CASE STUDY | Village at 115

Promoting sustainability through design, construction, operation, living & learning

THE VILLAGE AT 115
CASE WESTERN RESERVE UNIVERSITY

GOODY CLANCY, ARCHITECT
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Overview

For their new residential village, the stakeholders at Case Western Reserve University wanted a traditional look that conveyed a sense of history, that featured Case’s strengths in engineering and innovation, and that met their goals for a more sustainable campus. At the same time, decisions needed to make fiscal sense, with a reasonable payback.

The “Village at 115” is both traditional and innovative: the residential buildings are Collegiate Gothic in appearance, but, from the orientation of the buildings to the selection of brick, the buildings were designed to minimize energy use during both construction and operation and to promote a sense of community and awareness of the environment. This attitude of “Living and Learning” guided the design and construction process, and continues to influence the ongoing operation of the Village.

The seven residential houses are distributed among three buildings that, with the garage, are positioned along street edges to maximize open space in the center of the site. Locally obtained masonry and slate provide detail and scale; light shelves add variety and interest to the exteriors while minimizing the summer heating loads and bringing light deeper into the rooms during the winter.

LOCATION
Cleveland, OH

CLIENT
Case Western Reserve University

PROJECT TYPE
New construction in an urban setting:
—multi-unit residential
—higher education
—stadia and arenas
—transportation

PROJECT AREA
Total 22.6 acres
—Residential: 5.6 acres
—Athletic Fields: 14.0 acres
—Garage: 3.0 acres

PROJECT SCOPE:
North Building:
4 Floors/ 133,819 SF
Middle Building:
4 Floors/ 59,412 SF
South Buildings:
4 Floors/ 228,806 SF
Garage:
6 levels, 1200 parking spaces
Football Stadium
Athletic Fields: baseball, football/soccer, track & field

COMPLETION
August 2005

RATINGS,
U.S. GREEN BUILDING COUNCIL LEED NC, V.2.1:
Middle Building:
Gold (pending certification)
North and South Buildings:
Silver (pending certification)
The design of the buildings and site minimizes demand on water and stormwater systems, decreases light pollution and promotes heat island reduction. The building envelope is designed to reduce heating and cooling loads by 30 to 40 percent, and to meet those demands in the most efficient way possible. Control of lighting, windows and apartment HVAC systems requires the participation and education of the student residents. The University’s commitment to sustainable living continues through the use of a measurement and verification plan that monitors and fine tunes the operational systems, and that is integrated with a web-based educational display available to faculty and students to explore and research the concept of “green living and learning.”
Project Team: Village at 115

**North Residential Buildings and Athletic Fields**

Client: Case Western Reserve University  
Structural Engineer: Zaldastani Associates, Inc.  
Mechanical, Electrical, Plumbing: Bard, Rao + Athanas Consulting Engineers, LLC  
Civil Engineer: Neff & Associates, Inc.  
Specifications: Falk Associates  
Landscape Consultant: Michael Van Valkenburgh Associates  
Lighting Consultant: LAM Partners, Inc.  
Sports Consultant: HOK  
Sports Consultant: Paige Design Group  
Sustainable Design: Steven Winter Associates  
Sustainable Design: Buro Happold  
Commissioning Agent: H.F. Lenz Company  
Information Technology Consultants: Karpinski Associates  
Contractor: Whiting-Turner Contracting Company  
Hydrologist: Hydrosphere Engineering

**Garage, Press Box and Stadium**

Client: Case Western Reserve University  
Architect of Record: The HNTB Companies Inc  
Design Architect for building exterior: Goody Clancy & Associates  
Contractor: Whiting-Turner Contracting Company
At each step of the design process, and through construction and commissioning, the team—including the owner, construction manager, designers and engineers, sustainability consultant and the commissioning agent—worked together to challenge assumptions. As a result of this process, the team considered both new technologies and more efficient designs of conventional technologies. This was especially evident in the evolution of the HVAC design.

