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# HUNZINGER CONSTRUCTION COMPANY

## LEED CI REMODEL: GREEN THROUGH THE EYES OF THE GENERAL CONTRACTOR

Kevin O'Toole,<sup>1</sup> Dan Davies, LEED AP,<sup>2</sup> David Dell'Agnese, AIA LEED AP,<sup>3</sup>  
Phil Vetterkind, LEED AP,<sup>4</sup> and Frank Falsetti<sup>5</sup>

### INTRODUCTION

*Leadership takes on many forms in an industry as challenging as construction. For more than 20 years, Hunzinger Construction Company conducts an annual strategic planning process whereby we take a hard look at our industry and develop tactical initiatives designed to challenge the status quo and be responsive to the ever-changing environment in which we conduct our business. Significant outcomes from this process have been (a) the development of a Total Quality Management process and commitment (Q<sup>3</sup>) where we engage our clients, specialty subcontractors/vendors/suppliers, and employees in the culture of quality awareness in every aspect of our project delivery systems, (b) the development and funding of Hunzinger Construction University (HCU) with the goal of providing continuous improvement of the skills of our people to make us a better company, and (c) researching emerging markets that we believe are key to the success and growth of our company.*

*Additionally, we participate in a national PEER Review Group that provides quarterly sessions with eight similar, non-competing firms from every corner of the nation. Given the breadth of the participating firms and the depth to which the process delves into how each firm conducts itself in its respective marketplace, this PEER group activity stands out as one of the strongest drivers of our continued success and growth. This prestigious group, made up of the President/CEOs of each of the participating firms, spends a great deal of time discussing trends in the industry and looks for meaningful ways that each can react to changing trends and remain on the leading edge of new developments. It was from this forum that the subject of green building came to light and Hunzinger Construction Company embarked on a commitment to internally challenging our culture to be true to the precepts of sustainable design and construction as we moved into our second century. We saw this as yet another success driver and an ability to continue to differentiate ourselves in a very competitive marketplace, while responding to the ever-growing trend of green building.*

*We began our journey by becoming a corporate member of the U.S. Green Building Council (USGBC) and the Wisconsin Green Building Alliance. Once these were in place, we hosted a USGBC Workshop in September 2004 to introduce the concept not only to staff members, but also extended the invitation to our Q<sup>3</sup> partners, as well as the design and engineering community. The workshop was sponsored by HCU and was conducted by a USGBC trainer. Our goal was to provide a proper kick-off to our commitment, position us favorably in the marketplace, and begin to educate our team on the importance of sustainable design and construction.*

*As a follow-up to the initial HCU event, President John C. Hunzinger and Executive Vice President James R. Hunzinger challenged all of our professional staff to obtain LEED Accredited Professional status. To achieve this goal, HCU sponsored company-wide training activities and study groups to insure that our people were well versed and prepared to pass the professional examination. To date, more than 65% of our professional staff has achieved LEED AP credentials, and we have over 20 additional LEED trained professionals among our ranks that are available to our clients for consultation in the early stages of project development.*

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1. Executive Vice President, Hunzinger Construction, [www.hunzinger.com](http://www.hunzinger.com). Kevin O'Toole et al. may be reached at 262.797.0797 or [kotoole@hunzinger.com](mailto:kotoole@hunzinger.com).

2. Sr. Project Manager, Hunzinger Construction, [www.hunzinger.com](http://www.hunzinger.com). Dan Davies may be reached at [ddavies@hunzinger.com](mailto:ddavies@hunzinger.com).

3. Hunzinger Construction, [www.hunzinger.com](http://www.hunzinger.com). David Dell'Agnese may be reached at [ddellagnese@hunzinger.com](mailto:ddellagnese@hunzinger.com).

4. Estimator, Hunzinger Construction, [www.hunzinger.com](http://www.hunzinger.com). Phil Vetterkind may be reached at [pvetterkind@hunzinger.com](mailto:pvetterkind@hunzinger.com).

5. Tenant Improvement Division, Hunzinger Construction, [www.hunzinger.com](http://www.hunzinger.com). Frank Falsetti may be reached at [ffalsetti@hunzinger.com](mailto:ffalsetti@hunzinger.com).

Hunzinger Construction Company, Brookfield, WI. From left: Exec. V.P. James R. Hunzinger, Exec. V.P. Kevin O'Toole, and President John C. Hunzinger.



