
A NOT SO COMMON COLLEGE COMMONS

Sustainable Dining at Bates College

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INTRODUCTION

The growing emphasis in the United States on a building's sustainability as it is constructed is clearly indicated by the exponential growth of the U.S. Green Building Council's LEED rating system. In addition, society is beginning to pay attention to the existing building stock's environmental footprint, focusing on energy and water efficiency. There is less discussion, however, on how the design of the building can actually facilitate sustainable living within and even affect behavior beyond the building's envelope. In some cases, what we do in the building may outweigh the environmental impact of the building itself.

A dining facility on an average college or university campus, for instance, has potentially the single highest environmental footprint compared to all other buildings on campus, outside of laboratory or medical facilities. It is one of the most costly to operate and employs a high percentage of campus staff. The dining facility is one of the campus's largest consumers in terms of purchased goods and producers of waste. It is also one of the biggest energy and water hogs. Conditions for the people working in the building can be dismal, with many kitchens lacking natural light, let alone fresh air or views to the outside. Yet, at the same time, the dining facility often serves as the center for student life on campus and has the greatest opportunity to affect students' behaviors relative to sustainability.

In 2004 when Bates College began planning for a new dining facility (Figure 1), the goal was to break the stereotype for campus dining. The College wanted to push the envelope of the healthy and sustainable dining experience. In the end, Bates built a new dining Commons that is energy and water efficient, equitable to staff, produces close to no waste, supports local and organic food, uses materials responsibly, and increases relationships between students and faculty, coursework and dining, and campus life and community work.

KEYWORDS

sustainable dining, local food, food services, health and productivity, energy efficient dining hall, energy efficiency, waste management

PROJECT BACKGROUND

Bates College is a private, liberal arts and sciences college in Lewiston, Maine. Ninety-five percent of its approximately 1700 students live on campus. Bates's commitment to sustainable environmental policies has grown steadily over the past decade. In 2003, the college asked Sasaki Associates, a design and planning firm from Boston, to prepare a campus facilities master plan (Figure 2) that would aid in establishing an environmentally responsible framework for campus development.

The plan identified the need to upgrade Bates's existing dining facility, Chase Commons, built originally for a student population of 600 but at the time

serving 1700 students. Contrary to the current trend of distributed dining across campus, Bates students advocated for building a single new dining facility that would allow them to dine as a community. It was important for the students that the Commons continue to have a familial feel.

Designed by Sasaki, the new dining Commons, sited on an underutilized central campus location (Figure 3), is one of the first capital projects at Bates College in over a decade and is the centerpiece of the first implementation phase of the campus master plan. The plan reflects Bates' commitment to environmentally responsible policies. Completed in 2008, the 55,000 gross square foot dining and

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FIGURE 1. The new dining Commons at Bates College breaks the stereotype for campus dining. Photo: ©Robert Benson Photography.



campus life center is designed to meet the expansion needs of the college and provide opportunities for informal conversations and socialization among students, faculty, and staff. The Commons supplements the traditional student center spaces and dining room (Figure 4) with a cafe/emporium (Figure 5), fireplace lounge (Figure 6), meeting rooms (Figure 7), and cozy student alcoves. The mezzanine can be zoned for various uses at different times of the day and week, which allows for a wide variety of events. As a wireless environment, any space becomes a solo or group study space. The building was designed, as directed by Bates, to LEED NC 2.1 Silver standards.

ENERGY

According to the Commercial Building Energy Consumption Survey (CBECS), conducted in 2003, an average cafeteria in the United States has an on-

site energy use intensity of 302 kbtu/sf, more than double the energy of a classroom building. Dining halls are among the largest energy users on campus, second to laboratory buildings. A review of the traditional energy profile for a dining facility in New England reveals that approximately 65% of the facility's energy consumption could be attributed to interior lighting, space cooling, and fan equipment (Figure 8). The current trend of multiple cooking stations displayed in an open servery contributes to the high energy load. Each of the stations has an independent hood that draws kitchen exhaust out of the building, often at a constant volume, whether the air needs to be exhausted or not. In order to balance the air system and to provide the appropriate amount of fresh air, every cubic foot of air exhausted through the hood must be replaced. And all of that fresh air needs to be conditioned to meet the demand for comfort. This results in an incredibly

FIGURE 2. Bates College's Campus Master Plan by Sasaki identified the need for a new dining commons. Drawing: ©Sasaki Associates.