The first step in evaluating the HVAC systems was to challenge the assumptions for heating and cooling loads. A detailed energy analysis based on 3D modeling and a DOE analysis of the building provided a more accurate prediction of loads that took into consideration the tight building envelope, light shelves, insulation, high-efficiency windows, and the exact configuration and orientation of the building. This analysis reduced the design loads by 50 tons of cooling for the three buildings.

The original concept for the mechanical services called for central plants: a steam-fired heat exchanger in each building, a single central chiller plant and a central electrical substation, each with distribution to each of the three buildings. The team worked together to identify and explore options that included geothermal wells, microturbines with absorption chiller (MTAC), as well as more decentralized conventional systems that would reduce both initial capital cost and ongoing operation (energy) costs.
Finance

The project team initiated studies that considered capital cost, the cost of distribution, present and projected energy cost (cost of gas, steam, electricity), and the intangible costs of risk—the cost if new technology failed, or the cost of backup systems—as well as the benefits of publicity and education if new technologies were used.

If the costs were significant without payback, or if the risks were high, the features were not pursued. In the Cleveland area, the water and electricity costs are low, which made it difficult to make a case for a reasonable payback for mechanical system features with additional capital costs. Features that provided cost tradeoffs, such as improvements to the exterior envelope that increased architectural costs but reduced HVAC costs, were incorporated.

Most successful were features that were incorporated at no additional cost, such as the low-flow aerators, chillers with no CFC, HCFCs or Halon, and the groundwater discharge system.

The final design reduces energy consumption primarily by tailoring the systems to provide only the amount of energy (heating, cooling, water, or electricity) that is actually required, and by reducing loss of energy due to waste or inefficient distribution.
Land Use and Community

Case Western Reserve University is located along the busy Euclid Avenue commercial corridor on the north-east side of the city of Cleveland, Ohio. The project site is one block north of Euclid Avenue between East 115th and East 118th. To the south, East 116th and East 117th Streets extended north from Euclid and dead-ended at the project site. The area to the north of the site is single-family residential, while the area to the south, along Euclid, is a mix of residential and business. Little Italy, a block south of Euclid, is a busy commercial and restaurant area. The area is served by the Case shuttle bus, RTA buses, and the Euclid stop of the RTA rapid-transit commuter train.

The Village at 115 is the residential component of a new project that includes apartment-style housing for 725 undergraduates, a new parking garage for 1200 cars for residents and commuters, and replacement of existing athletic fields.

The project area fell within three existing zoning districts—residential, multi-family and retail—with a variety of height and area limits. The project team worked with the Cleveland Planning Commission to develop an alternative plan that would balance density with open space. This new plan extended East 116th and 117th streets through to the adjacent streets, and allowed higher-density four-story residential buildings along the three north-south streets (East 115th, East 116th, and East 117th). All surface parking was replaced with an eight-story parking structure located on East 118th, the largest of the four north-south streets.

This plan extended the character of the existing brick apartments located south of the site and provided an open-space buffer between the project buildings and the single-family homes to the north. Open space was
maximized by locating the soccer/football field in the center of the site, providing optimum views from the buildings and individual courtyards. As a bonus, the majority of the buildings were oriented on a north-south axis, minimizing heating loads from south-facing elevations.

The Village at 115 takes its name from its location off of East 115th Street, and the siting of the houses along its edge strengthens both the urban fabric and the Village's identity.

Strategies for Sustainable Land Use

- **Property Evaluation**
  - Assess property for integration into local and regional transportation corridors
  - Investigate property for possible contaminants (e.g., toxic/hazardous wastes, dumps)

- **Support for Appropriate Transportation**
  - Design development to have pedestrian emphasis rather than auto emphasis
  - Provide storage area for bicycles
  - Provide access to public transportation
  - Provide vehicle access to support car- and vanpooling

- **Responsible Planning**
  - Ensure that development fits within a responsible local and regional planning framework
Site

The site was originally covered by athletic fields and surface parking lots. In the new Village, all parking has been consolidated in the parking garage and the athletic fields have been relocated to the center of the site. The remaining open space has been restored with rolling lawns, ground cover and perennial trees and shrubs, with an emphasis on native and drought-resistant planting.

