Major Projects Quarterly Sustainability Report

June 2011

Alice Crocker Lloyd Hall Renovation

Project Description

Alice Crocker Lloyd Hall is a 176,000 gross-square-footage residence hall housing approximately 560 students. The renovation will update infrastructure, including: new plumbing, heating, cooling, ventilation, fire detection and suppression systems, wired and wireless high-speed network access, renovated bath facilities and accessibility improvements. New spaces will be created in the vacated dining areas that are no longer needed since the Hill Dining Center became operational. New and reorganized spaces within the facility will revitalize the old residence hall and create much needed spaces for living-learning and academically- related activities, dance practice and multipurpose space, art studio, music practice rooms and spaces for student interaction and community development.

Energy Efficiency Measures

Alice Crocker Lloyd Hall design focuses on maximizing energy efficiency and incorporates numerous energy conservation measures including:

- Insulating all existing exterior walls that are not currently insulated.
- Utilizing the chilled water from the Mechanical Services Building adjacent to Mosher-Jordan Residence Hall as the cooling sources for the resident rooms in lieu of DX units.
- Reducing the lighting power density for the first and second floor common areas.
- Utilizing space occupancy sensors on the first and second floor common spaces to reduce run hours for the central station air handling units.
- Using increased inspections, including infrared scans, during construction to identify missing insulation, gaps in the enclosure, and other wall/roof assembly deficiencies.
- Using an enthalpy wheel in the mechanical system as a means of energy recovery to utilize the lost heat from the toilet room exhaust system.

Other Sustainability Features

- Alice Crocker Lloyd Hall is being renovated on its current site with over 75% of the existing walls, floors, and roof being re-used as well as 50% of the interior non-structural elements are being re-used.
- Access is being improved, thus encouraging the use of UM and public transportation.
- Bike racks will be installed to encourage the use of bicycles for transportation.
- No new parking will be provided on site (to reduce pollution and land development impacts).
- The use of water conserving plumbing fixtures including low flow toilets, urinals and shower heads will reduce water consumption by over 30%.
- Use of regional and local materials used where possible (not less than 10%).
- Use of low VOC materials including adhesives, sealants, paints, coatings, carpet systems, composite wood and agrifiber products.
- During construction, the demolition contractor is separating and recycling metal and brick/block.

Project Data

- Budget: $56 M
- Schedule: Completion scheduled for Summer 2012
- Square Feet: 176,000 gsf

Status as of May 2011

- Project Status: Construction
- Design Complete: 100%
- Construction Complete: 6 %

George Granger Brown Memorial Laboratories Mechanical Engineering Addition

Project Description
The 62,500 gross square feet, $46 million addition will house research laboratories and faculty and graduate student offices to support emerging research endeavors such as bio, energy and nano systems, as well as enhance the ability to realize ultra-high-resolution measurements at molecular and atomic scales. This addition will be designed to support interdisciplinary collaboration within the university and with other academic institutions and industry.

LEED Certification: This project will seek LEED Silver-level Certification

Energy Efficiency Measures

- Maximum insulation in foundation walls, exterior walls, under slab, and roof assemblies
- Use of increased inspections, including infrared scans during construction to identify missing insulation, gaps in the enclosure, and other wall/roof assembly deficiencies
- Energy efficient windows/glazing for increased thermal performance
- High efficiency lighting throughout
- Occupancy sensors to control lighting
- Hybrid Lab HVAC System Configuration
- Dual Effect Energy Recovery System
- Lab Lighting Power Density Reductions
- Lighting Control/Space HVAC Setback

Other Sustainability Features

- Use of an Erosion and Sedimentation Control Plan during construction to reduce pollution from construction by controlling soil erosion, waterway sedimentation, and airborne dust generation
- GG Brown Laboratory sited on public and UM bus routes, encouraging use of public transit
- No new parking provided on-site (to reduce pollution and land development impacts)
- Use of water conserving plumbing fixtures
- Energy efficient transformers
- Use of select sustainable materials (e.g., steel structure, terrazzo flooring)
- Use of low-VOC materials (e.g., carpets, paints)
- Use of regional and local materials where possible

Project Data

- Budget: $46 M
- Schedule: Completion scheduled for Winter 2014
- Square Feet: 62,500 gsf

Status as of May 2011

- Project Status: End of Design Development Phase
- Design Complete: 40 %
- Construction Complete: 0%

Building Access Control Project

Project Description

Most entrance doors on the Ann Arbor campus are locked and unlocked manually. This project will replace existing lock hardware and install electronic card readers and door monitors on exterior doors for 106 general fund buildings. The new system will provide greater security and reliability. The building access system will be able to utilize the new university enterprise directory to manage access rights, and it will be able to be expanded to include additional doors in the future. The technology will enhance campus security by allowing for the potential to lock-down building access during major emergencies and by allowing deletion of individual lost, stolen or terminated cards without the expense and inconvenience of reissuing new building keys to all authorized users. Although there will be additional equipment to maintain, overall productivity enhancements will occur as the technology will eliminate the need for daily manual door locking and unlocking by custodians and other facility occupants. Also included in the project scope are the costs to re-issue all M-Cards to include the new smart card technology.

