

# Department of Facilities

## Introduction

The Department of Facilities has continued to transform its organizational structure and processes to enhance service and improve stewardship of the Institute's physical assets. We administered an employee survey and conducted interviews with customers to assess both the work environment and customer satisfaction. This information formed the foundation on which we built our new strategic plan. We also began a program to review and improve work processes throughout the department. Teams composed of employees trained in continuous quality improvement (CQI) tools reviewed work processes and streamlined them, which resulted in improved service and simplified work.

In addition to developing a strategic plan and initiating the CQI program, we continued on our path of building organizational strength through restructuring and redefining the six divisions within Facilities. This process required both the hiring of new employees and the deployment of existing staff. We completed the restructuring of the group formerly known as Development, Design, Engineering, and Construction (DDEC), formed project management teams, and identified staff to fill roles. We are also in the planning stages of instituting a work control group within the Operations Division. The primary function of this group will be to plan, prioritize, and schedule maintenance and repair work and manage maintenance service contracts.

We have been working on a number of energy and environmental initiatives, including programs in relamping and steam trapping. We have accomplished some equipment upgrades at the Central Utilities Plant (CUP) and we are developing a plan to provide efficient steam, cooling, and electrical service to the campus for the next two decades. The MIT recycling program was recognized by the City of Cambridge for its efforts in reducing waste and increasing recycling.

## Strategic Planning

In preparation for our strategic planning sessions during the early part of 2006, we conducted employee surveys and customer interviews in the fall of 2005. The purposes of this were to assess our strengths and weaknesses, measure the work climate within the department, and determine the level of satisfaction with the services we provide. With this information, we began a process to redefine our mission and vision and to develop strategic goals. The plan, intended to set our course for the next three years, was developed by the Department of Facilities Executive Steering Group during numerous strategy sessions.

We reaffirmed our *mission*:

— To provide high value, professional facilities services, and wise stewardship of MIT's physical assets in support of the Institute's mission of education, research, and service.

We developed our *vision*:

— As a valued partner of the MIT academic community, we deliver exceptional customer service, are respected as stewards of MIT's physical environment, and are known for providing a rewarding working environment through teamwork, innovation, and professionalism.

We established five *strategic goals* to increase the value of services we provide:

- Make continuous improvement part of daily business
- Improve internal and external communications
- Enhance the effectiveness of the workforce
- Reinvent the project delivery system
- Reduce energy consumption

These goals focus on some basic organizational issues as well as improvement initiatives that are strategically important to the Institute and our customers.

### **Continuous Quality Improvement**

In September we implemented a formal program in continuous quality improvement. CQI is both a philosophy and a set of guiding principles that form the foundation for continuously improving our processes and thereby the services and products we provide. CQI focuses primarily on work processes and the external customer. This effort is based on teaching Facilities employees how to improve work processes by maximizing value-added work and eliminating waste. CQI is a tool to use resources more effectively. An equally important benefit of the CQI program is making people's jobs better and more rewarding. The key to an effective CQI program is to use the people who actually do the work to review and revise work processes. A total of 12 teams have been engaged in process improvements that include areas such as communications, invoice payment, efficient transportation of people and materials, outdoor cleaning, and campus courier service. A team that worked on the Custodial Services improvement effort received an Infinite Mile Award from the department for its work.

### **Organizational Changes**

Over the past year the department consolidated its main office onto one floor in Building NE49. This consolidation has helped to improve communication and teamwork. Furthermore, it freed space on the third floor of NE49, which allowed the Audit Division to vacate space in E19.

We completed the process of reorganizing the former Development, Design, Engineering, and Construction (DDEC) group. We created three separate divisions: Project Management, Engineering, and Campus Planning and Design. Pamela Delphenich is the director of Project Management, Walt Henry is the director of Engineering, and Talitha Fabricius is the interim director of Campus Planning and Design. A national search is now under way to fill this important position permanently.

