Standard 8.
Physical and Technological Resources

1. Description

1.1. Facilities and Physical Resources

The Bentley campus is located on 163 acres in Waltham, Massachusetts, 12 miles west of Boston and approximately one mile from the center of the City of Waltham. Bentley moved to Waltham from downtown Boston in 1968. The campus includes 48 buildings encompassing over 1.7 million gross square feet. Since the last NEASC visit, Bentley has constructed six buildings, two parking decks, renovated and expanded the athletic center and library, and created two new athletic fields.

The campus has three districts: main campus that includes upper and lower campuses, south campus located immediately south of Beaver Street, and North Campus located just over one half a mile north of the main campus. The main campus features the oldest buildings, primarily academic and administrative, that frame a series of traditional quadrangles around the library on the upper campus. Residential and student life buildings extend down a hillside from the lower campus and across Beaver Street, with the Dana Athletic Center and the athletic fields on the South Campus. The North Campus comprises almost 20 acres and includes four student residences.

During the period 1999 through 2007, Bentley undertook an aggressive plan of physical expansion intended to enhance physical facilities for pedagogy, student life, and faculty and staff effectiveness and efficiency. Exhibit 8.1 below summarizes the highlights of this effort.

Exhibit 8.1: Developments between 1999 and 2007

| Acres Acquired | 54 | 50% Increase |
| Beds Added     | 726| 30% Increase |
| Square Feet Added | 420,000 | 36% Increase |
| Parking Spaces Added | 772 | 34% Increase |

Other highlights of this effort included the complete renovation and expansion of the library (completed in 2006 at a cost of $17 million) and the renovation and expansion of the Dana Athletic Center in 2006. At the time of the submission of this self-study, work is being completed on a substantial renovation of the LaCava building. The goal of this work is to create an appropriate front door for Bentley to house externally oriented functions including admissions, alumni relations, advancement, corporate relations, the Conference Center, career services, and the
Center for Women and Business. After Undergraduate Admissions moves to its new space in LaCava, the second floor of the Rauch Administration Center will be renovated for Human Resources and marketing to consolidate most central administrative functions in Rauch.

1.2. Maintenance and campus planning

Bentley commissioned Sasaki Associates, Inc.¹ to perform a comprehensive campus master plan completed in 2007 just before the general economic crisis in 2008. While the pace of construction has certainly slowed since the recession, reference is still made to the master plan to ensure projects are considered within the context of the larger vision. Bentley will likely update the master plan in the next few years. Pending this, Bentley continues to contract with Sasaki on specific project and space planning needs. Bentley’s campus planning is aligned with strategic planning, and the university is able to respond to strategic facilities needs quickly and effectively.

Unlike most United States colleges and universities, deferred maintenance is not an issue at Bentley. The university has a continuing maintenance and renovation schedule that is funded through a rolling, five-year capital budget. It includes regular enhancements of classrooms, academic and administration buildings, and residence halls to assure that the institution stays abreast of the latest business and technology innovations and safety features. All of the university’s buildings are in substantial compliance with the requirements of the federal Americans with Disabilities Act. Over 95% of buildings on campus have sprinkler systems (including all residence halls) and life safety systems are monitored 24 hours a day.

1.3. Environmental sustainability

Since the installation of electrical sub-meters in 2008, energy efficiency projects and upgrades to the energy management system (EMS) at Bentley have resulted in a 10% reduction in electrical consumption. This work was also a key contributor in earning ENERGY STAR certification for six buildings on campus. As of the close of FY12, the university’s total energy consumption was 82,000 BTU per square foot, far less than most institutions in a nationwide database of over 250 colleges and universities maintained by Sightlines Inc.²

As discussed in Standard 11, Bentley is a signatory of the American College and University Presidents’ climate commitment (ACUPCC). The ACUPCC recognizes that institutions of higher education have a unique role in society as both community role models and as hubs of research and innovation. Signatory institutions are committed to achieving carbon neutrality on their campuses. As of the writing of this report, the university has achieved its first carbon footprint reduction goal of 50% by 2015. The reduction was achieved through sound energy management and conservation efforts along with the purchase of wind energy via renewable energy certificates. Bentley is committed to further reducing campus greenhouse gas emissions 70% by 2020 with the ultimate goal of achieving carbon-neutrality by 2030. The Princeton Review named Bentley one of the country’s most environmentally responsible colleges in its 2012 Guide to 311 Green Colleges.