Energy Efficiency Measures

- Electric strikes utilize low-voltage power (used everywhere possible)
- Minimized high-voltage needs except where design constraints prohibited an alternative

Other Sustainability Features

- Centralized lock/unlock capabilities reduce the need for travel from building to building for keyed locks (typically executed with a single-occupant vehicle)
- Strikes, bollards and exit devices are made from stainless steel which is highly recyclable
- Strikes implemented wherever possible, in lieu of electrified panic devices, to reduce
    - Materials and labor for future replacement if/when necessary
    - Conduit required with high-voltage panic devices
- Reuse of existing exit devices wherever possible, reducing the amount of raw materials used in the project

Project Data

- Budget: $9 M
- Schedule: Completion scheduled for Spring 2011

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 100%

Couzens Hall Renovation

Project Description

Constructed in 1925, with a large addition added in 1956, Couzens Hall is an approximately 180,000-gross-square-foot residence hall housing 526 students. The renovation will repair and update infrastructure, including: new plumbing, heating, ventilation, fire detection and suppression systems, wired and wireless high- speed network access, renovated bath facilities and accessibility improvements. In addition, air-conditioning will be provided throughout the renovated building. New community and program spaces will be created in the dining areas that became vacant with the opening of the Hill Dining Center in the fall of 2008. New and reorganized spaces within the facility will revitalize the old residence hall and create spaces for living-learning and academic initiatives, student interaction, and creation of community. The energy performance of the overall building will be brought up to our current design guidelines by a number of energy conservation measures.

Energy Efficiency Measures

The Couzens Hall Renovation design focuses on maximizing energy efficiency and incorporates numerous energy conservation measures including:

- Insulating all existing exterior walls that are not currently insulated.
- Replacing existing window framing and glazing in the west half (original) of the building and replacing glazing in the east half (newer addition) of the building to increase thermal performance.
- Utilizing the chilled water from the Mechanical Services Building adjacent to Mosher Jordan Residence Hall as the cooling source for the Resident Rooms in lieu of DX units.
- Reducing the lighting power density for the first and second floor common areas.
- Utilizing space occupancy sensors in the resident rooms to reduce lighting power density and reduce run hours for the fan coil units.
- Utilizing space occupancy sensors on the first and second floor common spaces to reduce run hours for the central station air handling units.
- Using increased inspections, including infrared scans during construction to identify missing insulation, gaps in the enclosure and other wall/roof assembly deficiencies.
- Using an enthalpy wheel in the mechanical system as a means of energy recovery to utilize the lost heat from the toilet room exhaust system.

Other Sustainability Features

- Couzens Hall is being renovated on its current site with over 95% of the existing walls floors and roof and 50% of the interior non-structural elements being reused.
- Access is being improved thus encouraging the use of UM and public transportation.
- Bike racks will be installed to encourage the use of bicycles for transportation.
- No new parking will be provided on site (to reduce pollution and land development impacts).
- The use of water conserving plumbing fixtures including low flow toilets, urinals and shower heads will reduce water consumption by over 20%.
- Daylighting and views will be provided for over 75% of the spaces in the building.
- Use of regional and local materials used where possible (not less than 10%).
- Use of low VOC materials including adhesives, sealants, paints, coatings, carpet systems, composite wood and agrifiber products.

Project Data

- Budget: $49 M
- Schedule: Completion scheduled for Summer 2011
- Square Feet: 180,000 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 84%

Crisler Arena Expansion

Project Description

Built in 1967, Crisler Arena is a multi-purpose venue used for academic, athletic, and entertainment events. In October 2010, the Board of Regents approved a renovation of the arena's core infrastructure and replacement of spectator seating, with a seating capacity of approximately 12,800. The Department of Intercollegiate Athletics now proposes to further renovate and expand Crisler Arena. New construction of approximately 63,000 gross square feet will create new spectator entrances, retail spaces, ticketing areas and a private club space. Renovation of approximately 54,000 gross square feet will accommodate accessible seats, improve circulation and egress, increase the number of restrooms and concession areas, and add other fan amenities. The scope of this project includes the architectural, mechanical, and electrical work necessary to accomplish these improvements.