The open areas are loosely divided into the public street side, and the more private “courtyard side.” The three residential buildings are divided into seven “houses,” each with its own public entrance, private back door, and courtyard. The courtyards overlook the football/soccer field, and to the north is the baseball field, visible through the open end of the football/soccer field. Each area provides opportunities for sustainable design at a variety of scales.

The lighting on the site features a combination of traditional fixtures along the street and a more contemporary style in the courtyards. Both minimize light pollution, and the traditional model was carefully selected to provide a shielded fixture similar in appearance to the campus-standard acorn, which does not have shielding.

In the courtyard of the middle building, Case is experimenting with the use of drought-resistant “buffalo” grass, which will not need to be irrigated after it is estab-
lished. Initially, there was concern that native grass would look unkempt, or resemble a wheat field, but the specified grass looks like a conventional lawn. If successful, the “buffalo” grass could be used on future projects.

The large open areas provided by the football/soccer field and the baseball field presented different opportunities for additional uses. Early in the schematic design, the design team investigated the use of geothermal wells for heating and cooling, but determined that they were not feasible for this project. Shallow geothermal wells (300 feet) have been used successfully at Trinity Cathedral in Cleveland and at the Environmental Center at nearby Oberlin College, but the heating and cooling demands of the Village would require wells over the entire open space of the fields, and this proved too expensive. Deep wells (1500 feet), such as those used successfully by Goody Clancy at Trinity Church in Boston, were also investigated, and looked financially feasible until it was discovered that the Cleveland area is known for gas pockets. As a result, deep wells were too risky because the only way to confirm the location of the pockets was to drill.

On the other hand, Cleveland’s unique geology was perfect for a groundwater-recharge system. The local beach and glacial lake bottom deposits from the Wisconsin Glacial Period are now used to collect 70% of the stormwater from both buildings and site, including the garage and football field, and divert it into perforated pipes under the athletic fields, where it can percolate directly through this substrate into the groundwater.

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**Strategies for a Sustainable Site**

- **Development Impact**
  - Minimize building footprint
  - Limit parking area
  - Manage storm water on site

- **Landscape Plantings**
  - Landscape with indigenous vegetation

- **Low-Water-Use Fixtures**
  - Use low-flow toilets

- **Demand for Irrigation**
  - Select plants for drought tolerance

- **Site Planning**
  - Provide for solar access
Groundwater Recharge

The entire project area is situated over a shallow unconfined sand aquifer—25 feet of brown and gray sand—over shale. The design team worked with the civil and geotechnical engineers to perform physical tests on-site to determine the water levels and percolation rate, and worked with a hydrologist who created computer models to determine the likely performance of a system. Analysis included both theoretical and on-site percolation tests to ensure that the system would absorb water from a 100-year storm and that the ongoing process would not affect the substrate of the athletic fields above.

In order to slow the rate of heated stormwater runoff from building roofs, a system of gravel strips was specified and installed around the perimeter of the buildings. The gravel strips are troughs comprised of washed river stone confined by an impermeable membrane with a perforated pipe at their bottom to collect the runoff. In areas where gravel strips could not be utilized, such as building entrances, roof runoff is collected by gutters and downspouts in a traditional method. The collective runoff from the downspouts and gravel strips is directed to catch basins equipped with sumps and
traps. These catch basins allow sediment and debris to settle out of the stormwater where it can be removed from the system during periodic maintenance. The stormwater then travels in solid pipes to a system of manholes and perforated pipes located under the football field. The perforated pipes allow the stormwater to percolate into the sand aquifer over a large area.