## LEED CI PROJECT OVERVIEW

The renovation of Hunzinger Construction Company's corporate office strived for the following goals:

- Create a more centralized Estimating Department.
- Maximize the existing space for the Accounting Department and project management support personnel.
- Update the HVAC system to provide better temperature control to occupants.
- Create a more energy and resource efficient building, which promotes the health and well-being of its occupants.

The scope of the project included the renovation of approximately 5,300 square feet of our existing office building. The area to be renovated was built in 1986 and remained relatively untouched since then with the exception of the addition of demountable furniture systems in a previously open area on the northeast end of the building. The nearly twenty-year-old building was equipped with an HVAC system consisting of two constant volume rooftop units serving the entire area. The conventional electrical and plumbing systems were also installed at the time of construction in 1986.

The LEED project team set forth in the initial planning stages to target a LEED-CI Gold rating. The LEED-CI checklist dictates that we would have

to obtain at least 32 out of a possible 57 points to achieve our goal. The following items were identified as achievable points, broken down into the following categories.

### *Sustainable Sites*

Even though the existing facility is not a LEED certified building (which would have been worth 3 points) we were still able to achieve points for some of its inherent qualities or with minor modifications. A full point is available since we have no permanent irrigation system satisfying requirements SS Credits 1H and 1G – Water Efficient Irrigation. By replacing a few plumbing fixtures with low-flow fixtures we would be able to gain another 1/2 credit for SS Credit 1J – Water Use Reduction.

A few simple site modifications would grant another 2 points in the area of Alternative Transportation. Since the existing facility already had showers and changing rooms, the addition of a bicycle storage rack achieves SS Credit 3.2 – Bicycle Storage & Changing Rooms. By designating a carpool spot in the existing parking lot, we would be able to achieve SS Credit 3.3 – Parking Availability.

### *Water Efficiency*

By increasing the water efficiency of the building to at least a 30% reduction over a typical building, as defined by the Energy Policy Act of 1992, we could achieve 2 points. This was accomplished by replacing the standard plumbing fixtures with a waterless urinal, low-flow toilets, and low-flow, sensor operated lavatory faucets.

### *Energy & Atmosphere*

There are three prerequisites in the Energy & Atmosphere category that need to be met by all projects hoping to obtain any level of LEED certification. Utilizing a third party HVAC contractor to review the design, start-up and additional activities of the design-build project, commissioning could be completed. In order to meet the Minimum Energy Efficiency and CFC Reduction requirements, we had to replace the existing rooftop units, which were near the end of their life expectancy. The RTUs were replaced with new Aaon units utilizing the non-CFC refrigerant R-410a, satisfying this prerequisite. The HVAC design exceeded the requirements set forth in ASHRAE/IESNA Standard

90.1-2004, reused the majority of the existing ductwork, and added Variable Air Volume boxes to increase the number of comfort zones. The exact number of points granted is based on the percentage of energy reduction achieved over the design standards.

To achieve the specified Lighting Power credit all the existing light fixtures were replaced with high efficiency recessed direct/indirect fixtures with T8 lamps. A variety of lighting controls including dual level switching, automatic shut-offs, and photo-sensing dimming were employed to fulfill the Lighting Control credit.

### **Material & Resources**

Beyond simply meeting the prerequisite of a recycling area for this renovation project, we set out to create a recycling area that would assist all of our projects in diverting construction waste from local landfills. While the actual amount of waste generated by this project would be minimal, we could have a greater effect on recycling efforts by locating dumpsters in our yard designated for sorted goods such as concrete, wood, and metals. We would still be responsible for diverting at least 75% of construction waste from the landfill by utilizing manufacturers' recycling programs for the ceiling tile and carpet and sorting the remaining materials for proper recycling.

The extent of the interior renovation relied heavily on the amount of existing components that could be left in place or reused in a new capacity. Over 60% of the existing floors, walls, and ceilings were left in place. Also doors, hardware, casework, furniture, and other existing materials were refurbished and reused in a new capacity. Any new materials purchased for the project contained high-recycled contents and were locally produced, achieving up to 4 credits based on the ultimate percentages.