LEED Certification: This project will seek LEED Silver-level Certification

Energy Efficiency Measures

The Crisler Arena Expansion design focuses on maximizing energy efficiency and incorporates numerous energy conservation measures, including:

- Maximum insulation in foundation walls, exterior walls, under slab, and roof assemblies
- Use of increased inspections, including infrared scans during construction to identify missing insulation, gaps in the enclosure, and other wall/roof assembly deficiencies
- Energy efficient windows/glazing for increased thermal performance
- High efficiency lighting throughout with daylight sensors for spaces with fenestration
- Occupancy sensors to control lighting
- Demand control ventilation to reduce mechanical loads to low occupancy and empty spaces
- High efficiency air cooled chiller
- Increase thermostat deadbands (the gap between the heating setpoint and cooling setpoint during which no conditioning is provided)
- Increased exhaust air energy recovery
- Automatic static pressure reset

Other Sustainability Features

- Use of an Erosion and Sedimentation Control Plan during construction to reduce pollution from construction by controlling soil erosion, waterway sedimentation, and airborne dust generation
- Reuse of existing Crisler Arena (in lieu of new facility on green-field site)
- Crisler Arena sited on public and UM bus routes, encouraging use of public transit
- No new parking provided on-site (to reduce pollution and land development impacts)
- Use of water conserving plumbing fixtures, including low-flow shower heads low-flow lavatories, and waterless urinals
- Energy efficient transformers
- Use of select sustainable materials (e.g., steel structure, terrazzo flooring)
- Use of low-VOC materials (e.g., carpets, paints)
- Use of regional and local materials where possible (e.g., limestone, brick)

Project Data

- Budget: $53 M
- Schedule: Completion scheduled for Winter 2014
- Square Feet: 63,000 New and 54,000 Renovation

Status as of May 2011

- Project Status: Construction Document Phase
- Design Complete: 60%
- Construction Complete: 0%

Crisler Arena Renovation

Project Description

Built in 1967, Crisler Arena is a multi-purpose venue with a seating capacity of approximately 13,800 used for academic, athletic, and entertainment events. The arena has received minor renovations since construction, and we now propose addressing its highest priority infrastructure needs, including life safety, mechanical and electrical. The project will include: replacement of the roof and asbestos abatement as needed; new fire detection, alarm, and suppression systems; a new smoke evacuation system; emergency egress lighting; replacement of the heating and ventilation units; and building electrical system upgrades. The project will also replace the seats in the lower and upper bowl, including the addition of seating meeting the requirements of the Americans with Disabilities Act, as well as relocate and widen aisles and add hand rails to the aisles.

Energy Efficiency Measures

- Increased insulation in the existing roof, in the new exterior walls and under new slabs.
- Energy efficient windows/glazing in new windows for increase thermal performance.
- High efficiency lighting throughout.
- Occupancy sensors to control lighting during unoccupied times.
- Demand control ventilation to reduce amount of outside air being heated/cooled during times of low occupancy.
- Increase thermostat dead bands for heating during unoccupied times.
- Supply air ductwork sized at lower velocities which reduces the static pressure and therefore less fan energy is required.

Other Sustainability Features

- Reuse of the existing Arena, reducing waste from demolition of the existing arena and reducing the impact from constructing an entirely new arena.
- Site is located on public and UM bus routes, encouraging use of public transit.
- No new parking provided on-site (to reduce pollution and land development impacts).
- Use of an Erosion and Sedimentation Control Plan during construction to reduce pollution from construction by controlling soil erosion, waterway sedimentation, and airborne dust generation
- Energy efficient transformers
- Use of low VOC materials for pipe connections.
- Monitoring outside air delivery to ensure during low load conditions that the correct amount of outside air is being delivered.
- Air handling systems will be designed for thermal comfort by the occupants.
- Refrigerant systems will utilize HCFC which have almost zero ozone depletion ratings.
- The new mechanical system will be commissioned.
- Use of low-VOC materials (eg carpets, paints).
- Use of regional and local materials where possible.

Project Data

- Budget: $23 M
- Schedule: Completion scheduled for Winter 2012
- Square Feet: 360,000 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 98%
- Construction Complete: 50%

Institute for Social Research Addition

Project Description

The Institute for Social Research (ISR) is the oldest and largest academic survey and social research organization in the world. Expansion of the ISR's facilities on Thompson Street will increase the capacity of the institute's research facilities to support its large and growing externally-funded research programs. Expansion will also enhance research effectiveness by integrating research programs within a single building complex, and will provide state-of-the-art facilities for communicating with national and international research partners. A four-level addition of approximately 44,700 gross square feet to the existing Institute for Social Research building is proposed. The expansion will create office and research spaces, collaborative meeting spaces, and secure data and biospecimen storage. The project also involves renovations to approximately 7,200 gross square feet of the existing building where it will connect to the addition.

LEED Certification: This project will seek LEED Silver-level Certification

Energy Efficiency Measures

The Institute for Social Research Addition is being designed to consume 30 per cent less energy than allowed by the 2007 edition of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1.