The perimeter manholes are designed with a high-overflow system that will divert excess water to a similar distribution system under the baseball field. At the end of the system is an overflow structure that connects to the municipal combined sewer system. Computer simulations and field tests indicate that the system and underlying sand have sufficient capacity to absorb all of the water that is diverted to the system. This is especially important because of the existence of combined sewers (off site) that carry both stormwater and sanitary sewage flows. Eliminating seventy percent of the stormwater runoff from this site will decrease the burden on the existing wastewater-treatment plant during storm events.

Approximately thirty percent of the stormwater runoff from the site could not be diverted and is transported directly to the municipal sewer system. This runoff is primarily from roofs located in areas along the street that could not be connected to the recharge system via gravity sewers.

The recharge system also collects all stormwater runoff from the adjacent parking garage, and from all storm drains in the courtyards. The new synthetic football field has its own drainage system that will divert stormwater to the recharge system, although most water on the field is expected to bypass the collection system and percolate directly into the sand layer below.
Energy

Building Envelope

The first energy-performance strategy of the Village at 115 was to reduce the energy loads for heating and cooling through the design of the building envelope. This design includes additional insulation in a continuous layer on the exterior of the structural walls and roof, additional roof insulation, and a continuous air barrier. Windows and curtain wall are thermally broken with argon-filled low-E insulated glass. All windows are operable in order to maximize free cooling and heating during spring and fall.

- U value of exterior wall . . . . .055
- U value of windows . . . . . . . . .360
- U value of curtain wall . . . . .470
- U value of roof . . . . . . . . . . .037

Heating & Cooling

The original concept for cooling the residential buildings was to build a new central chilled-water plant, and distribute the conditioned water to each of the seven houses. During the sustainability review, this concept was challenged, and a series of studies evaluated a range of options, including central plants using geothermal wells, conventional chillers, and absorption chillers that used the exhaust heat from microturbines and decentralized plants including multiple chillers and package roof-top units at each of the seven houses.
The initial plan for heating was to distribute steam to each house from the university-affiliated MCCO steam system, which generates steam off-site from coal and gas. Alternative studies included the use of geothermal wells, the use of microturbines to heat the buildings, and alternatives for distributing the steam, including converting the steam to hot water in a central location, and distributing the hot water to each house.

Studies of the distribution costs and losses determined a decentralized system was most efficient: large enough to use standard equipment sizes, but small enough to minimize distribution costs. In the final design, hot and chilled water are generated at two central locations. One plant serves the four houses in the south building, and another serves the three houses in the middle and north building. A two-pipe change-over system controlled by outside air temperature is used for both site and building distribution. The system is designed to reduce energy use and loss, and maximize use of free cooling and heating during the “shoulder” seasons of spring and fall.

The team studied options for distribution of conditioned air within the building, including an all-air-ducted system and an all-water/vertical-fan-coil system. These studies considered capital and operational cost, but also considered the impact by, and on, the users. It was determined that a single fan-coil system for each apartment, with ducted air distribution within the apartment, would provide the best balance of occupant versus building control. Occupants can control the supply of conditioned air in their apartment through use of the thermostat, and to their individual rooms by way of a mechanical damper. However, because the temperature of conditioned water serving the fan coils is controlled by outside air temperature, the overall system is less susceptible to abuse. An example is a student going away for the weekend and leaving a window open: An unexpected drop in temperature will cause the local unit to run in response, but the building and site distribution will be unaffected.

**Ventilation**

Energy use was also reduced in the ventilation system. Typically, the minimum rate of air flow for the ventilation system is dictated by the lowest rate that can be measured while balancing the system even though the minimum required by codes for ventilation is much lower. This discrepancy was discovered during the DOE energy analysis by the sustainability consultant. During a brain-storming session with the engineers, sustainability consultant, commissioning agent, and Case’s Facilities Department (which would maintain and operate the system), a system was designed that would provide the higher flows required for testing and balancing, and then use variable-
speed drives to reduce the overall airflow to meet code ventilation minimums for the life of the building. This design saves energy by eliminating the need to temper the additional volume of air.