### **Indoor Environmental Quality**

The HVAC Contractor was responsible for a design that met the minimum Indoor Air Quality prerequisites as well as following an IAQ Management plan during construction. A flush-out period for the new HVAC system was scheduled as part of the IAQ Management plan prior to occupancy to expel any lingering off-gasses from construction. Low-emitting paints, carpets, and sealants were specified for use in the project.

In addition to the added controllability of the lighting system, the introduction of VAV boxes increased the number of zones from 2 to 18, allowing temperature control in each private office and smaller segments of the open offices. The existing skylights, along with the demolition of some private offices, allowed increased daylight and views.

## **LEED CI CREDIT CALCULATIONS**

### **Water Use Reduction**

Following the office remodel, Hunzinger Construction now uses 34.4% less water than baseline fixture performance requirements of the Energy Policy Act of 1992. This equates to a water savings of over 19,000 gallons of water annually. Water conservation fixtures used in the building include a Sloan WES-1000 Water-free Urinal, low-flow toilets (1.6 gal/flush), and Toto low-flow, sensor operated lavatory faucets (1.06 GPM).

### **Optimize Energy Performance—Lighting Power**

To optimize the energy performance for the lighting power the designers opted to replace all the lighting fixtures with more efficient models. By replacing all the fixtures, Hunzinger Construction's office has achieved greater than an 18% reduction in lighting power density, below the standard required by ANSI/ASHRAE/IESNA 90.1-2004.

### **Optimize Energy Performance—Lighting Controls**

The lighting controls for our remodel consist of several layers. These layers provide an efficient method of delivering light to the various spaces of the project and are described as follows:

1. Area-Wide Automatic Shut-Off
2. Local Dual Level Switching
3. Local Automatic Shut-Off
4. Local Photo-Sensing Step-Down Dimming

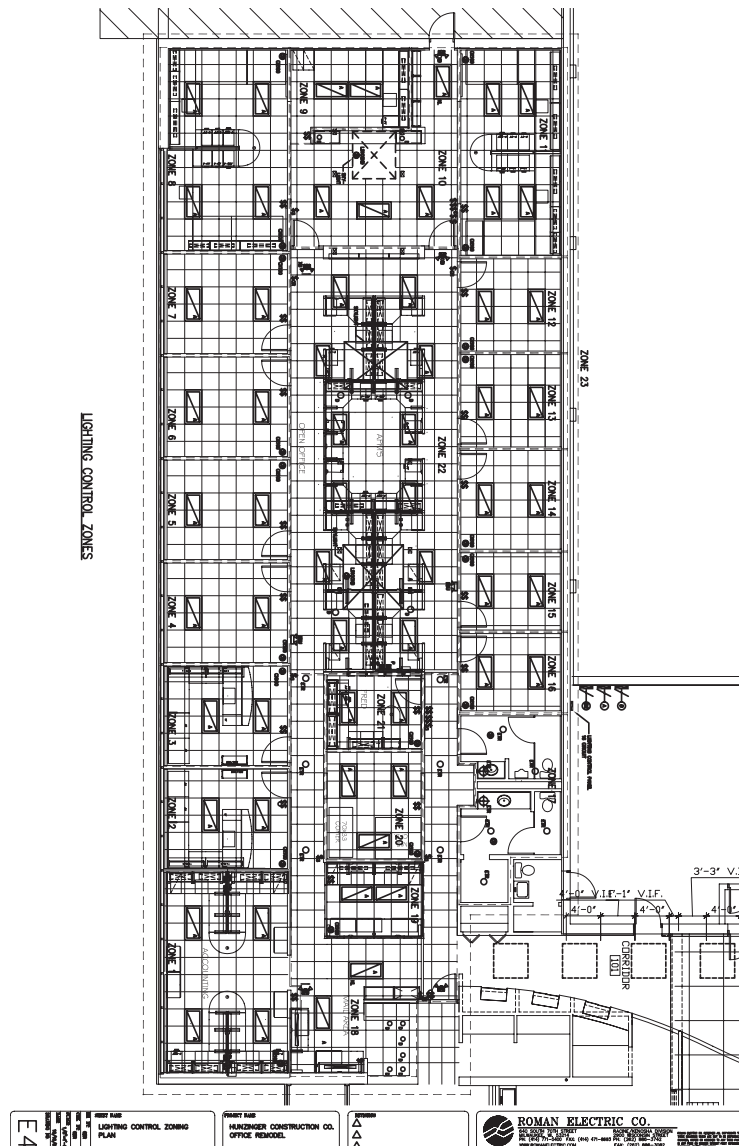
**Area-Wide Automatic Shut-Off:** All of the branch lighting circuits serving the area are wired through a programmable lighting control panel, PCI Lite-keeper LK-16. The control panel energizes and de-energizes the lighting circuits throughout the space at

programmed times. Lights left on past the programmed shut-off time are turned off automatically. Three override switches are located throughout the space to provide a 2-hour override of the automated shutdown.