Project management and capital project management for the Committee for the Review of Space Planning (CRSP) were merged into the Project Management Division. Following the merger, three teams of project managers were created to foster accountability and to provide a range of services for all sizes of projects. The teams were aligned by school or senior officer. For instance, one team manages all projects for the School of Science from small renovations to major capital projects.

The Central Utilities Plant, within the Utilities Division, underwent a complete change in its management team. A new chief engineer, assistant chief engineer, and maintenance manager were all hired this year.

### **Energy and the Environment**

A utility master planning process is under way to determine how best to provide steam, electricity, and chilled water to the campus for the next 25 years. This process will involve determining the best methods for energy conservation, reducing current consumption, and constructing more energy-efficient buildings.

The CUP has conducted repairs to boilers and chilled water equipment to obtain maximum efficiency from the systems.

Two noteworthy energy conservation initiatives begun this past year are a relighting project for the Department of Athletics, Physical Education, and Recreation (DAPER) and a steam trap refurbishing program. Much of the indoor athletic facilities have been retrofitted with new efficient fixtures and occupancy controls. The new fixtures have raised the lighting levels significantly. Further, NStar increased their rebates for this kind of work by 50 percent, and we were able to take advantage of those rebates.

A program to refurbish nonfunctional steam traps in residence halls will begin in the 2006–2007 academic year. This work will increase comfort levels and reduce steam costs. We can expect to recover the costs of this work in less than two years.

Finally, the Department of Facilities was proud to accept, on behalf of MIT, the GoGreen Award from the City of Cambridge for its work in reducing waste and increasing recycling. The campus recycling rate improved to approximately 40 percent in calendar year 2005. In 2001, the MIT recycling rate was just 12 percent. Working in collaboration with the Environmental Programs Office, MIT custodians and Grounds personnel contributed greatly to MIT earning this award.

### **Rewards and Recognition**

The Department of Facilities Rewards and Recognition (R&R) program presently has three types of awards: the WOW spot award, which acknowledges individual contributions throughout the year; the team celebration, which rewards a team's accomplishment for performing a specific task or project; and the Infinite Mile Award, given annually to selected individuals or teams. The 2006 R&R program acknowledged staff through 106 WOW awards, 12 team celebrations, and 8 Infinite Mile awards. A large number of service staff, as well as support and administrative staff, were recognized.

Many of this year's Infinite Mile nominations represented areas in which the department has focused on customer service, process improvement, and teamwork.

We have begun a realignment of the R&R program for 2007. The program will create more visible recognition for staff who excel in areas that are tied to the department's strategic goals and who support our delivery of exceptional customer and professional services to the MIT community.

## Operations

The Operations Division's strategic plan was developed in January 2006 with four major strategic goals for the next three years. The Operations Division is executing the initial 12-month action plan developed in the strategic plan. The goals of the action plan are to:

- Establish and implement a comprehensive training program
- Establish clear performance expectations and accountability
- Establish a Work Control Center
- Implement continuous quality improvement

Grounds Services was instrumental in reducing the volume of nonrecyclable trash during the past few years. In 2001, MIT discarded 7,035 tons of trash. In 2005, the trash volume was 4,851 tons, even with the large increase in square footage on campus. The cost of trash removal and recycling has also seen a dramatic reduction in the past several years.

Grounds employees performed several campus enhancements, including: sod installation in the empty lot adjacent to Building E23; the addition of numerous new-style trash and recycling containers; and the creation of the garden honoring Vicky Sirianni, former chief facilities officer, at Simmons Hall.

Repair and Maintenance (R&M), along with Custodial Services, has successfully undertaken to maintain and clean the Brain and Cognitive Sciences Complex, which opened in December 2005.

In addition, through a focused effort of the B Zone and Central Shops, the Stata Center maintenance and building systems have been stabilized, and there are very few active water leaks.

R&M processed more than 53,000 corrective maintenance and preventative maintenance work orders. In addition, this group took responsibility for installing air filters for central station air handlers with in-house personnel.