In addition, an energy recovery unit at each house will transfer latent and sensible heat from exhaust air systems to preheat the outside ventilation air.

Measurement & Verification

A "Measurement & Verification" plan is in place to allow the Facilities Department, faculty researchers and students to analyze the usage of water, electricity, natural gas, and steam and to compare the consumption between buildings within the Village at 115 and other residential buildings on the Case campus. The measurement-and-verification plan will provide comparisons on a monthly and/or yearly basis. This data, as well as additional, continuously compiled data, will be available through an internet-based educational display, and in greater detail on a case-by-case basis for educational and research projects by the Facility Department, students and/or faculty.

The system is tied to a weather station on campus that measures and reports wind speed, temperature, and humidity so that energy use can be directly related to weather conditions.
In the first year of operation, feedback from the monitoring system identified high electrical use at apartment distribution fans. An adjustment to the HVAC control system to run the fans in the apartments intermittently rather than continuously was tested, and then implemented building-wide, and resulted in an immediate energy savings.

### Water and Related Laundry Systems

Water-efficient low-flow sinks and showers and water-efficient front-loaded washing machines are used throughout the facility to reduce amount of water usage and related hot-water demand. The flow rate for each fixture was determined by working with Case Housing to determine the minimum flow that would be acceptable to occupants. High-efficiency gas water heaters with well-insulated storage tanks and recirculation lines are used to conserve natural gas. Natural-gas dryers are interlocked to the Building Automation System to vary the amount of make-up and ventilation air provided to the laundry room based on the actual number of dryers operating at any given time.

On the site, water is conserved by using drip irrigation at areas with extensive ground cover, shrubs and trees in combination with the lawn irrigation, which is zoned to maximize control and minimize use. A synthetic playing surface eliminates the need for any irrigation at the football field, but is pervious to allow any precipitation to...
percolate through the system into the sand. Drought-resistant “buffalo” grass is used in the House 5 courtyard as a test in anticipation of more extensive use during future phases. Seventy percent of the stormwater, including roof runoff and site drainage, is collected on site and distributed through perforated pipes in the existing sand substrate, where it percolates into the groundwater table rather than being drained into municipal storm systems.

**Power and Lighting Design**

The Village public and private (apartment) spaces are designed to maximize light and views. Each house has a living room that opens onto an exterior courtyard. Interior corridors extend to the exterior wall in order to provide views and daylight to interior corridors. Energy use for lighting is also reduced through the use of natural lighting provided by large windows, with light shelves on south and east elevations. Remaining lighting loads are reduced through control and use of energy-efficient fixtures, most of which are fluorescent.

Local motion sensors are used to control all lights (except emergency lights) in bathrooms, exit and house stairs, and corridors. In egress paths, alternate fixtures, or alternate lamps within the fixture, are wired on separate circuits so that emergency lighting systems can operate independently of the motion controlled system.

The control system takes advantage of large windows by dimming the artificial lighting when natural light meets the desired light load.
In the house living room, the lighting-control system allows occupants to set the lighting level in the house living room to a variety of settings. Daylight sensors read the amount of natural daylight, and automatically adjust the light levels of fixtures, based on the current setting at the light-control system.

Electrical distribution is designed to reduce power loss due to lower voltage distribution by using decentralized distribution panels wherever possible. Each house is fed from high-voltage switchgear within the basement of the house. Substations are located in Houses 2, 3, 4, 5, and 6. Houses 1 and 2 share a substation, and Houses 6 and 7 share a substation. The substation in House 3, which has a back-up emergency generator, also feeds all systems in all houses that would require emergency power or standby power. Within each house, power is distributed directly to a power and lighting panel within the suite.