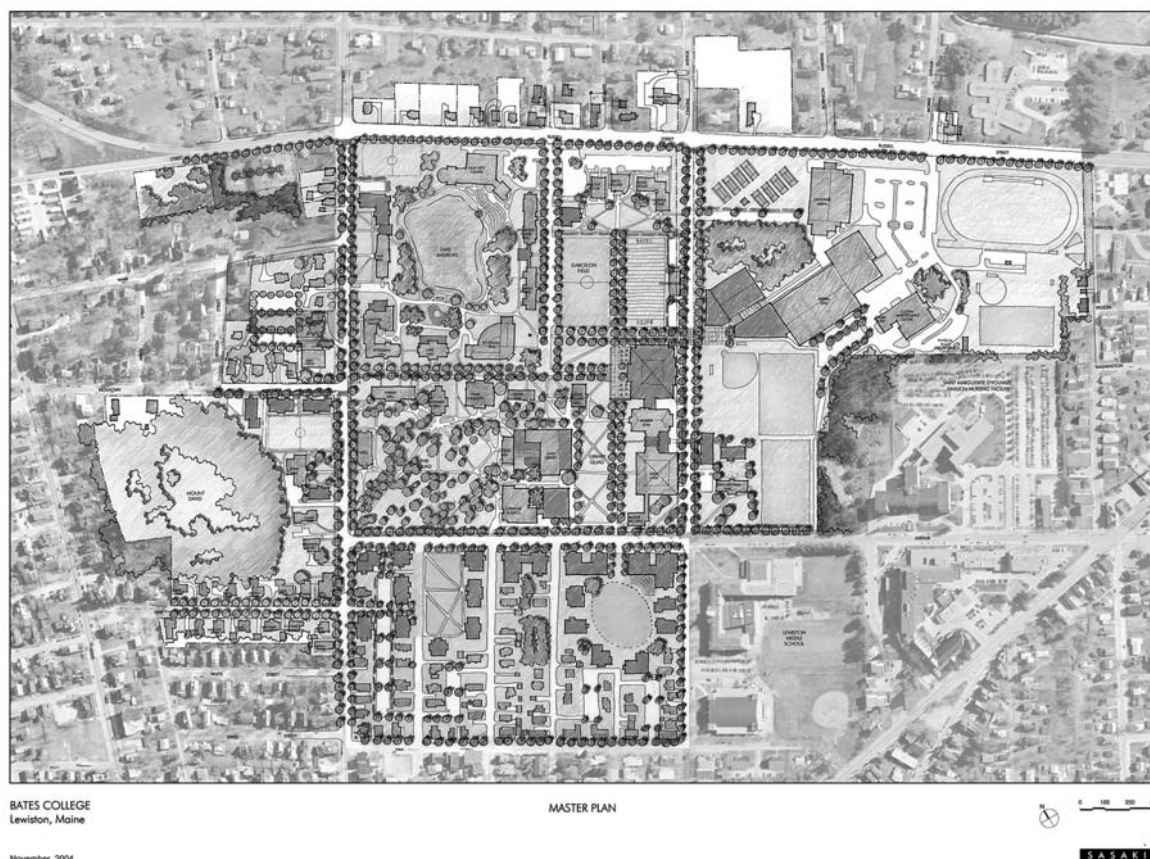


FIGURE 3. The Master Plan also called for the creation of Bates Walk, a transformation of a former street and parking lot into a pedestrian landscape lined by a 1000 foot grove of Birch trees. Bates Walk links the new Dining Commons to major athletic and recreation facilities providing a new connection between the academic and social-cultural centers of campus. Drawing: ©Sasaki Associates.