**Local Dual Level Switching.** All of the light fixtures throughout the private office and open office spaces have the ability to be reduced to 50% power via a step-dimming ballast, controlled by two single-pole

light switches; when either one of the light switches is engaged, the light fixture is at 50% power. Engaging the second light switch while the first is engaged brings the light fixtures to 100% power (unless there is a photo sensor in the control circuit. See photo-sensing control feature).

**Local Automatic Shut-Off.** All of the private offices, restrooms, and workrooms utilize a local occupancy sensor. The Wattstopper CX100 is installed in the



Lighting control zoning plan.

private offices and workrooms, while the Wattstopper W1000A is installed in the restrooms. These devices provide an immediate shutdown of local light fixtures upon sensing an unoccupied space for a set amount of time. The occupancy sensor is wired ahead of the local wall light switches to assure a shutdown of light fixtures, even if the occupant forgets to turn off the lights manually via the wall switches.

**Local Photo-Sensing Step-Down Dimming.** The private offices with windows and the open office spaces with skylights utilize a photo sensor to control the light levels in these spaces. A Wattstopper CX100 senses both occupancy and daylight levels passing through the windows of the eight southward facing offices to determine the power level allowed from that office's light fixtures. If the office is occupied and the photo sensor detects daylight levels of 20 foot-candles, the light fixtures will not step down to 50% because the space is occupied. If, however, the occupant leaves the room and comes back in, the light level will be reduced to 50% power while the daylight is sensed at 20 foot-candles. If daylight levels of 20 foot-candles are detected prior to occupying the room, the wall switches will only illuminate the light fixtures to 50% power. A Wattstopper LS100XB is used in the open office spaces to reduce the light fixtures to 50% power upon sensing daylight of 20 foot-candles from the skylights.

### **Optimize Energy Performance—HVAC**

The HVAC system installed in the Hunzinger Construction office remodel consists of two rooftop units and a zoned air conditioning system, which are further discussed below.

### **Equipment Efficiency**

Since this remodel is within an existing building, actual lighting, glass, and wall information in each room was used for the load calculations. The Trane Trace 700 load program was utilized on our project. The remodeled area consists of office areas separated with two walls adjacent to conditioned spaces, a window wall with a southern exposure, and a short west wall with no windows. The building also contains three skylights.

The rooftop units are Aeon Model RM08. Each unit has a factory installed full modulating econo-

mizer, two compressors, 6-row cooling coil, four-stage gas furnace, and supply fans. The rooftop units utilize R-1004A refrigerant. The rooftop units are rated at 12.7 EER, and an IPLV rating of 14.6. The benchmark requirements are 11.0 EER and 11.4 IPLV.

### **Appropriate Zoning and Controls**

The remodeled space has private offices on the south facing perimeter wall and the north internal wall. Open office space, a computer room, and a copy room are between the private offices. The air conditioning systems were separated into a perimeter rooftop unit that serves only the offices on the south wall, and an interior rooftop unit that serves the north wall offices, the computer room, the copy room, and open office area. Each rooftop unit was ducted into an east-west running supply main; from these mains are round taps serving zone dampers.

Each private office has a zone damper and adjustable zone sensor. The open interior area has three zone dampers. The DDC Andover control system provides each zone with variable volume airflow. Each zone is connected to its respective rooftop unit through a DDC system and can call for cooling or heating as required. Each rooftop control system also has a ventilation mode allowing air to circulate without firing the gas furnace or cycling the mechanical cooling.