- Use of hydronic chilled beam terminal induction cooling devices, which transfer cooling through liquid rather than air and which eliminate fan energy for large ductwork . Distribution of cooling within rooms via induction minimizes distribution energy within rooms.
- Installation of an enthalpy energy wheel to recover waste heat.
- Cooling tower will be winterized, to allow "free cooling" when outdoor air temperature is low.
- Use of increased building envelope inspections, including infrared scans during construction to identify missing insulation and gaps in the building enclosure.
- High efficiency lighting throughout.
- Inclusion of an atrium to bring natural daylight into interior of building, which will reduce the need for artificial lighting.
- Occupancy sensors to control lighting.
- High efficiency chiller.
- Increased thermostat dead band (the gap between heating and cooling set points during which no heating/cooling is required).
- Individually controlled window shades, to minimize solar heat gain on sunny days.

Other Sustainability Features

- Addition is being designed to attain LEED "Silver" certification.
- Installation of a living "green roof" to provide natural conductive roof insulation, to reduce peak storm water run-off, to utilize solar radiation, and to provide thermal inertia for the building (which minimizes peak heating and cooling loads).
- Installation of low flow plumbing fixtures to reduce water consumption 40 percent below the consumption rate of a typical building.
- Utilization of an urban building site that is convenient to UM and public transportation. No installation of parking, to further encourage use of mass transportation.
- Use of selected sustainable materials, such as terrazzo flooring.
- Use of low-VOC materials, such as carpeting and paint.

- At least 10 percent of new materials will be from local/regional sources.
- At least 10 percent of new materials will be recycled content.
- Consideration of combined chilled water/fire suppression piping to minimize excess piping in the building.
- Consideration of translucent floor panels in the floor of the atrium, to provide natural lighting to occupied basement areas.
- Solar optimization of atrium skylight monitors via energy modeling.
- Installation of new glazing at existing offices that will now front atrium, to provide natural lighting without building envelope heat gain/loss.

Project Data

- Budget: $23 M
- Schedule: Completion scheduled for Spring 2013
- Square Feet: 44,700 gsf addition and 7,200 gsf renovation

Status as of May 2011

- Project Status: Active
- Design Complete: 98%
- Construction Complete: 0%

Law School Academic Building and Hutchins Hall Student Commons Addition

Project Description

The project includes a new academic building located south of Monroe Street, an addition between Hutchins Hall and the William W. Cook Legal Research Library for a new Law School commons, and renovations within both Hutchins Hall and the Cook Library. The new academic building will be approximately 100,000 gross square feet that will house classrooms, multi-purpose spaces, clinic work spaces, and offices for Law School faculty and administrators. The Law School commons project of approximately 16,000 gross square feet will provide needed student study, interaction, and support spaces. Additionally, the project will include life safety upgrades to Hutchins Hall and the Cook Library and the addition of an electrical substation and chilled water plant. The project will also replace the metal siding on the connection between the Law Quad buildings and the Cook Library stacks wing with a masonry façade.

LEED Certification: This project will seek LEED Silver-level Certification

Energy Efficiency Measures

This project is designed to surpass code required energy efficiency by 30% and some of the examples of the energy conservation measures include:

- Maximum insulation in foundation walls, exterior walls, and roof assemblies
- Energy efficient windows/glazing for increased thermal performance
- Occupancy sensors for the shutdown of VAV boxes
- Increase of “deadband” in the thermostat controls for all academic spaces
- Use of increased inspections, including infrared scans during construction to identify missing insulation, gaps in the enclosure, and other wall/roof assembly deficiencies
- Daylighting controls for perimeter spaces
- Reduction of lighting levels through use of occupancy sensors
- More efficient mechanical cooling achieved with the use of high efficiency chillers
- Domestic hot water reduction by using low flow fixtures
- Mechanical room airflow reduction achieved by ventilating the mechanical room based on occupancy
- Free cooling achieved by using dry coolers and getting energy savings associated with not running the air conditioning unit compressors

Other Sustainability Features

This project will seek LEED Silver-level Certification and examples of some of the additional sustainability measures incorporated into the project include:

- Law School new academic building is situated on a previously developed site instead of a new site and has no threatened or endangered plants or animal species that inhabit this space
- New building is sited on public and UM bus routes, encouraging use of public transit
- Bike racks and shower facilities are provided, encouraging alternative transportation
- No new parking provided on the site
- Landscaping is designed to have only native and adaptive plants and no lawns, therefore reducing the need for mowing and using invasive fertilizers
- Storm water management incorporates a detention tank that will significantly reduce the quantity of storm water
- Storm water quality will be controlled with the use of hydrodynamic separators
- Light colored hardscape surfaces will be installed to help the heat island effect
- All plumbing fixtures within the building will be low-flow fixtures and dual flush toilets
- At least 50% of construction waste will be diverted from disposal
- Regional materials are used wherever possible, as well as certified wood
- Use of low-VOC materials (carpets, paints)
- Use of grating mats and exhaust systems with filters to improve indoor chemical and pollutant source control