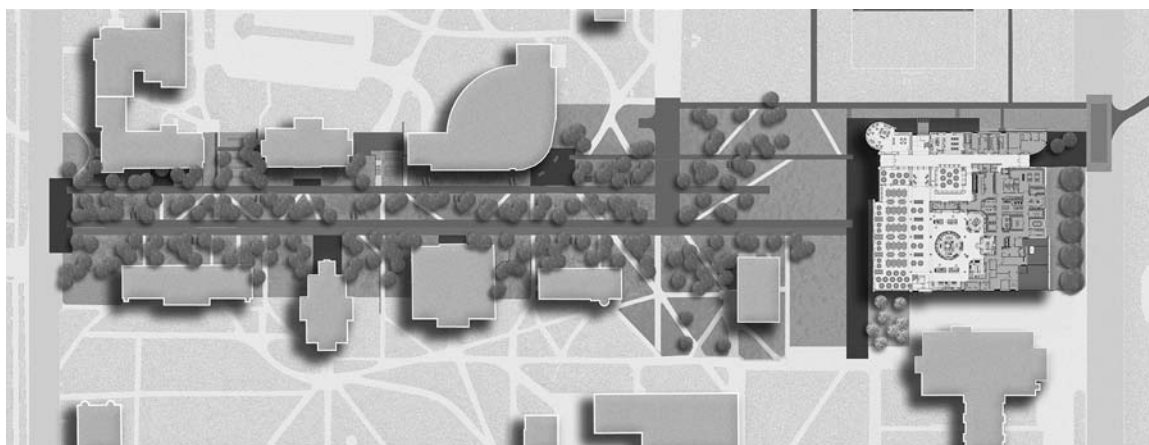


FIGURE 4. The Dining Room and Mezzanine can be zoned separately for various uses at different times. Photo: ©Robert Benson Photography.



FIGURE 5. Milt's Cafe provides alternative and late night food options. The cafe is so successful Bates added a second register. Photo: ©Phyllis Graber Jensen, Bates College.



FIGURE 6. The Fireplace Lounge is an informal space that can be transformed into gallery space or a lecture/performance room. Photo: ©Robert Benson Photography.



FIGURE 7. The Common's second floor holds meeting rooms. Photo: ©Robert Benson Photography.



inefficient building. These buildings tend to have long hours, with variable numbers of people at any given time, and are often heated or cooled to the same level regardless of how many people are in the building. Long hours means a lot of time lights need to be on and all of the kitchen equipment that never gets shut down.

Bates wanted to build a dining facility that would further its mission of environmental stewardship. Energy conservation was a main component. Lewiston, Maine, is cold and snowy in the winter and, with some exceptions, relatively pleasant in the summer. Considering the local weather conditions, Bates set a goal to eliminate air conditioning from the building to the greatest degree possible. Another goal was to have efficient mechanical and kitchen equipment and optimize lighting.

Working with Sasaki, mechanical engineers Cosentini Associates, and sustainable design consultant Steven Winters Associates, Bates explored many options for energy efficiency, including incorporating a solar wall system to preheat HVAC intake air, solar water heating, and heat recovery from the coolers and freezers for HVAC system or water heating uses. In the end the team incorporated strategies that met the triple bottom line of sustainability; environmentally responsible, economically sound, and socially just.

NO AC

Instead of providing air conditioning throughout the facility, the team employed a comprehensive natural ventilation strategy. Operable windows throughout the facility provide for comfort ventilation. The high sloping ceiling (Figure 9) in the dining room culminates in a large rooftop monitor (Figure 10) that acts as a thermal chimney and exhausts air to the outdoors. The monitor also houses a large fan that assists with air movement when needed. The only fully air conditioned space in the entire building is in the kitchen, where the hot-prep stations are located.

EFFICIENT SYSTEMS

In addition to eliminating the need for summer air conditioning, the design team installed highly efficient mechanical and kitchen equipment. The most critical of these are the Variable Drive Demand control kitchen exhaust hoods, which reduce the kitchen

FIGURE 8. The glass wall separating the auxiliary dining from the hallway during the day is opened at night to provide after dining space. Photo: ©Phyllis Graber Jensen, Bates College.



FIGURE 9. High ceilings in the Dining Room help exhaust heat in the summer. The ceilings are made from wood reclaimed from an old Thomas Edison Plant in Wisconsin. Photo: ©Robert Benson.