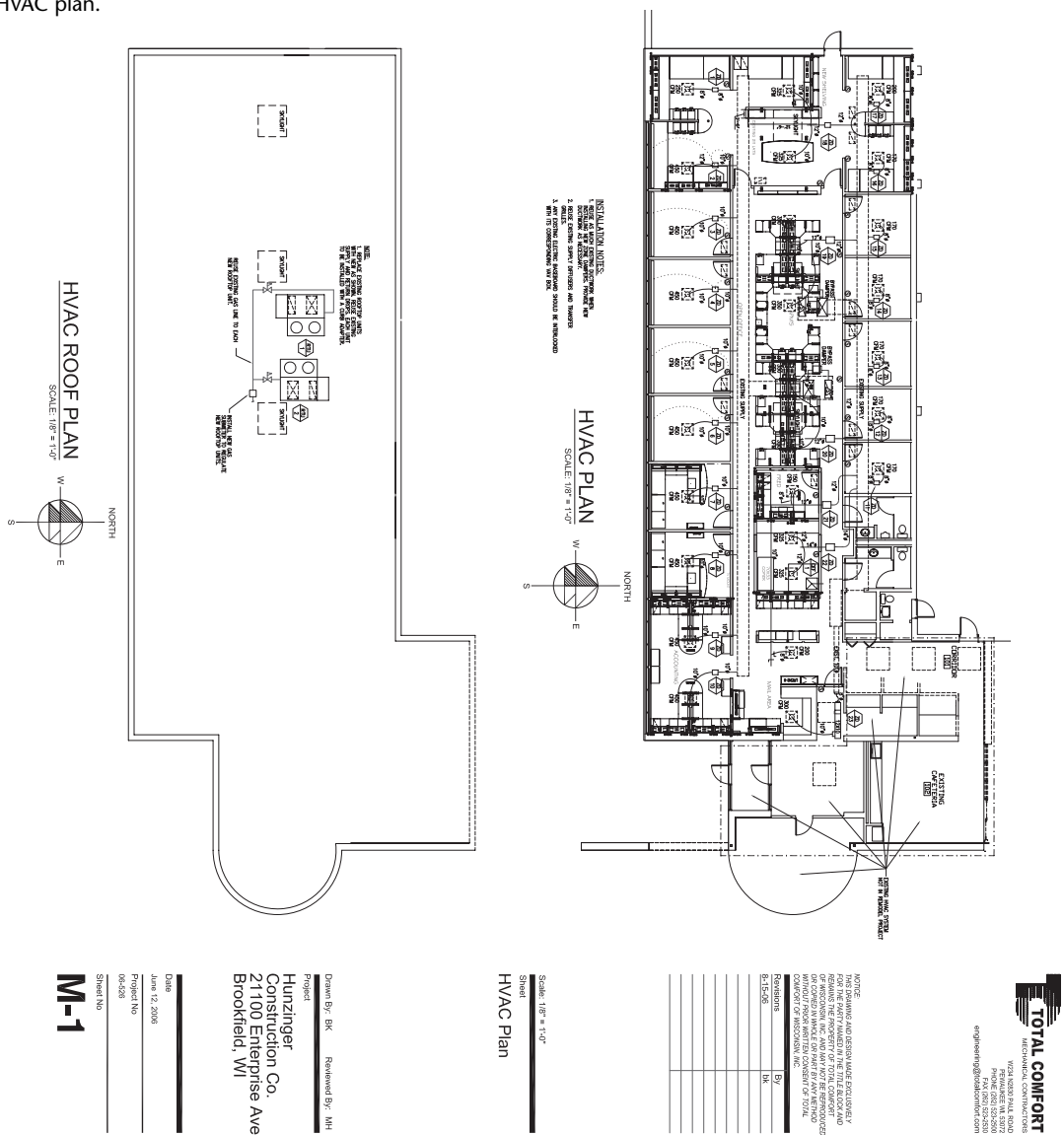
### **Building Reuse**

In the design phase of the office remodel, the designer's goal was to keep intact the integrity of the existing building by reusing over 60% of the existing non-shell, non-structural components. With these goals in mind, the design of the office remodel maintained over 65% of the existing non-shell, non-structure components of the existing space. Some examples of the retained components are: 78% of the ceiling was reused and 74% of the interior wall partitions were retained.

### **Construction Waste Management**

Prior to construction, guidelines were established on the key materials that would be mandatory for recycling and salvage. Based on the guidelines set, a construction waste management plan was implemented focusing on reduction, reuse, and recycling. This

HVAC plan.



process resulted in 4.6 tons of construction waste (89% of total) being diverted from the landfill.