Project Data

- Budget: $102 M
- Schedule: Completion scheduled for Fall 2011
- Square Feet: 116,000 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 87%

Michigan Memorial Phoenix Laboratory Addition and Second Floor Renovation

Project Description
The Michigan Memorial Phoenix Laboratory Addition and Second Floor Renovation project will create modern research laboratory space to support the Michigan Memorial Phoenix Energy Institute. A renovation of approximately 10,000 gross square feet is planned that will create state-of-the-art laboratory spaces for energy-related research, as well as construction of an addition of approximately 10,000 gross square feet for the institute's administrative functions. As part of this project, the building's electrical substation, which has exceeded its useful life, will be replaced.

LEED Certification: This project will seek LEED Silver-level Certification

Energy Efficiency Measures
The Michigan Memorial Phoenix Lab Addition and Renovation design focuses on maximizing energy efficiency and incorporates numerous energy conservation measures including:

- Insulating existing exterior walls impacted by the project that are not currently insulated.
- Utilizing space occupancy sensors on the ground and upper floor common spaces to reduce run hours for the central station air handling units.
- Maximum insulation in foundation walls, exterior walls, under slab, and roof assemblies.
- Use of increased inspections, including infrared scans during construction to identify missing insulation, gaps in the enclosure, and other wall/roof assembly deficiencies.
- Energy efficient windows/glazing for increased thermal performance.
- External shading of curtain wall glazing.
- High efficiency lighting throughout with daylight sensors for spaces with fenestration.
- Occupancy sensors to control lighting in offices, bathrooms, corridors, and conference rooms.
- Increase thermostat deadbands (the gap between the heating setpoint and cooling setpoint during which no conditioning is provided).

Other Sustainability Features
- No new parking will be provided on site (to reduce pollution and land development impacts).
- The use of water conserving plumbing fixtures including low flow toilets, urinals and shower heads will reduce water consumption by over 20%.
- Daylighting and views will be provided for over 75% of the spaces in the building.
- Use of low VOC materials including adhesives, sealants, paints, coatings, and carpet systems.
- Use of an Erosion and Sedimentation Control Plan during construction to reduce pollution from construction by controlling soil erosion, waterway sedimentation, and airborne dust generation
- The addition is constructed on a previously developed site in lieu of a green field site.
- The project is sited on public and UM bus routes, encouraging use of public transit
- Energy efficient transformers
- Use of select sustainable materials (eg steel structure, terrazzo flooring)
- Use of regional and local materials where possible (eg stone and brick)

Project Data

- Budget: $11.1 M
- Schedule: Completion scheduled for Spring 2013
- Square Feet: 10,000 gsf addition and 10,000 gsf renovation

Status as of May 2011

- Project Status: Active
- Design Complete: 93%
- Construction Complete: 0%

North Campus Chiller Plant Expansion

Project Description

The North Campus Chiller Plant (NCCP) was completed in 2005 to provide chilled water to North Campus. The NCCP, when compared with individual building chillers, has resulted in energy savings, reduced operation and maintenance costs, increased redundancy and reliability, and reduced proliferation of cooling towers and the associated noise. In fiscal year 2009, the estimated annual operating cost savings due to the NCCP was approximately $200,000, with the majority of savings achieved with increased energy performance. We are now increasing the size of the facility by 8,500 square feet and add two 1,300 ton chillers, increasing the total capacity to 6,500 tons. In addition to the expansion of the NCCP, underground connections will be extended to provide chilled water to the Earl V. Moore Building, Space Research Laboratory, and Naval Architecture and Marine Engineering Building (NAME). The increased overall capacity of the plant will allow the elimination of the existing building chillers at the Francois-Xavier Bagnoud, Electrical Engineering and Computer Science, and George Granger Brown Memorial Laboratories (G. G. Brown) buildings, as well as provide cooling for the planned additions to G. G. Brown and the Michigan Memorial Phoenix Laboratory. The estimated incremental annual operating cost savings will be approximately $100,000 based on today's cost, with the majority of savings achieved with increased energy performance. In addition, we will replace the steam and condensate interconnection between the Aerospace Propulsion Lab and NAME buildings to eliminate the need for one boiler.

Energy Efficiency Measures

The North Campus Chiller Plant Expansion design concept in general minimizes energy and operating cost by incorporating the following energy conservation measures:

- Selecting chillers based on lowest life cycle cost, which is largely dictated by highest energy efficiency.
- Turning off the new substation during winter operation and just using the existing substation.
- Reducing the energy usage of general lighting by nearly 50% as a result of utilizing energy efficient High Bay Fluorescent light fixtures in place of less efficient Metal Halide lamped light fixtures.
- Daylight harvesting through the glass curtain wall and lowering energy usage of general lighting in this area.
- Insulating all exterior walls.