FIGURE 10. The Roof Monitor brings daylight further into the building. A fan at its top exhausts warm air in the summer and recovers heat in the winter. Photo: ©Robert Benson Photography.



and server stations' make-up air requirements by 50% and result in significant savings in heating energy. While the rooftop monitor exhausts heat in the summer, in winter it recovers rising heat and transfers it to warm, fresh ventilation air. In addition, a heat recovery unit captures campus steam condensate to preheat domestic water. Lastly, much of the equipment, including the hot and cold holding boxes, dish machine, refrigeration components, and computer equipment, are all Energy Star rated.

DAYLIGHT/ EFFICIENT LIGHTING

The most efficient lights are those that don't have to be turned on. With that in mind, the design team went to great lengths to ensure adequate daylight deep into the building through the use of high windows and rooftop monitors. There are even windows in the kitchen and the servery, which, surprisingly, are rare amenities in a dining facility. Even when there is adequate daylight, lights tend to remain on for no apparent reason. To compensate, the building has an automatic daylight dimming system that adjusts light levels according to interior daylight levels. To further conserve lighting energy, super efficient fluorescent lighting is used with occupancy sensors throughout the building.

All of these strategies resulted in a dining facility that is 21% more efficient than ASHRAE/IESNA Standard 90.1 1999. According to the college, the natural ventilation is working well. Only during about 4 of the 52 weeks of the year is the lighting

FIGURE 11. Many sustainable strategies contribute to the Common's energy efficiency. Drawing: ©Sasaki Associates.

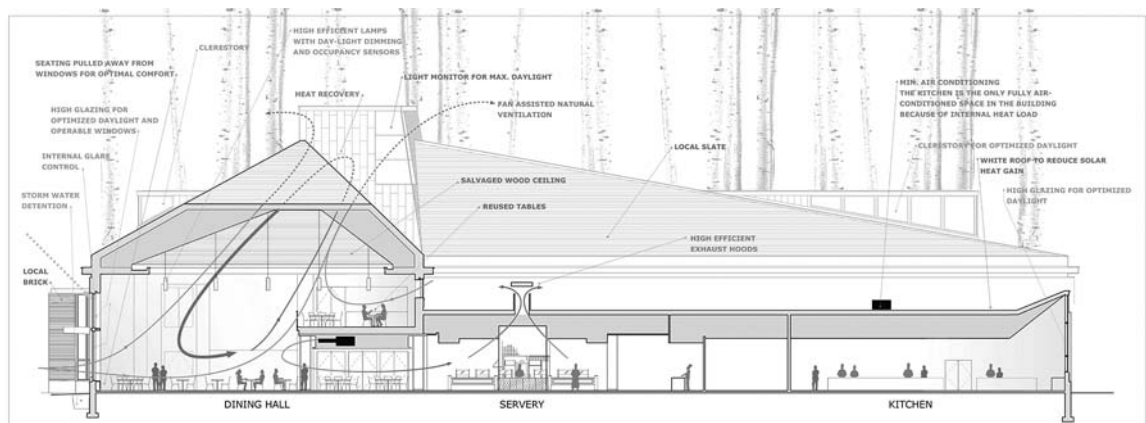


FIGURE 12. First Floor Plan.
Drawing: ©Sasaki Associates.