### Resource Reuse

A goal for the team was to reuse as many resources as possible, including materials not only from this project, but from past and present Hunzinger Construction projects as well. Examples of resources refur-

bished and reused from this project include: wood doors and frames, door hardware, and casework.

Examples of reused items from off-site past and present projects are best represented by our utilization of the Antique Bronze Entry Doors of Milwaukee's historic Pabst Theater. The Pabst Theater is the centerpiece of Milwaukee's downtown theater district—a magnificent example of architecture of an-

The Pabst Theater doors now shine in all of their grandeur in Hunzinger Construction's new green office space.



The ornate antique bronze doors as they once hung at the historic Pabst Theater in Milwaukee, WI.



other time and era that serves performers and audiences of the twenty-first century as it did at the turn of the twentieth century. Hunzinger Construction Company was honored to perform extensive renovations at the theater in 2001, at which point, the ornate bronze doors were carefully removed and replaced. The antique doors were securely tucked away at our office in hopes that some day they could shine again. In the true spirit of LEED, we were able to reuse the doors, which now hang proudly along the entry wall to the new Estimating Department at our headquarters.

In addition to the Pabst Theater doors, vinyl wall covering was also recovered from an existing project and installed at our office, thus diverting it from being sent to a landfill. In total, this project utilized salvaged, refurbished, or reused materials

and products (excluding furniture and furnishings), for which the typical replacement value is equivalent to an impressive 55% of the total material cost for this project.

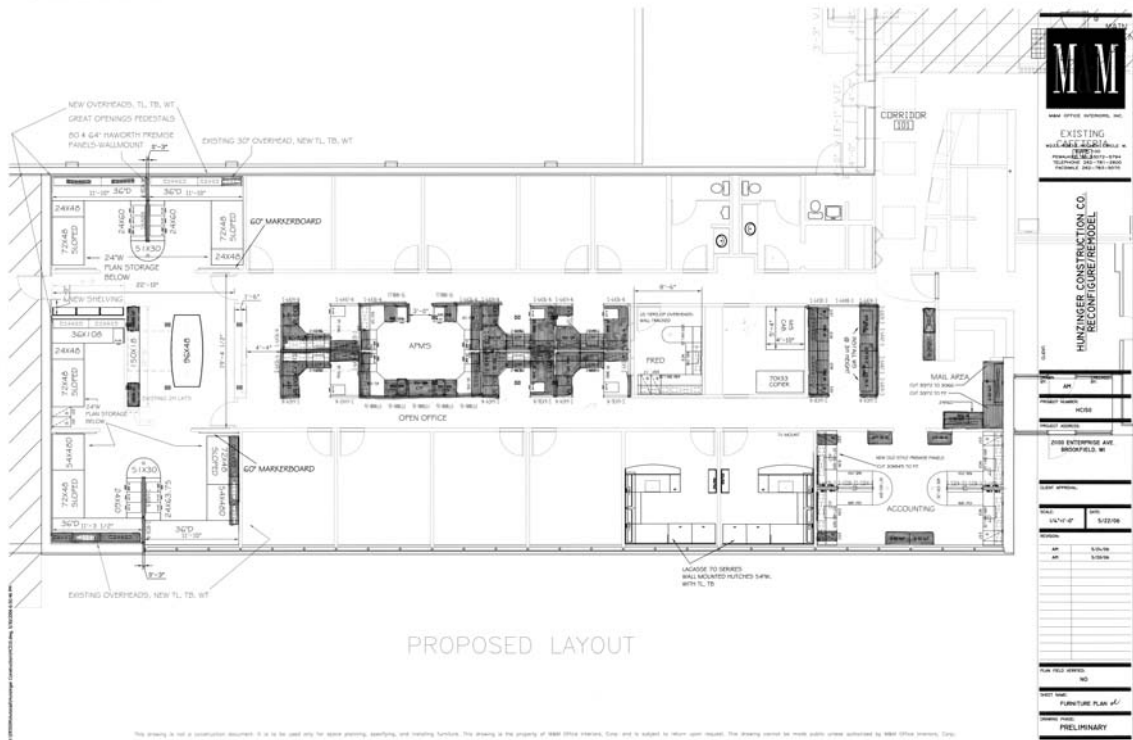
### ***Resource Reuse—Furniture and Furnishings***

In coordination with the designers and office furniture consultants, detailed plans showing all pieces of the modular furniture to be reused were inventoried to ensure a design that would maximize the furniture reuse. After careful coordination, over 33% of the existing modular furniture was reused.