Other Sustainability Features

- Salvaging the existing acoustical screen-wall panels on the east end of the building and re-installing them in the same relative location on the new east wall of the NCCP.
- Salvaging the existing glass curtain wall on the east end of the building and re-installing it in the same relative location on the new east wall of the NCCP.
- Underground piping extended to satellite buildings was installed by directional boring piping in select areas, to minimize disruption of trees and other surface elements.
- The bentonite slurry from the directional boring will be mixed with the top soil and compose at the North Campus Grounds Facility to improve moisture retention in lieu of going to a landfill.

Project Data

- Budget: $8.7 M
- Schedule: Completion scheduled for Fall 2011
- Square Feet: 8,500 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 90%

North Campus Research Complex Building 16 Renovation for Health Services Research

Project Description

A renovation of the North Campus Research Complex Building 16 is planned to co-locate several health service research groups currently dispersed throughout the University. The five above-grade levels will be renovated to promote collaboration amongst groups and consolidate redundant resources to create a more efficient and cost-effective research environment. Conference space and a fitness center located in the below grade level will be renovated for general NCRC use. The project will also update the building's infrastructure, including heating, cooling, technology, code and accessibility improvements.

Energy Efficiency Measures

A primary goal for this project is to reduce energy consumption where possible in those areas being renovated in conjunction with preserving as much of the existing building assets as possible. Several sustainable practices being evaluated and/or implemented as part of this project including:

- The new floor plan design will open up work space to draw natural daylight further into the facility
- Life cycle analysis is being evaluated for converting from existing electric heating panels to a new perimeter hydronic fin tube design solution
- New low flow fixtures will be provided in toilet rooms to reduce water consumption
- The level of renovation was reduced by preserving by reusing and/or repurposing approximately 60% of the current floor plan layout
- Almost all of the existing furniture within the 120,000 gsf facility will be reused in the renovated space
- New energy efficient lighting fixtures with electronic ballasts will be used
- New occupancy sensors are being provided for more energy efficient lighting controls in offices, conference rooms and support spaces
- New timer light switching will be provided in janitor closets and storage rooms that have infrequent use.
- The existing carpeting will be recycled as part of the renovation
- Low VOC and recycled content will be used where possible

Project Data

- Budget: $13,700,000
- Schedule: Substantial Completion Spring 2012
- Square Feet: 120,000 gsf

Status as of May 2011

- Project Status: Construction documents
- Design Complete: 90%
- Construction Complete: 0%

Player Development Center for Intercollegiate Basketball

Project Description

The Player Development Center for men's and women's varsity basketball will provide approximately 57,000 gross square feet of support space, including two full basketball practice courts, locker rooms for men's and women's players and coaches, training, and hydrotherapy. The second floor will accommodate men's and women's coaching staff and administrative support functions, as well as film-viewing rooms and strength and conditioning space. The building will also provide a new accessible entry to Crisler Arena and a dramatic Hall of Fame at the entry lobby. The thirty-six foot tall glass oval is a dramatic focal point for the public entry and interpretive/historical functions in the Hall of Fame, and provides a distinct, contemporary identity for the basketball program, while drawing on traditional oval forms from Crisler and Michigan Stadium.

Energy Efficiency Measures

The Player Development Center design focuses on maximizing energy efficiency and incorporates numerous energy conservation measures, including:

- Maximum insulation in foundation walls, exterior walls, under slab, and roof assemblies
- Use of increased inspections, including infrared scans during construction to identify missing insulation, gaps in the enclosure, and other wall/roof assembly deficiencies
- Energy efficient windows/glazing for increased thermal performance
- External shading glazing for Hall of Fame curtain wall
- Use of translucent glazing to add daylighting to practice gym
- High efficiency lighting throughout with daylight sensors for spaces with fenestration
- Occupancy sensors to control lighting in offices, bathrooms, corridors, and conference rooms.
- Demand control ventilation to reduce mechanical loads to low occupancy and empty spaces
- High efficiency air cooled chiller
- Increase thermostat deadbands (the gap between the heating setpoint and cooling setpoint during which no conditioning is provided)
- Increased exhaust air energy recovery
- Automatic static pressure reset

Other Sustainability Features

- Use of an Erosion and Sedimentation Control Plan during construction to reduce pollution from construction by controlling soil erosion, waterway sedimentation, and airborne dust generation
- Player Development Center constructed on a previously developed site between Crisler Arena and the parking lot (in lieu of a greenfield site)
- Player Development Center sited on public and UM bus routes, encouraging use of public transit
- No new parking provided on-site (to reduce pollution and land development impacts)
- Use of water conserving plumbing fixtures, including low-flow shower heads low-flow lavatories, and waterless urinals
- Energy efficient transformers
- Use of select sustainable materials (eg steel structure, terrazzo flooring)
- Use of low-VOC materials (eg carpets, paints)
- Use of regional and local materials where possible (eg limestone, brick)