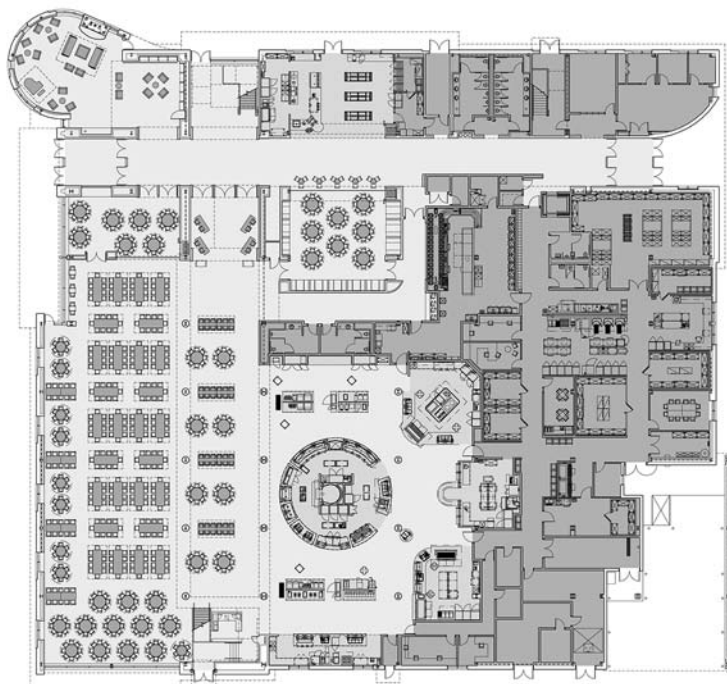
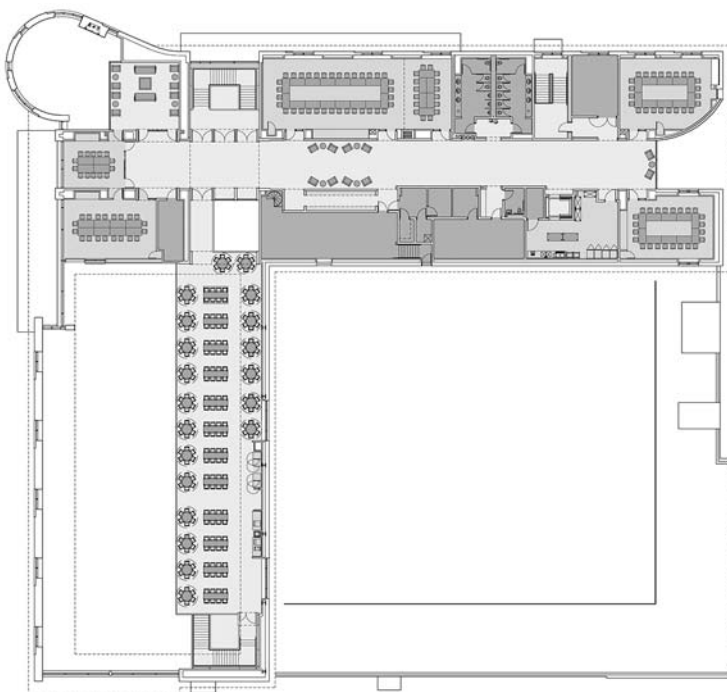


FIGURE 13. Second Floor Plan.
Drawing: ©Sasaki Associates.



slightly inadequate, which aligns with the College's sustainable ideals. To further its mission, Bates purchases 100% of the building's electrical power from Maine renewable energy sources.

FOOD: STORE MORE

Just as dining facilities tend to use high amounts of energy, the food served inside is also high in embodied energy and has a significant environmental footprint. Current agricultural practices contribute to soil erosion, loss of biodiversity, and pollution of the water supply due to the use of pesticides and fertilizers. Not only is food production harsh on the land, it is an energy-intensive industry. According to a 2002 study by the Leopold Center for Sustainable Agriculture at Iowa State, food travels on average 1500 miles before it reaches its destination. In fact, 10% of the energy used annually in the United States is consumed by the food industry; of that, as much as 40% is used to produce artificial fertilizers and pesticides (Heller et al. 2000). The current system negates the small local farmer as evidenced by the fact that since 1935, the U.S has lost over 4.7 million farms (Food Routes).

Colleges and universities spend anywhere from \$75,000 to \$17.6 million per year in food, or, on average, \$3 to \$4 million dollars per year (Murray 33). With this amount of purchasing, institutions can have a major effect on the availability of both local and organic foods while improving their students' health and academic performance. Studies have shown that students who eat well have higher grade point averages than other students (Trockel et al. 2000)

When the college began planning the new dining Commons, it was already purchasing 14% of its food supplies from within the state of Maine. With the new building came the opportunity to increase the percentage of healthy local food and decrease the College's food shed and carbon footprint. A major obstacle to serving more local food is Maine's relatively short growing season, which inconveniently coincides with the time when the fewest meals are being served. Bates could increase its use of local produce if it could buy food in the summer and store over the winter.