### Strategies for Reduced Power Consumption

- **Cooling Systems**  
  — Commission the HVAC system

- **Daylighting for Energy Efficiency**  
  — Use building elements to redirect daylight and control glare  
  — Daylight sensors tied to lighting control dimmer system

- **Lighting Controls**  
  — Use occupancy sensors

- **Hot Water Loads**  
  — Use water-efficient faucets

- **HVAC Distribution Systems**  
  — Size fans and pumps properly to meet the loads

- **HVAC Controls and Zoning**  
  — Provide sufficient sensors and control logic  
  — Use direct digital control (DDC) system
Microturbine Absorption Chiller Cogeneration System

Investigation of the MTAC (Microturbine absorption chiller cogeneration) system continued through the design and document phase, and was eventually bid as an alternate for one of the houses. This technology uses gas-fired turbine engines to generate electricity and exhaust heat. The heat is captured for heating during the winter, and fires an absorption chiller during the summer.

Although the system looked promising, it proved to be not practical on this project for a number of reasons. First, Case was uncomfortable with the potential risk of using new technology to heat residential buildings, and wanted a complete backup heating system. Second, because the University paid very competitive rates for steam, but relatively higher rates for gas, the best scenario was a payback period of 50 years, longer than the life of the equipment. The worst-case scenario was that Case would pay a premium—the system would cost more to operate than the conventional system.

Determining the payback proved to be a complicated and hypothetical process. The MTAC would require supplemental steam during the summer for the absorption chillers, and would generate some, but not all, electricity required by the buildings. The payback period would be affected by future cost of steam, gas and electricity.

The cost of energy on a project this size had tremendous impact, and the difference between five cents and ten cents for gas or electricity made the difference between breaking even and a loss. The steam generated near campus was fired by coal, but the future changeover to gas would make it both cleaner and more expensive.

Because the university valued the research, publicity and educational benefits, they chose to bid the MTAC system as an alternate, and investigate potential grants and other supplemental funding. The final blow was that the cost was substantially higher than estimated, in part because the subcontractors were unfamiliar with the system and with the potential costs.

Although the system was not used, all parties became more familiar with a system that had the potential to be economical under different circumstances. The same system has been used with great success at the YMCA in Angola, Indiana, where the swimming pool provides more constant use of the heat, funding and grants were available, the local utility rates were more favorable, and the local electrical company bought back excess electricity.
Materials and Construction

Case Western has a commitment to their campus that encouraged the selection of materials with a long life, such as copper and slate roofs, the concrete structure, and high-impact wallboard. In addition, the suites were designed to provide a measure of flexibility that would allow them to be subdivided into smaller units. For example, eight-bedroom duplexes for sophomores can be converted into two four-bedroom flats for upperclassmen. As apartments, they can easily be converted to rental units or condominiums for faculty or others. Interior partitions are non-load-bearing, and the fan-coil system allows easy modification within a suite.

Although the brick and slate used for the exterior of the Village are very traditional in appearance, they were carefully selected from locally available materials. Poured-in-place concrete was selected for the structural system due to the availability of local materials and familiarity of local tradesmen with the system, thus reducing shipping and off-site manufacturing costs, and providing a durable, long-lasting system. In addition, recycled fly ash was used in the production of the concrete, and concrete washed out from the trucks was also collected and recycled for aggregate. Brick, the single most aesthetically important exterior element, was selected from a range of locally available material, reducing both shipping time and cost. Overall, 32% of the building materials were regionally harvested and 44% were regionally manufactured.
The interiors are residential in character, with extensive use of wood paneling and trim, and a variety of carpet patterns and paint colors. From the ceiling tiles to the carpet, selections were made to maximize recycled content—10% overall—and minimize volatile organic compounds (VOC). Of these, the greatest challenge was to find a carpet that had recycled content, was durable and also offered a variety of colors and patterns. The final selection resulted in two manufacturers with carpeting that both had recycled content (24–25%) and was locally manufactured (within a 500-mile radius from the construction site).