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¹ Sasaki Associates, Inc. is an international planning and design firm that provides consulting and design services to many colleges and universities across the United States.

² Sightlines Inc. is a national facilities strategic benchmarking firm serving over 250 colleges and universities.
1.4. Technology-rich facilities and smart classrooms

The Princeton Review named the McCallum Graduate School number three in the nation for state-of-the-art facilities in 2012. All of Bentley’s ninety classrooms are smart classrooms, equipped with features such as LCD projectors, lectern PCs with internet connectivity, DVD players, document cameras, touch screen room controllers, student laptop power and data ports, wireless network/internet access, and a classroom network control system. This enables faculty members to select whether students will have access to the Internet, email, the campus network, etc., via their wired or wireless connections. Ten rooms, including the high technology laboratories, have student PCs at each seat. Although the smart classrooms are very effective to support most teaching and learning, the present size and configuration of classrooms limits the university’s flexibility to offer larger classes or to easily host different types of pedagogy such as the studio model pioneered in the Bentley MBA.

1.5. High-technology learning laboratories

Bentley has a number of innovative technological complements to the classroom. The Center for Marketing Technology (CMT) is an advanced teaching, research and consulting facility that partners with companies in several areas related to quantitative and qualitative marketing research. The Center for Marketing Technology hosts more than 250 focus groups annually and over 150 e-surveys targeting groups from 1,000 to over 100,000 respondents. Marketing courses use the CMT for research, focus groups and presentations.

Supporting 40-50 graduate and undergraduate courses each semester, the Hughey Center for Financial Services (Trading Room) provides faculty, students, and staff access to up to date financial software and data feeds including Bloomberg, Morningstar Direct and S&P Compustat. Further innovative facilities include the Center for Languages and International Collaboration (CLIC), the CIS Learning and Technology Sandbox, the Design and Usability Center (DUC), the Howard A. Winer Accounting Center for Electronic Learning and Business Measurement (ACELAB), and the Media and Culture Laboratory and Studio.

1.6. Resources for learning and research

1.6.1. The Academic Technology Center

The Academic Technology Center (ATC) assists faculty and students in leveraging technology in teaching, learning, and research. Through individual and small-group sessions, the center helps faculty to create and maintain course websites and resources, integrate web-based resources into curricula, acquire and use software relevant to their courses, and identify technology resources for conducting research. The ATC also provides support with statistical analysis of data, research methods, and survey design. It offers workshops on the use of numerous analytical software packages and provides research resources based on faculty and student requests and the strategic directions of the institution. These include Compustat Global, Thomson Reuters’ I/B/E/S and Standard and Poor’s Emerging Markets Database (EMDB). A majority of the databases are accessible via Wharton Research Data Services (WRDS). The ATC also supports a UNIX server that is used for research projects that require processing of large datasets.

1.6.2. Technical infrastructure

Bentley’s technical infrastructure and network is comprehensive. It includes 1 GB connections to every port, plus 300Mb 802.11N wireless connections across the entire campus. In order to provide students, faculty, and staff uninterrupted internet access when the primary provider fails, the internet connection has dual, redundant
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internet service providers (ISPs), including a 1 Gb primary fiber connection and a secondary fiber internet connection that provides 500 Mb. Should the primary ISP fail, the system is designed to re-route internet traffic to the secondary ISP. The campus also has 24x7 data center technical support and service agreements with Internet and networking equipment providers for rapid resolution of issues. There is a redundant operations center with disaster recovery plans for all major administrative systems.

