
responsible for the majority of pest control on campus. Their goal is to provide timely, quality service that
minimizes health and environmental risks while protecting the University's investment in its facilities. IPM takes a
proactive approach to pest control where early involvement produces the greatest results.

IPM enacted design standards in order to preempt common situations that lead to pest infestations. These
preventative measures will reduce overall incidents of pest infestations and the associated costs of control over
the life of the facility.
Alternative Solutions

1. The Preliminary Studies prepared in September of 2011 by CU Facilities Management Staff sets out the need for this project. An alternative to not do this renovation project was rejected due to the significant issues related to building maintenance and life safety.
   a. Constructing a new equivalent building would cost approximately twice the cost of the proposed renovation, and a site for such a building does not exist on the main campus. Replacing the building on the existing site would lengthen the period of time the bed capacity was eliminated due to the demolition time plus the new construction time. Loss of the historic central campus building was also not an acceptable option.
   b. Converting this building to academic uses would not be an efficient use of the building based on its configuration with long wings.

2. Several alternatives were studied to determine the best residential configuration of the Baker Hall existing square footage, as well as ways to increase the square footage of the building to optimize the bed count of the residence hall. In addition, several internal alternatives were studied to determine the most likely bed count that can be accommodated within the existing square footage.

3. This program plan establishes a “Base Case” for the purpose of determining a probable bed count for the renovated Baker Hall. The “Base Case” calls for the replacement of the four non-compliant exterior fire escapes from the third floor with code compliant fire escapes. This “Base Case” allows for the optimized bed count.
   a. Constructing new enclosed stairways on four locations of the existing building would allow the non-compliant fire escapes to simply be removed. Such new enclosed stairways would require very careful design attention to how they were incorporated onto the historic fabric of the building. This option would have minimal effect on the budget over the new fire escapes noted for the “Base Case”. This option would not effect room counts.
   b. Constructing new stairways within the existing building will solve the code violation from the third floor, but would eliminate beds on the third, and second floors. Approximately 16 beds would be lost with this alternative.

4. Alternatives were studied to add additional square footage to the building in order to increase the bed count. In all three cases, there are negative impacts to the integrity of the original Baker Hall design which would require careful evaluation. All three alternatives below require additional toilet fixture counts which need to be accommodated within the new space or by enlarging the proposed interior toilet rooms. None of the following are recommended because matching existing colors and textures of stone, roof tile, etc. will not be possible:
a. One – expand the east and west face of the east and west courtyard façade (see sketch below). This additional space allows for as many as 80 additional beds but that is based on using ‘triples’ which is not a highly desired room type. Architecturally, this alternative requires a flat roof which is not in keeping with the Baker Hall design. Construction cost is estimated to be approximately $3.5 million.
b. Two – build an addition at the east opening of the east courtyard (see sketch below). This space allows for as many as 48 beds and creates a secure courtyard for the residents, however, this same addition will not fit on the west courtyard. The east addition restricts the bicycle parking area and the north-south pedestrian walkway. Construction cost is estimated to be approximately $2.5 million.
c. Three – build two new wings to the building extending north as shown on the attached sketch. This space allows for as many as 54 beds, depending if the rooms are designed as suites or traditional rooms. These additions restrict the east-west pedestrian walkway. Construction cost is estimated to be approximately $3.5 million.
VI. IMPLEMENTATION INFORMATION

Budget

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<tr>
<th>A. Land Acquisition</th>
<th>Total Project Costs</th>
<th>Prior-Year Appropriation(s)</th>
<th>Current Request FY 2013-2014</th>
<th>Year 2 Request FY 2014-2015</th>
<th>Year 3 Request FY 2015-2016</th>
<th>Year 4 Request FY 2016-2017</th>
<th>Year 5 Request FY 2017-2018</th>
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<td>(1) Land (Building Acquisition)</td>
<td>$0</td>
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<td>$0</td>
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<td>$0</td>
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B. Professional Services

| (1) Master Plan/Programming | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (2) Site Surveys, Investigations, Reports | $1,028,484 | $1,028,484 | $0 | $0 | $0 | $0 | $0 |
| (3) Architectural/Engineering/Basic Services | $3,659,035 | $3,659,035 | $0 | $0 | $0 | $0 | $0 |
| (4) Code Review/Inspection | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (5) Construction Management | $940,652 | $940,652 | $0 | $0 | $0 | $0 | $0 |
| (6) Administration | $325,000 | $325,000 | $0 | $0 | $0 | $0 | $0 |
| (7a) Inflation for Professional Services | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (7b) Inflation Percentage Applied | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| (8) Other | $1,500 | $1,500 | $0 | $0 | $0 | $0 | $0 |
| (9) Total Professional Services | $5,966,357 | $5,966,357 | $0 | $0 | $0 | $0 | $0 |