### Strategies for Sustainable Construction

- **Job Site Recycling**
  - Require a waste-management plan from the contractor
  - Investigate local infrastructure for recycling

- **Recycling by Occupants**
  - Specify recycling receptacles that are accessible to the occupants
  - Design a physical in-house recycling system

- **Toxic Upstream or Downstream Burdens**
  - Use true linoleum flooring

- **Pre-Consumer Recycled Materials**
  - Use recycled materials as aggregate in the concrete
  - Specify carpet made with recycled-content face fiber
  - Use recycled-content rubber flooring

- **Greenhouse Gas Emissions from Manufacture**
  - Use concrete with fly ash replacing a portion of the cement

- **Transportation of Materials**
  - Prefer materials that are sourced and manufactured within the local area
Indoor Environment

The interiors are designed to be warm and welcoming, and to encourage social and intellectual interaction. Behind the scenes, the buildings are designed to provide a healthy environment. Paints, adhesives, and wood composites were all selected to meet low-VOC criteria, and selections were monitored during submittal process and construction to ensure that the criteria were met. The buildings were monitored during construction to minimize the introduction of dirt and dust into mechanical systems, and the buildings’ ventilation systems were flushed prior to occupancy.

Strategies for a Healthy Environment

- **Entry of Pollutants**
  —Design entry to facilitate removal of dirt before entering building

- **Ventilation and Filtration Systems**
  —Provide occupants with access to operable windows

- **Thermal Comfort**
  —Use glazing with a low solar-heat-gain coefficient
  —Provide occupants with the means to control temperature in their area

- **Visual Comfort and Light Sources**
  —Use electronic ballasts with fluorescent lighting
  —Provide occupants with control of light in their area
  —Provide illumination sensor

- **Reduction of Indoor Pollutants**
  —Use only very low- or no-VOC paints
Ratings

The Village at 115 as a whole was designed with a goal of obtaining a LEED Silver rating. The middle building, which has additional features—such as drought-resistant landscaping and lighting controls for measurement and verification—that may allow it to reach a higher rating, was submitted in 2007 for certification with the U.S. Green Building Council LEED-NC, v.2.1, with a goal of Gold (41 points), as rated below:

- **Sustainable Sites, 8 of 14 possible points**
  - SS Prerequisite 1, Erosion & Sedimentation Control
  - SS Credit 1, Site Selection
  - SS Credit 2, Urban Redevelopment
  - SS Credit 4.1, Alternative Transportation, Public Transportation Access
  - SS Credit 4.2, Alternative Transportation, Bicycle Storage & Changing Rooms
  - SS Credit 5.1, Reduced Site Disturbance, Protect or Restore Open Space
  - SS Credit 6.1, Stormwater Management, Rate and Quantity
  - SS Credit 7.1, Landscape & Exterior Design to Reduce Heat Islands, Non-Roof
  - SS Credit 7.2, Landscape & Exterior Design to Reduce Heat Islands, Roof

- **Water Efficiency, 3 of 5 possible points**
  - WE Credit 1.1, Water Efficient Landscaping, Reduce by 50%
  - WE Credit 3.1, Water Use Reduction, 20% Reduction
  - WE Credit 3.2, Water Use Reduction, 30% Reduction

A program to monitor and verify operation, and make adjustments, is part of Case's ongoing commitment to operating a sustainable village.
• **Energy and Atmosphere, 9 of 17 possible points**
  — EA Prerequisite 1, Fundamental Building Systems Commissioning
  — EA Prerequisite 2, Minimum Energy Performance
  — EA Prerequisite 3, CFC Reduction in HVAC&R Equipment
  — EA Credit 1.1-1.10, Optimize Energy Performance
  — EA Credit 3, Additional Commissioning
  — EA Credit 4, Ozone Depletion
  — EA Credit 5, Measurement and Verification