Other projects completed include: the reroofing of Buildings E51 and E40; completion of Main Group window painting on Massachusetts Avenue and Memorial Drive; replacement of the NW17 boiler; upgrading of the N42 air-conditioning system; completion of the conversion of condensation drains in Building 14; and sealing of

the windows in Buildings E17, E18, and E19. R&M also completed certification work from the Association and Assessment for the Accreditation of Laboratory Animal Care International for the Department of Comparative Medicine.

This year, Custodial Services completed about 140 requests for carpet shampooing. This represented approximately 1,200 MIT worker hours for a function that was previously performed by an outside vendor. In addition, a new vendor partnership was established for custodial supplies and products; this includes regular staff and supervisor training.

Mail Services has nurtured a preferred provider status as a vendor for outside print houses. In addition, it simultaneously increased revenue and provided enhanced delivery service to the MIT Activities Committee. It also incorporated the delivery of mail to the new Brain and Cognitive Science Complex and the Broad Institute without any additional resources. Finally, Mail Services participated in the Purchasing Initiative with the Controller's Accounting Office, which has meant significant savings for MIT.

## Utilities

The CUP continued to provide reliable, electrical, steam, and chilled water service to the Institute's buildings, labs, and centers in support of MIT's educational and research missions. Additionally, the CUP continued its program of presentations and tours of the Institute's energy-efficient and Environmental Protection Agency award-winning cogeneration plant. Tours were provided to MIT departments, including Mechanical Engineering, Aeronautics and Astronautics, Civil and Environmental Engineering, and Architecture. Among the groups from outside the Institute who visited the plant were students from Northeastern University, Harvard University, and a Cambridge community environmental group.

The multiyear electrical interconnection upgrade project that increased the firm capacity from NStar to MIT from 28 mW to 48 mW is now complete. This project ensures that the campus's full electric load can be supplied reliably by NStar if necessary, both now and into the foreseeable future.

The ability of the Central Utilities Plant to provide adequate chilled water to the campus was improved with the installation of a new temporary cooling tower, Tower Number 9. This cooling tower enables the full use of Chillers 7 and 8, providing an additional 4,000 tons of refrigeration.

In addition to the new cooling tower, all of the CUP's remaining cooling towers were upgraded and repaired to ensure that full capacity could be obtained from all refrigeration machines.

A major change to chilled water system operations was initiated during the spring of 2006. Previously, the main CUP chilled water plant and East Campus chilled water plant were operated independently. The systems are now tied together and operated as one system, each providing backup to the other. This arrangement provides better flexibility, improved reliability, and reduced operating costs for the overall system.

Boiler Number 3, installed in 1964, underwent major repairs to its super heater section, casing, burners, and exterior boiler piping. This work was similar to the rehab effort done the previous year to Boiler Number 4. This rehab provides greater reliability and efficiency in the operation of a boiler.

An effort to stabilize the utility purchased commodities budget was realized with the purchase of a financial hedge for the price for natural gas. MIT and the Bank of America entered into an agreement to fix the price of natural gas. This effort will stabilize the pricing for a major portion of the fuel necessary to heat, cool, and provide electricity for the campus and will greatly reduce the volatility of the purchased commodities budget.

### **Shared Services**

A Shared Services CQI team was launched to develop and implement a process that will streamline the time, steps, and effort to pay invoices on time. The team has completed its work and has implemented a new process. The team is monitoring the process, collecting data, and measuring success.

Facilities Finance and Accounting, together with Facilities Information Technology (IT), assisted in planning and implementing the new HR-Payroll system, concentrating on the process for unionized staff. Our IT group assisted in building an interface between our time and attendance system, Kronos, and HR-Payroll. Additionally, we conducted our own in-house training for all employees who would be required to use the new process.

The IT group also provided valuable assistance in creating a customer database for the department. Information from several databases, including the shutdown notification and construction updates lists, was combined. Many department members were trained in the database's operation and are now using the tool to provide enhanced communication to the MIT community.