The new building incorporates a flash freezer and added storage space for buying more local produce

and storing it for later in the year. This past summer the college bought Maine blueberries from a nearby farmer and put them in the blast chiller immediately after cleaning them. Frozen so soon after picking, it was like having fresh blueberries for most of the year.

While the most sustainable space is typically the one not built, that is not true in this instance. Adding storage to the Commons has resulted in some significant environmental and economic savings. Having more storage space has allowed Bates to decrease deliveries from seven to four days per week. This reduction in vehicle miles traveled means that vendors are willing to negotiate more favorable contracts. In addition, instead of unloading trucks every day, the common's staff can be more productive with their time. The ability to buy in bulk reduces the associated carbon footprint and helps local farmers. And, best of all, since moving into the new Commons, Bates has doubled its use of local and farm fresh produce to 28%.

WASTE: NO TRASH COMPACTOR

Even while incorporating additional storage, the designers were able to eliminate the dumpsters and trash compactors on-site. This is almost unheard of in a dining facility. Dining facilities typically produce an enormous amount of waste, including food scraps, packaging, and take-out containers, not to mention all the cooking oil that is used. In addition over 82% of the waste produced annually by Bates is diverted from the landfill

How was this accomplished? First, it is important to note that landfill use varies by location and local legislation. In Maine, there are no laws prohibiting feeding pigs kitchen scraps. All of the post-consumer food scraps, everything coming off the plates, is sent through a pellitizer and given to a local pig farm for feed (Figure 14). A few other initiatives are as follows:

- A local farmer picks up pre-consumer scraps from the kitchen and composts them at the farm.
- All leftover prepared food is donated to a local food bank. Last year, this accounted for 33,000 meals.
- A central grease system collects all of the used fryer oil, which Bates sells for bio-diesel fuel.

FIGURE 14. Post-Consumer food waste is sold to a farmer for feed. Photo: ©Phyllis Graber Jensen, Bates College.



FIGURE 15. Food waste is collected, pellitized, and sold to a pig farmer for feed. Eliminating garbage disposals from the building saves the College about \$3,500 annually. Photo: ©Phyllis Graber Jensen, Bates College.



- The amount of paper products used in the facility is limited. Because most of what is used is either recyclable or compostable, the college does not use trash compactors or dumpsters

The savings from these strategies are very real. While reducing their costs for waste removal by two-thirds, Bates is also saving money from a decrease in pest management related to dumpsters. While the college used to pay to have fry oil taken away, now it is receiving income for its use as a resource. The grease system has resulted in a much cleaner kitchen and there have been fewer injuries due to burns; burns and knife cuts are the two top causes of inju-

ries in similar facilities. Having no garbage disposals saves approximately 1,428,090 gallons of water and \$3500 per academic year (Figure 15).

Education is key to the success of this comprehensive solid waste recycling program. The new facility includes several stations for students to pre-sort containers for recycling. At a dedicated recycling room these goods are rinsed, weighed, and packed for pick-up at a dedicated service bay.

TREATING KITCHEN STAFF LIKE FAMILY

Bates' old Commons was not an exception to the typical dining center kitchen. Although students described feeling that staff was like family, the staff who worked in the basement were disconnected to the world above. There was even little interaction among staff on the different levels where they were employed. The old kitchen, like so many commercial kitchens across the United States, had no views to the outdoors. Staff could not know what was happening outdoors, whether it was snowing or sunny. In designing the new Commons, it was important to Bates to have a kitchen that lived up to the professed way the college felt about the staff.

The resulting new kitchen is bright and airy (Figure 16). The entire kitchen, including dishwashing, is on one level. Some of the cooking stations are actually out in the servery, connecting the people preparing the food more closely with the students. The new kitchen includes staff lockers and a break room. An expansive and tall east-facing window provides natural light deep into the kitchen's preparation area. Even the dishwashing station gets some natural light. While most kitchens are the hottest and most uncomfortable spaces in the building, Bates's kitchen is the only fully air-conditioned space in the entire Commons. According to Christine Schwartz, Director of Dining Services, the overall spirit in the kitchen is nicer. After moving into the new Commons, Schwartz has seen a decrease in kitchen injuries, a 9% increase in productivity, and a 2% decrease in sick days. Schwartz believes these are directly correlated to the new dining kitchen.