### ***Recycled Content***

Overall, the level of recycled content, both post-consumer and post-industrial, in the construction materials we selected, contain 23.5% recycled content.

Before the renovation: highlighted areas below identify the furniture and furnishings to be reused.



Some examples of the recycled content are: Haworth Premise Systems furniture (20% Post-Consumer, 22% Pre-Consumer), Armstrong Graphis Ceilings (1% Post-Consumer, 51% Pre-Consumer), J&J Xtra Terrestrial Carpet (0% Post-Consumer, 33% Pre-Consumer), and Herman Miller Mirra Chair's (31% Post-Consumer, 11% Pre-Consumer).

## CONSTRUCTION CHALLENGES

LEED principals are not just a planning and documentation process. Sustainability needs to be placed into action at some point, or its value will not be fully realized above that of an academic exercise.

The construction industry is sometimes slow to embrace change. This resistance manifests itself in the construction process in ways that can jeopardize successfully completing and receiving Certification. Experienced tradesmen will do things exactly the same way they did the last time, unless there is a rea-

son to change. This is the challenge for all sustainable projects, regardless of whether or not they are attempting certification.

The construction challenges we experienced were mitigated by a four-pronged education program that addressed the labor forces of our subcontractors as well as our own forces performing the installation.

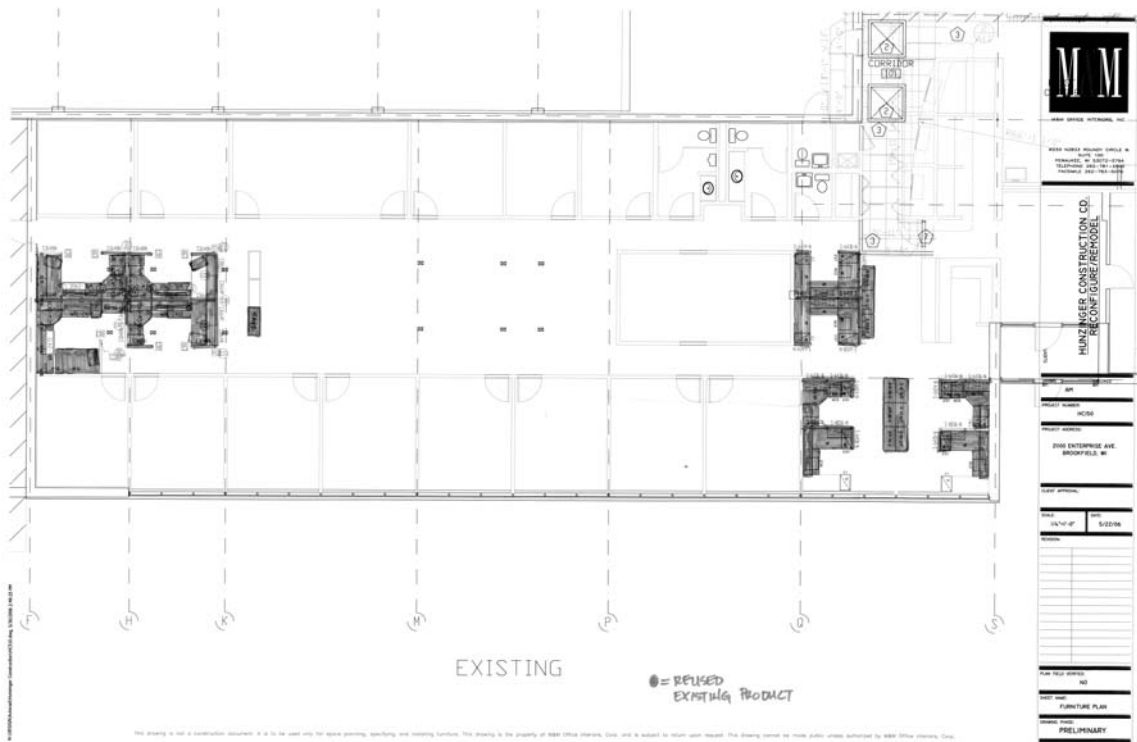
## Education

The remodeling project was a regularly scheduled agenda item at our weekly office-wide planning meeting. Schedules were distributed periodically to keep the users informed on upcoming activities, as well as the LEED principles that were being executed. E-mail was used extensively to keep temporarily relocated personnel up to date on construction that was taking place in or near their permanent office spaces.