C. Construction or Improvement

| (1) Infrastructure | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (2a) Service/Utilities | $81,464 | $81,464 | $0 | $0 | $0 | $0 | $0 |
| (2b) Site Improvements | $2,554,771 | $2,554,771 | $0 | $0 | $0 | $0 | $0 |

D. Equipment and Furnishings

| (1) Equipment | $24,999,866 | $24,999,866 | $0 | $0 | $0 | $0 | $0 |
| (2) Furnishings | $60,000 | $60,000 | $0 | $0 | $0 | $0 | $0 |
| (3) Communications | $432,000 | $432,000 | $0 | $0 | $0 | $0 | $0 |
| (4) Demolition | $1,028,484 | $1,028,484 | $0 | $0 | $0 | $0 | $0 |
| (5a) Inflation for Demolition | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (5b) Inflation Percentage Applied | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| (6) Furnishings | $29,564,473 | $29,564,473 | $0 | $0 | $0 | $0 | $0 |

E. Miscellaneous

| (1) Art in Public Places | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (2) Annual Payment for Certificates of Participation | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (3) Relocation Costs | $1,028,484 | $1,028,484 | $0 | $0 | $0 | $0 | $0 |
| (4) Furniture Delivery & Installation | $60,000 | $60,000 | $0 | $0 | $0 | $0 | $0 |
| (5) Other Costs (specify) | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (6) Other Costs (specify) | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (7) Total Misc. Costs | $1,028,484 | $1,028,484 | $0 | $0 | $0 | $0 | $0 |
| (8) Total Project Costs | $37,590,338 | $37,590,338 | $0 | $0 | $0 | $0 | $0 |

F. Project Contingency

| (1) Construction or Improvement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (2) Professional Services | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| (3) Other | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

G. Source of Funds

| CCF | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| FF | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
The construction portion of the budget shown on the previous page was calculated by the cost consultant member of the team. The total budget is $100,000 less than the approved target for the project, but this amount is statistically equivalent to the target budget.

**Funding Sources**

This project will be funded by revenues from Housing and Dining Auxiliary Services. Revenue bonds may be issued by the University on behalf of this project with interest capitalized at the time of construction and repaid with HDS Auxiliary Services revenues. Modest annual rent increase spread across the housing system may be implemented to pay for the renovation project. Rent increases will recognize the effect of increases at comparable institutions and the rates within the City of Boulder rental market.
Schedule

1. General
   a. With the approval of this Program Plan for the Baker Hall renovation, it is the intent to not assign students to Baker Hall after the end of the 2012-2013 Academic Year. The building will also not be used for conferences during the summer of 2013.
   b. Significant cost increases and a significant increase in the duration of the renovation would occur if the project is undertaken with a partially occupied building. Students can be accommodated for the duration of construction in various residence halls included the newly constructed Kittredge Central building.

2. The following schedule assumes a separate design phase followed by a construction phase. A Design-Build delivery methodology might shorten the overall duration slightly, but not enough to bring the renovated Baker Hall on-line a semester sooner.
   a. June 2012: All approvals to proceed with the project are obtained
   b. July-Sept 2012: Selection of Architect and/or construction team
   c. Oct 2012-Mar 2013: Design and documentation
   d. May 2013-June 2013: Empty building for renovation
   e. June 2013: Hazardous material abatement
   f. July 2013-May 2014: Construction
   g. June 2014-July 2014: Furniture and Communications/IT fitup/Building Flush-Out
   h. August 2014: Building move in/Students move in
VII. APPENDICES

Campus Location Map

Baker Hall Location
Site Plan
Existing Floor Plans
Building Egress and Exiting: Basement and First Floor Levels

The proposed building circulation is straightforward and is explained as follows:

1. The existing stairs in the residential wings will be retained and utilized.
2. The existing elevator is proposed to be removed to open up the middle of the building on the lower floor levels.
3. Two new elevators are proposed to be added. They will provide egress on the floors that have split levels.
4. A new south entrance / exit is proposed for the basement level providing access from the south side of the building.
5. A new stair is proposed in the center of the building running just from the basement to the first floor levels.
Residential Wing Layout

This graphic illustrates one of the ‘test fits’ of the Program Plan residential spaces into a typical wing of the existing building. There are several constraints from existing conditions that guided the layout of the rooms and they are as follows:

1. The floor plate is narrow so the rooms tend to be shallower than what is believed to be optimal.
2. The spacing of the windows limits how many different room types can be considered.
3. Stairwells dictate the location of the corridor and challenge the placement of the ‘end’ double room.
4. Columns must be worked into the room layouts.
5. New mechanical duct chases will impact the room configuration along the corridors.
6. Restrooms are expanded in size and functionality from what is existing, impacting the residential room layout.
7. Single semi-suites are highly desirable, but tend to cause the loss of one or more beds per wing.