Research and curricular databases and software are available in specialty laboratories, smart classrooms, the library, and through the Virtual Laboratory, a central applications server that provides campus-wide access. Others are available online through hosted services (e.g., SAP). Some of the software and hardware is discipline-specific (e.g., video editing software installed on high-end Apple computers for students in the Media Studies lab, network monitoring software and hubs, switches, and routers installed in the CIS Sandbox lab). Other applications are used across disciplines.

1.6.3. Computing facilities

State-of-the-art hardware and software is ubiquitous at Bentley, with a fully enabled wireless campus with a secure network for faculty, students and staff and an unsecure private network for our guests and visitors. There are over 250 servers, most using virtualization software, and several hundred PCs available for students who do not have laptops.

1.6.4. Standardized desktop and notebook computer configurations

Client Services supports approximately 5,500 Bentley-owned notebooks and desktops on campus. The mobile computing program provides undergraduate students with a standardized computing platform that insures seamless integration with Bentley’s computing environment. This notebook is replaced after two years with graduating seniors keeping their computers upon graduation. At the graduate level, the majority of students provide their own computers. Students in the Bentley MBA are provided notebooks, and doctoral students are offered a Bentley-configured notebook. All full-time faculty and staff with a business need are provided with a notebook or desktop that is supported and replaced on a schedule.

1.6.5. Computer laboratory and services

With the library renovation, Bentley abandoned its traditional computer laboratory that was physically separate from the resources students utilize when studying and researching. Instead, the university installed 120 PCs throughout the library in proximity to the reference librarians who are experts in navigating the eighty online databases. The Computing Services Helpdesk is also located in the library so that students with any technical issues can have them resolved conveniently.

1.6.6. Data security

Bentley has a full time information security and data privacy administrator, responsible for creating privacy policies, auditing the physical and electronic handling of sensitive data, and implementing new systems to secure data. The position reports to administrative computing and to a joint faculty and staff Information Privacy Committee. Bentley has had no reported data breach incidents.

3 The library is open approximately 110 hours per week.
1.6.7. Science laboratories

The science laboratories on the first floor of Jennison Hall comprise 8,000 square feet and include teaching space, a shared faculty and student research laboratory, and approximately 2,280 square feet dedicated to chemical storage, preparation facilities, and laboratory coordinator/staff work areas. During the last five years Bentley has invested in analytical instrumentation for scientific analysis of environmental samples, consumer products, foods, and various biological materials. This instrumentation supports an increasingly inquiry-based curriculum in the sciences, is maintained by dedicated technical support staff, and is used extensively across the science curriculum. Although the laboratory space, in terms of square footage, is adequate for the range of laboratory courses and number of class sections offered, Jennison Hall was built in 1968 and represents an inefficient, outdated infrastructure and layout that could be improved to more effectively support contemporary pedagogical practices in science teaching.

2. Appraisal

2.1. Physical facilities and resources

Bentley is proud of its reputation for excellent facilities. However, as part of its ongoing space planning and evaluation of physical resources, it has identified strategic needs, including additional faculty offices and student study space, student organization offices, student wellness space (so health and counseling can be co-located), additional hybrid technology-equipped classrooms, a few flexible classrooms to accommodate twenty to eighty students in various configurations, and renovation of science laboratories and auditoriums. These will be addressed in priority order over the next several years based on available resources and centrality to the mission and strategic plan. These items are in addition to the regular, ongoing renovation and maintenance of student residence halls and academic buildings that allow Bentley to be one of the top performers for planned maintenance among universities nationwide. Sightlines Inc. also commented that Bentley relies on recurring capital that creates a proactive and predictable model, that stewardship spending consistently outspends peers with Bentley’s annual stewardship reaching the highest performance on the Sightlines database in FY12.

If sufficient external funding is generated, the university may consider constructing a convocation center. Students have consistently expressed a strong desire for a large convocation or meeting space and the convocation ceremony, held for freshmen in September, has become a new tradition. This event and others throughout the year including admissions open houses are hosted under a tent erected and removed (at significant cost and disruption) on the upper campus quadrangle. A large meeting space could accommodate these events plus student-focused events like concerts.