Members of the IT group worked diligently to support the consolidation of Facilities staff in NE49 this spring. Throughout the move, they worked closely with the relocation team, as well as with members of MIT's Information Services and Technology (IS&T) Department to ensure that computer equipment was relocated with minimal downtime for users.

The Parking and Transportation Office was relocated to the Stratton Student Center (W20) to enable the demolition of Building E32. Both the Parking Office and the Card Office are located in the basement of Building W20. This arrangement continues the convenience, established in Building E32, of one-stop service for parking, MBTA passes, and ID cards.

The Parking Office staff maintained an inventory of 4,814 parking spaces despite the disruption caused by several construction projects. In addition, the office distributed more than 60,000 MBTA passes and processed more than 8,000 parking permits during the year. The shuttle fleet provided more than 22,000 hours of service to more than 500,000 riders.

## Project Management

As part of the department's strategic plan, the Project Management Division will focus on reinventing the project delivery system. To achieve that goal, the Project Management Strategic Improvement Group will take on streamlining the CRSP process; formalizing consultant and contractor selection; improving initial project scoping and estimating; strengthening customer relations; enhancing project management skills; and exploring alternative project delivery methods.

The following is a list of significant and representative projects completed this year:

- Brain and Cognitive Sciences Complex—a 411,000-square-foot building that provides new laboratories, offices, and classroom space for the McGovern Institute for Brain Research, the Picower Institute for Learning and Memory, and the Department of Brain and Cognitive Sciences—completed in December 2005
- Renovation of the Pappalardo Laboratory in Building 5 for the Department of Mechanical Engineering, completed in January 2006
- Renovation of Building W89 to provide a building and adjacent parking for the MIT Police, completed in March 2006
- Installation of Temporary Cooling Tower Number 9 adjacent to Building N16 as an interim solution for campus chilled water requirements, completed in March 2006
- Construction of a second Technology Enabled Active Learning Classroom (TEAL II) in the basement of the Stata Center, completed in March 2006
- Renovation of a laboratory in Building 1 for Professor Sylvia Ceyer of the Department of Chemistry, completed in June 2006
- New laboratory in Building 54, with shielding, for Professor Benjamin Weiss of the Department of Earth, Atmospheric, and Planetary Sciences, completed in December 2005
- Relocation from Building 9 to Building 35 of the Professional Education Program, completed in March 2006
- Upgrade of the electric power supply in Building 24 to serve IS&T, completed in November 2005
- Relocation of the occupants of Building E32, including the Parking Office and the Card Office, to the Stratton Student Center, in preparation for Building E32 demolition, completed in May 2006
- Renovation of the Civil and Environmental Engineering Undergraduate Teaching Laboratory in the basement of Building 5, completed in January 2006
- New laboratories and offices for the Department of Mathematics in Building 2, completed in November 2005

Now well into construction and scheduled to open in spring 2007 is a new 49,000-square-foot building situated in the courtyard of Buildings 2, 4, 6, and 8. The PDSI project (for Physics, Department of Materials Science and Engineering, Spectroscopy

Lab and Infrastructure) includes a comprehensive renovation of 79,000 gross square feet of adjacent space and provides infrastructure improvements for an additional 127,000 square feet and life safety upgrades for an additional 90,000 gross square feet.

Scheduled to begin construction in August 2006 is a major renovation of Building E25. The project will renovate 29,300 square feet to accommodate the Division of Health Sciences and Technology, as well as the Department of Earth, Atmospheric, and Planetary Sciences. In addition, the project will provide new, energy-efficient infrastructure for 90,500 gross square feet.