BENEFITS OF AN AFTER DINNER LIFE

Previously, it was typical for Bates students to drive 35 miles each way to the nearest city for a night out. There really weren't many food options once the

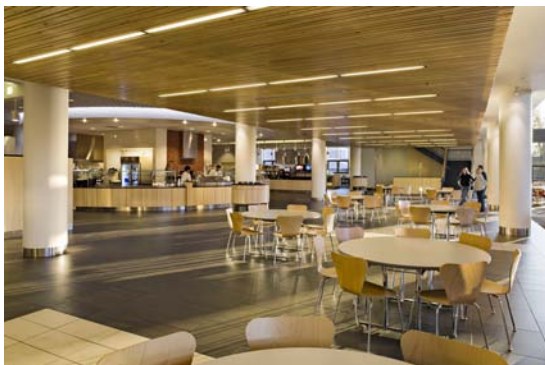
FIGURE 16. Windows in the kitchen and servery provide a healthy environment for the kitchen staff. Photo: ©Robert Benson Photography.



FIGURE 17. Photo: ©Phyllis Graber Jensen, Bates College.



FIGURE 18. Photo: ©Robert Benson Photography.



dining room closed. The Commons has changed campus life. With the building remaining open after the dining room closes and the College hosting such events as a Winter Carnival, more students remain on campus during the evening. Now, a second register has been opened at the convenience store in the Commons, and the College has found a direct correlation between providing late night food options and reduced vandalism in the dorms. Additional benefits include the reduction of carbon emissions associated with vehicle miles traveled each weekend and fewer accidents involving students driving back to campus late at night.

SUCCESS—THE DESIGN PROCESS

Since the opening of the Commons, participation in the College's dining program has increased from 84% to over 90%. And all off-campus students are opting into the meal plan. After moving into the building, Bates Dining received a \$2.5 million gift from an anonymous donor to increase local and sustainable food purchases. In August 2009, Bates was ranked among 12 of the country's greenest college cafeterias by "The Daily Green" and in 2010 the Commons won the 2010 Association of College Unions International (ACUI) Facility Design Award of Excellence.

Bates credits much of the building's success to the integrated design process. Early in the process, the team held a sustainability workshop with faculty, staff, and students to identify project issues, establish goals, and develop sustainable strategies.

In May 2005, Sasaki Associates invited a group of the students and staff to join them at their offices in Watertown, MA, for their annual internal Green Day. The five students and four staff members who participated visited with the many sustainable manufacturers exhibiting at the office. They also attended the keynote session given by Anthony Cortese of Second Nature, one of the founders of the American College and University President Climate Commitment, of which Bates is now a signatory. This event resulted in renewed vigor on campus to support green building policies and encouraged 30+ students to attend the second sustainable brown paper workshop held by Sasaki on campus. There, students were invited to comment on proposed building strategies and recommend alternative ideas.

FIGURE 19. The building is educating our world's future leaders about sustainable living. Photo: ©Phyllis Graber Jensen, Bates College.



The Bates dining and facility staff also worked side by side with the team the entire way through design and construction. The dining director, for instance, sat with many people, from the metal fabricators to the locksmiths as they keyed the entire building. Because she had such hands-on experience with design and construction, she knows the building inside out and very quickly knows if something isn't right.

CONCLUSION

As the heart of campus, the new dining Commons at Bates College has helped the College further its commitment to sustainability. With added space for storage, Bates is able to purchase more local food. The integrated waste management program significantly reduces the College's landfill waste, and the building's design and systems conserve water and energy. Most importantly, the building is educating our world's future leaders about sustainable living.

Since the Commons was built, Bates completed its Green House Gas Emissions Inventory. The College created an Energy Master Plan to supplement the Campus Master Plan and has developed a Climate Neutral Action Plan with the goal of Climate Neutrality by the year 2020.

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