2.2. Computing and technology infrastructure

Bentley invests in infrastructure to insure that our students are proficient with state-of-the-art databases, business software and other technology resources, and to maintain our strategic position as a leader in information and

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communication technologies. This leadership is demonstrated in its award-winning\(^5\) hybrid approach to online learning that enables the university to serve undergraduate and graduate students across the United States and abroad.

To further improve experiences for students off-campus as well as growing numbers of those taking undergraduate and graduate classes online, the Academic Technology Center has begun working with systems, networks, and telecommunications to pilot test virtualization tools. Virtualization of programs that have previously been available only on campus will provide a more seamless experience for those living off-campus.

While Bentley prides itself on its integration of state-of-the-art technology into research and the curriculum, it is recognized that there is now a need to dedicate more resources to the support of administrative and other key systems. For example, the MyBentley campus portal for students, faculty, and staff has recently experienced several performance problems at times of peak usage. Strategic initiatives to develop an employee performance appraisal system and implement imaging technologies to convert paper processes such as undergraduate applicant review also increase the demand on administrative systems and support personnel. Although central administrative computing is often recognized on campus for quality work, like most other universities, there never are enough resources to fulfill all the administrative needs.

Other areas of opportunity related to technology and policy at Bentley include remote access, enterprise reporting, and acquiring new systems. To improve access to university systems, an effort is currently underway to develop an environment that provides easy, secure remote access for faculty and staff. Bentley has recently built a solid infrastructure for enterprise reporting, including the Cognos web reporting tool. However, data access policies, data definitions, and specific cross-functional reporting requirements need to be addressed in order to maximize its effectiveness. Finally, the university needs to develop a more explicit and rigorous build versus buy and best of breed versus enterprise-wide decision-making process when considering application solutions. These processes need to include such factors as university-wide efficiency and compliance, as well as system life-cycle costs.

Since 1985, the university has had a mandatory undergraduate mobile computer purchase/lease program that enables Bentley to manage expectations about classroom technology, network management, software images, and technical support. The standardization provides certain benefits to faculty and students inside and outside the classroom, but the emergence of more innovative platforms including tablets and lightweight notebooks introduces new opportunities with regard to teaching, research and incidental use. Identifying the costs and benefits of moving to a more open computing environment and deciding on Bentley’s direction in this area is important and is scheduled to be addressed for the 2014 fall semester.

\(^5\) Bentley was the winner of the Government and Academic Power Award presented at the Saba Global Summit in 2010.
3. Projection

The newly appointed Vice President for Administration and Finance has responsibility for overseeing finance, facilities and information technology, among other areas. The combination of these responsibilities into one position presents an opportunity to reassess the university’s approach to these areas.

At present, no major new building initiatives are planned for the next two to three years unless substantial external funding is received. However, work has already begun to prioritize the facilities needs by focusing on available financial resources over the next two years and deploying them to address the most important needs of faculty and students in support of the strategic plan. Campus community input will be sought to align needs, expectations and resources to accomplish projects that tentatively include addressing student organization space needs, student wellness, student study space, and faculty offices. **Timeline:** Commencing Spring 2013: Vice President for Administration and Finance.

Likewise, the five directors across academic, marketing, and administrative computing have begun a dialogue that is intended to lead to a highly coordinated, efficient and effective information technology planning process and a Bentley Long-range Technology Plan. As currently envisioned, the planning process will be aided by an external consultant and community input and will result in a new governance structure for information technology project prioritization and policies that encourages leadership in both academic and administrative areas in direct support of the strategic plan. **Timeline:** Commencing Spring 2013: Vice President for Administration and Finance.

4. Institutional Effectiveness

The university has managed through difficult economic times to maintain and improve facilities and technology. The new Vice President is charged to work collaboratively with trustees, faculty, students and staff to plan and allocate resources to ensure that Bentley retains its well-deserved reputation for excellent physical and technological resources. These attributes are a distinctive competitive advantage for Bentley and will enable Bentley to compete successfully for top students in a challenging demographic market.
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