Projects currently under way include:

- Vassar West streetscape—continuation of street improvement begun at Vassar East begins fall 2006
- Design of a new 209,000-gross-square-foot facility for the Sloan School of Management
- Design of 450-car subterranean garage associated with the Sloan School

Projects currently at an early stage include:

- New 550-bed graduate residence at the corner of Pacific Street and Albany Street
- Feasibility study for the conversion of Ashdown House from a graduate to undergraduate residence
- The Media Lab project, dormant for several years, will prepare to start construction in spring 2007.
- Architect selection is about to begin for the Center for Cancer Research building

## **Campus Planning and Design**

As part of the department's reorganization, the Campus Planning and Design (CPD) Division has renewed its emphasis on the front end of campus planning projects. The CPD continues to have primary responsibility for the following functions:

- Campus planning, including development of the overall campus framework, sector, and systems plans
- Design guidance and design review
- Facilitation of city and state coordination, including permitting and compliance
- Oversight of the capital planning program
- Conduct of feasibility studies, project definition and programming, and development of strategic options
- Support of the Institute's Executive Committee, Building Committee, and CRSP



- Participation in the department's strategic planning and CQI initiatives, including reinventing the project delivery process and two related CQI projects
- Management of the department's graphical information enterprise, including development and enhancement of computer-aided drafting and geographic information systems and management of the Institute's space management system
- Maintenance of department's record drawings for buildings and utility systems; maintenance and preservation of Facilities archives; conduct of biannual surveys that provide space data for indirect cost recovery

The following is a list of significant and representative ongoing and completed projects:

- Campus Planning/Campus Student Activities Space Study—a strategic plan for student and community activity and event space across the MIT campus, to conclude summer 2006.
- DAPER Study—a strategic plan for DAPER activities and spaces across campus, to conclude summer 2006.
- Fraternity, Sorority, and Independent Living Group (FSILG) Study—a plan for relocating some FSILG housing from Boston and Brookline to the MIT Cambridge campus, to conclude fall 2006.
- Northwest Area Study—Cooper Robertson hired to prepare conceptual design and estimates for the Northwest residential area streetscapes, common areas, and pedestrian connections to the main campus, to conclude fall 2006.
- Animal Facility Study—analysis of existing animal facility program and projection of facility needs over the next 15 years, to be completed August 2006.
- Utility Master Plan—a collaboration with the Engineering and Utilities divisions on a strategy for MIT to meet its energy needs over the period 2006–2030, expected to be completed in fall 2006.
- Libraries Study—a study of options to consolidate MIT's Engineering and Science libraries in one location. Evaluation and test fit of various options are ongoing; the comprehensive study will begin fall 2006, for a December 2006 completion.
- Campus Framework—Institute will embark on a comprehensive framework to guide future development on campus. Current activities include definition of scope, process, and schedule. Anticipated start in fall 2006; completion in fall 2007.

## Community Planning

Key accomplishments include:

- Annual Town-Gown Report prepared and presented at Planning Board, spring 2006
- Teamed with local and regional agencies and institutions on planning for the urban ring
- Planned for maintenance of MIT's parking inventory as projects such as the new graduate student residence force a shift in the location of spaces from open lots to underground or structured facilities

In addition, CPD is taking the lead in working with the City of Cambridge and other regulatory agencies on permitting and approvals for MIT's major capital projects, such as the Sloan School facilities, graduate housing, and various others. Recent successes include permits from the Cambridge Historical Commission for the demolition of Building E32, the Hayward Garage, and the Dibner Building.

## Preliminary Project Planning

- Chemistry teaching labs—feasibility study and estimate for the renovation of undergraduate teaching labs for the Department of Chemistry, located primarily on the fourth floor of Building 4. Due to the scale of the renovation, this project is likely to become a future capital project. Expected study completion date: December 2006.
- East Vassar Bridge—study to assess the feasibility and cost of making a connection between the Brain and Cognitive Sciences Complex and Building 36. Expected study completion date: August 2006.
- Sloan backfill—study to evaluate the space to be vacated by the Sloan School when the new building is completed. Study is using the new space management system. Expected study completion date: December 2006.
- Sailing pavilion—a feasibility study exploring options for renovation and possible expansion of the current sailing pavilion. Its location on the Charles River and the age of the building places it in a complex regulatory environment. Expected study completion date: fall 2006.