Project Data

- Budget: $23.2 M
- Schedule: Completion scheduled for Fall 2011
- Square Feet: 57,000 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 60%

UMHHC Children's and Women's Hospital Replacement Project and Shell Space Completion Project

Project Description

The key goal for the C. S. Mott Children's Hospital and Von Voigtlander Women's Hospital is to provide a new, state-of-the-art inpatient and outpatient facility for children and women. The 1,100,000 gross square foot facility consists of a clinic building of 9 floors and an inpatient building of 12 floors plus a helipad on the easternmost roof. The building includes inpatient space, clinic and office space, and programmed shelled space. It is connected to the existing Taubman Health Center via a link as well as an elevated walkway to the Simpson Parking Structure. Site Improvements include utility reconfigurations, roadway reconfigurations, landscaping, steam tunnel and ductbank extensions, and storm water detention.

LEED Certification: UMHHC Children's and Women's Hospital Replacement Project will seek LEED Certification

Energy Efficiency Measures

The Children's and Women's design is focused on obtaining LEED certification. Other Energy Efficiency Measures include:

- Designed to ASHRAE Standard 90.1 including building envelop and glazing efficiencies.
- Energy modeling was performed to determine optimum system selections with maximum efficiencies.
- Energy efficient equipment is provided such as chillers, pumps and fans.
- Reduction of lighting power densities through the use of energy efficient compact fluorescent and LED fixtures.
- Reduction of lighting power usage through occupancy sensors throughout the building and daylight harvesting controls for the main lobbies and clinic corridors.
- Sophisticated Building Management System controls to optimize fan speeds and system performance.

Other Sustainability Features

- Vegetative roof to reduce storm water run-off, reduce heat island effect, and create a natural habitat.
- Storm water infrastructure (collection) and management to minimize run-off and avoid impact to neighboring Nichols Arboretum.
- Landscape Plan uses native plants and plant varieties acclimated to the Ann Arbor climate zone.
- Landscaping will be irrigated by 100% non-potable water collected in the underground storage basins.
- Use of Best Management Practices and Erosion and Sedimentation control measures during construction to minimize and prevent pollution, soil erosion, waterway sedimentation, and airborne dust generation.
- Recycling approximately 75% of construction waste.
- Building materials utilizing a high amount of recycled content.
- Very low amount of volatile organic compounds (VOC) utilized in building components.

Project Data

- Budget: $754 M
- Schedule: Completion scheduled for Spring 2012
- Square Feet: 1,100,000 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 98%

University Hospitals Central Sterile Supply Expansion

Project Description

Surgical procedure activity in the University Hospital operating rooms has increased by 30 percent since 1995. The volume of instrumentation requiring sterilization has exceeded the capacity of the current processing facilities. To achieve improvements in space, equipment, and work process, an expansion of the central sterile supply area on level B2 of University Hospital is proposed. A renovation of approximately 16,000 gross square feet of space will consolidate surgical instrument processing, assembly, sterilization and storage operations. The scope of the project includes the architectural, mechanical, and electrical work necessary to accomplish these improvements.

Energy Efficiency Measures: within the renovated areas, new HVAC and electrical systems are designed to optimize efficiency.

- Variable air volume control used where there are nonessential air pressure relationships including offices, locker rooms, break room, etc.
- Limited use of incandescent lighting.
- Occupancy sensors used where appropriate.
- Low consumption urinals, lavatory faucets, and shower heads used.
- Premium efficiency motors were used on all new motor driven equipment.

Other Sustainability Features

- NA

Project Data

- Budget: $ 6,900,000 Total
- Scheduled Completion: Winter 2012 (actual completion Fall 2011)
- Square Feet: 16,000 gsf

Status as of May 2011

- Project Status: Construction
- Design Complete: 100%
- Construction Complete: 99%

University Hospitals Emergency Department Expansion

Project Description

A multi-phase renovation of approximately 22,500 gross square feet on level B1 of University Hospital will create 27 treatment bays, 6 triage rooms, 2 family consultation rooms, as well as expanded and improved patient reception areas for the Emergency Department. This renovation also includes the relocation and expansion of the Psychiatry Emergency Service to space adjacent to the Emergency Department. The scope of this project includes the architectural, mechanical and electrical work necessary to accomplish these improvements.

Energy Efficiency Measures: within the renovated areas, new HVAC and electrical systems are designed to optimize efficiency.

- The entry vestibule design is such that direct heating and cooling loses are minimized including insulated panels and glazing.
- Variable air volume control used where there are nonessential air pressure relationships including offices, locker rooms, break room, etc.
- Limited use of incandescent lighting.
- Occupancy sensors used where appropriate.
- Low consumption urinals, lavatory faucets, and shower heads used.
- Premium efficiency motors were used on all new motor driven equipment.