Multi-phase moving plans were updated weekly and adjusted as construction progressed. Hard copies



The highlighted areas below show where the reused furniture and furnishings were utilized in the new office.



of plans were posted on the walls to quickly orient new workers on the goals of the project, as well as to remind them of some of the construction salvage, reuse, recycling, relocation goals, and mandatory construction activities.

### Reinforcement

The project demanded additional reinforcement in the field. Subcontractor personnel and our own laborers were pulled in and out depending on the workload, material deliveries, and required trade activities. Quickly changing personnel mandated both general orientation and individual education and sometimes re-education. Daily planning meetings with the construction teams, immediately after safety review and morning stretching session, was the logical place to make the LEED goals and implementation concepts understood. The daily meeting provided a non-threatening and informal setting, which encouraged questions from new personnel.

The new centralized Estimating Department features ergonomically designed workspaces along the exterior walls, with a group work area in the center of the space to accommodate Bid Day functions. The new Estimating Department has the ability to temporarily separate itself from the rest of the office by means of two closable entry doors, one on each side of the Pabst Theater Doors display wall.



## **Monitoring**

Experienced workers and new hires were monitored throughout the construction process, over and above what would normally be required. The recycling, salvage, diversion, and protection of reused materials were checked daily by the construction project manager, as well as the office project managers. We had the benefit of a large number of LEED Accredited Professionals as well as LEED trained staff who were aware of the project goals and strategies. This resulted in identifying potential problems that may have jeopardized any points we were going after.

## **Execution**

We had the luxury of controlling large portions of the work with our own experienced tradesmen and subcontractors, who were well versed in the project goals and sustainable principles. Our project was not as complex as a new building; however, it had a smaller margin of error, due to the limited scope of work and volume of new materials.

## **SUMMARY**

The success of our project is due to a committed team, as well as a pre-planned strategy to bring all the stakeholders toward a clear and well-communicated goal. One of the most valuable recommendations, in our eyes, for anyone planning a LEED project is this: The key to minimizing the detours in any project is recognizing the hurdles early on and planning your education, reinforcement, monitoring, and execution program to accommodate them.

## **SUBCONTRACTORS**

Services and technical data provided by:

**Electrical:** Roman Electric Company, Gab Rose, 640 S. 70th Street, Milwaukee, WI 53214, 414.771.5400

**HVAC & Plumbing:** Total Comfort of WI, Mike Hyde, W234N2830 Paul Road, Pewaukee, WI, 262.523.2500

**Painting & Wall Coverings:** Hess Sweitzer, Inc., Michael Mendola, 2805 South 160th Street, New Berlin, WI 53151, 262.641.9100

**Carpeting:** Lippert Tile, Doug Prahst, N89W14260 Patria Drive, Menomonee Falls, WI 53051, 262.437.9650

**Window Treatments:** M.A. Lichter Co., 221 E. Buffalo Street, Milwaukee 53202, 414.276.6006

**CM and Labor:** Hunzinger Construction: Dave Dell'Agnese, 21100 Enterprise Avenue, Brookfield, WI 53045, 262.797.0797

**Furniture:** M&M Office Interiors, Timothy Rudd, W233N2883 Roundy Circle West, Ste 100, Pewaukee, WI 53072, [www.mmoffice.com](http://www.mmoffice.com), 262.781.2600

**Millwork:** Precision Woodwork, Inc., Dan Heinitz, 13000 W. Custer Avenue, Butler, WI 53007, 262.781.3990

**Communications:** Carpenter Technology, Dave Carpenter, 4635 N. 124th Street, Butler, WI 53007, 262.783.7770

**AV:** AV Design Group, Fred Williamson, 154 Green Bay Road, Thiensville, WI 53092, 262.512.9390

**Custom Conference Table:** CJ & Associates, Inc., Gary Gapinski, 16915 W. Victor Road, New Berlin, WI 53151, 262.786.1772

**Hardware:** Builder's Hardware & Hollow Metal, Steve Hicks, W165N5690 Continental Parkway, Menomonee Falls, WI 53051, 262.781.5525