## Design Coordination

Provided ongoing design guidance and design review for the major capital projects—Sloan, graduate housing—as well as the smaller CRSP projects.

## Committee Support

Provided support to the Institute's Executive Committee, Building Committee, and CRSP. Support included preparation of the agenda, presentation materials for distribution to the committees, and meeting minutes.

## Space Planning

The new space management system (SMS) is MIT's source system and primary utilization and planning tool for MIT's inventory of space. It is in final development, undergoing a testing phase with users across the Institute prior to rollout to all administrative officers, deans, and other staff who manage space. Current studies managed by CPD that utilize SMS concern the Sloan backfill, the Music and Theater Arts Section, the School of Engineering's bioengineering initiative, the Program in Writing and Humanistic Studies, and the Engineering Systems Division.

## Drawing Information Systems

Drawing Information Systems is working on the following projects:

*GIS data and mapping*—ongoing initiative to expand capabilities to serve the Department of Facilities and Institute with an analytical, database, and planning tool. For example, CPD is working on production of a land database and development capacity model.

*Utility distribution drawing maintenance*—ongoing activity to consolidate and update engineering and archival utility data (both internal and external to MIT's buildings) into a single database. This is a resource for use by Facilities operational groups, Facilities engineers, and outside design consultants.

*Aerial/base map update*—spring 2006 update of campus map using flyover data of MIT's Cambridge campus. Map provides base data for GIS applications, campus planning, design and construction projects, and community mapping services.

*"Whereis" community mapping*—ongoing web service provided to the MIT community.

*Indirect, cost-recovery, biennial audit*—biennial audit of space across campus to facilitate indirect cost recovery for the Institute.

## Engineering

The Engineering Division provides consulting engineering services to other Facilities divisions as well as to those departments, laboratories, and centers that require engineering services. Recently, for example, the division supported IS&T's upgrade of its computer rooms in Buildings W91, W92, 24 and E40. In addition to these services, the division is responsible for utility planning and for the Institute's energy conservation and sustainability efforts.

Another project of note is the Utility Master Plan, a yearlong effort directed jointly by Campus Planning and Design and Engineering and conducted by KEMA, a utility and energy consulting firm with a worldwide practice. This plan sets out the investments that the Institute must take to ensure a supply of steam, electricity, and chilled water for the next 25 years.

The Engineering Division is developing an innovative design approach for the new Sloan School addition. It is called the integrated design process, and in this method the

design process is much more circular or iterative, as opposed to traditionally linear. Working with the Project Management Division, and with the help of a sustainability consultant, the division has set aggressive energy goals for the project. For example, where many buildings operate at 350 square feet per ton of cooling, the new Sloan building will operate at 1,000 square feet per ton.

These energy conservation programs were funded by Facilities. However, the department's ability to fund programs is limited by available budget. A proposal to create a revolving loan fund for energy conservation purposes has been advanced by the MIT Energy Research Council in the "Walking the Talk" section of its May 2006 report. Such a fund would allow the implementation of a much larger number of energy cost reduction initiatives than can be funded by Facilities alone.

## Summary

As we proceed into 2006–2007, we look forward to continued improvements to the organization. The most significant change will be the hiring of a new director of Campus Planning and Design. This person will work closely with MIT senior administration and will redefine how planning is done at MIT. We will also implement the Work Control Center within Operations. We will continue the CQI program, forming new teams to review and improve additional work processes. Our strategic plan will drive the improvements we seek to make in service and stewardship. Action plans will be developed for our goals, and we will measure the success of our efforts. Finally, since MIT has made energy and the environment a high priority, the Department of Facilities will continue to improve campus energy conservation, utility production, and efficiency, and will work to ensure environmentally sound waste and materials handling practices.

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**Chief Facilities Officer**

*More information about the Department of Facilities can be found at <http://web.mit.edu/facilities/>.*