Other Sustainability Features

- NA

Project Data

- Budget: $ 13,900,000
- Scheduled Winter 2012
- Square Feet: 22,500 gsf

Status as of May 2011

- Project Status: Construction
- Design Complete: 100%
- Construction Complete: 48%

University Hospital Medical Procedure Unit Expansion

Project Description

This project will expand the MPU space by approximately 4,000 gross square feet into the exterior courtyard on level 2 adjacent to the MPU, and renovate 2,200 gross square feet of existing space. The expansion will create additional prep/recovery bays, procedure rooms, and storage space, and expand the patient and family reception and waiting room. The project will also include networking upgrades that will accommodate newer technology for endoscopic procedures. The estimated cost of the project is $6,000,000.

Energy Efficiency Measures

The project utilizes existing central HVAC equipment but the goal was to utilize energy efficient methods and strategies for the new construction wherever possible.

- Utilized variable air volume system.
- Installed energy efficient VFD and premium efficiency motors on existing central equipment supply and return fans serving space.
- Revised controls sequence for supply and return fans.
- Provided digital controls for new VAV boxes.
- Incorporated occupancy sensors to automatically shutoff lights where appropriate.
- Used high efficiency fluorescent lighting in all general spaces.
- Use ultra high efficiency LED exit lights, night lights and down lights in procedure rooms.
- Provided multi-level switching and dimming of lights.
- Maximized insulation in new roof assembly, exceeding min energy code requirements.
- Low VOC interior finishes (Paints, Flooring, Wall coverings, etc).

Other Sustainability Features

- High level of air quality in spaces.
- Infill of exterior courtyard, reuse of existing wall construction.

Project Data

- Budget: $6 M
- Schedule: Completion scheduled for Spring 2012
- Square Feet: 4,000 gsf addition and 2,200 gsf renovation

Status as of May 2011

- Project Status:
- Design Complete: 100%
- Construction Complete: 1%

Varsity Drive Building and Alexander G. Ruthven Museums Building
Museum of Zoology Collection Relocation and Renovations

Project Description

The project will relocate the majority of the Museum of Zoology's "wet" collection and support areas into approximately 46,000 gross square feet of renovated space within the Varsity Drive building, renovate approximately 6,800 gross square feet within Ruthven to create a safe storage compartment for the teaching collection as well as install a new fire alarm system throughout Ruthven.

Energy Efficiency Measures

The portion of the project which deals with renovating Varsity Drive building will comply with ASHRAE Standards 90.1-2007 as required by the University of Michigan design guidelines for projects with construction costs estimated between two and ten million dollars.

- The collection will be stored on a compact storage system to minimize project footprint and associated systems to minimize energy usage.
- The new toilet room was equipped with low flow fixtures and aerators.
- This project replaced some existing un-insulated garage doors with an insulated wall & glazing system.
- Ceilings have been specified within the Varsity Drive collection storage areas to minimize the volume of space which needs to be conditioned.
- Energy recovery within mechanical systems will be provided to save energy and reduce peak loads.
- Additional insulation was added to the exterior wall within the project area which will result in energy savings.

Other Sustainability Features

- Site selection, project renovated existing building instead of building new.
- Utilized construction materials with recycled content.
- Utilized regionally manufactured materials.
- Utilized lighting controls to optimize energy performance.
- Utilized low-emitting material to improve indoor environmental quality.

Project Data

- Budget: $ 20 M
- Schedule: Fall 2012
- Square Feet: 52,800 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 75%

Wolverine Tower Renovations for Business and Finance

Project Description

Constructed in 1973, the eleven-story, approximately 225,000-gross-square-foot Wolverine Tower building was purchased by the University in 1992 and houses administrative units. A renovation of approximately 61,000 gross square feet on seven levels will consolidate units currently spread across several floors, move all staff workstations out of the basement, and accommodate the relocation of MHealthy into Wolverine Tower, resulting in more efficient use of office space and increased cross-departmental sharing of both administrative staff and of common areas, such as conference and training rooms, kitchens and lunch rooms. The project will also address life safety and accessibility concerns and add a common lunch room, wellness area and showers, and a personal room.

Energy Efficiency Measures and Other Sustainability Features

- Installation of new light fixtures which exceed ASHRAE +30%, equating to approximately $36,000 in electrical savings.
- Installation of occupancy sensors and controls in offices and conference rooms.
- Replacement of original variable air volume (VAV) boxes with new energy efficient units which will provide better temperature control as well as offering cost savings.
- The majority of existing office furniture was diverted from a landfill thru reuse or recycling.

Project Data

- Budget: $6.1 M
- Schedule: Completion scheduled for Fall 2011
- Square Feet: 61,000 gsf

Status as of May 2011

- Project Status: Active
- Design Complete: 100%
- Construction Complete: 85%