• **Materials and Resources, 5 of 13 possible points**
  — MR Prerequisite 1, Storage & Collection of Recyclables
  — MR Credit 2.1, Construction Waste Management, Divert 50%
  — MR Credit 4.1, Recycled Content: 5% (post-consumer + 1/2 post-industrial)
  — MR Credit 4.2, Recycled Content: 10% (post-consumer + 1/2 post-industrial)
  — MR Credit 5.1, Local/Regional Materials, 20% Manufactured Locally
  — MR Credit 5.2, Local/Regional Materials, of 20% Above, Harvested Locally

• **Indoor Environmental Quality, 11 of 15 possible points**
  — EQ Prerequisite 1, Minimum IAQ Performance
  — EQ Prerequisite 2, Environmental Tobacco Smoke (ETS) Control
  — EQ Credit 3.1, Construction IAQ Management Plan, During Construction
  — EQ Credit 3.2, Construction IAQ Management Plan, Before Occupancy
  — EQ Credit 4.1, Low-Emitting Materials, Adhesives & Sealant
  — EQ Credit 4.2, Low-Emitting Materials, Paints
  — EQ Credit 4.3, Low-Emitting Materials, Carpet
  — EQ Credit 4.4, Low-Emitting Materials, Composite Wood
  — EQ Credit 5, Indoor Chemical & Pollutant Source Control
  — EQ Credit 6.1, Controllability of Systems, Perimeter
  — EQ Credit 7.1, Thermal Comfort, Comply with ASHRAE 55-1992
  — EQ Credit 8.1, Daylight & Views, Daylight 75% of Spaces
  — EQ Credit 8.2, Daylight & Views, Views for 90% of Spaces

• **Innovation and Design Process, 5 of 5 possible points**
  — ID Credit 1.1, Innovation in Design “Integrated Pest Management”
  — D Credit 1.2, Innovation in Design “Ground Water Recharge”
  — ID Credit 1.3, Innovation in Design “Educational Display”
  — ID Credit 1.4, Innovation in Design “Exemplary Performance in Recycled Content and Local Materials”
  — ID Credit 2, LEED® Accredited Professional
Lessons

The design of the Village at 115 benefited from the commitment of all team members early in the design and construction process. Although many of the more exciting early concepts, such as the microturbine absorption chiller cogeneration system, ultimately did not prove feasible, the very process of exploring and designing the system expanded everyone’s understanding of both conventional and new systems, and the impact of design on energy consumption, and resulted in a better project. Buro Happold and Steven Winter Associates worked with Bard Rao and Athanas to develop options for mechanical systems, and then to fine-tune those systems to provide the optimum performance. H.F. Lenz Company provided comment and critique during design, and challenging commentary during construction that ensured that the final product met the intent of the designers. During all phases, the Owner and Construction Manager were committed to and contributed to the exploration of sustainable ideas, ranging from consideration of fuel cells (by Owner) to recycling concrete waste (by CM). This teamwork, which encouraged contributions from different perspectives, was critical to the success of the project. One lesson learned: It is never too early for participants to get involved.

The early commitment to incorporating sustainability during the construction and operation of the Village at 115 allowed the project team to thoroughly investigate and appreciate the potential benefits, limitations and tradeoffs associated with the many types of conventional and innovative building systems.
Awards & Recognition

The Village at 115 has been recognized with an Honor Award for Excellence in Campus Planning, bestowed jointly by the Society for College and University Planning and the American Institute of Architects Committee on Architecture for Education. In addition the project won a 2007 Golden Trowel Award for Brick from the Ohio Chapter of the International Masonry Institute.

Learn More

For more information on real-time energy use at the Village at 115, click on “Village at 115 Real Power Graph” at http://www.case.edu/finadmin/plantsrv/

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