

Grand Valley State University Guidelines LEED-NC v2.2

Based on the Application Guide for Multiple Buildings
and On-Campus Building Projects (AGMBC)

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Purpose:

Provide Design & Construction Guidance for Project Teams that is educational and provides implementation strategies that:

- are consistent with the Grand Valley State University development principles.
- are in conformance with Leadership in Energy and Environmental Design-NC v2.2 (LEED-NC) requirements.
- are in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC).
- streamline the LEED-NC certification process for all projects on the GVSU Allendale, Michigan (main) campus.

*Leadership in Energy and Environmental Design

Principles of Development:

EDUCATE: Students are to shape their:

- Lives – Lifestyles
- Professions
- Societies

Provide opportunities for students & faculty to use the campus buildings, grounds and operations as learning tools. Students have worked on the management of waste with *Hospitals for a Healthy Environment (H2E)* to develop computer software that is designed to assess, track and divert campus waste. Other collaborative student ventures might include plans or policies for:

- Purchasing
- Waste Management
- Landscape Management
- Transportation Management
- Performance Benchmarking & Tracking – Indoor Air Quality, Energy, etc.

OPTIMIZE: The learning environment should enhance health & well-being via:

- Daylight & Views
- Indoor Air Quality
- Acoustics

Research studies have demonstrated that students have higher test scores and that absenteeism is reduced in daylight classrooms. Good indoor air quality also plays a major role in optimizing learning environments. The University should establish Construction and Operations strategies and requirements that will enhance the health and well-being of the campus community.

CHANGE:

- Measure
- Assess
- Implement:
 - Climate Change/Global Warming, CO2 emission reductions
 - Resource efficiency – Water, Energy, Waste
 - Whole Systems Integration Approach
 - Sustainability/triple-bottom-line approach – economic, environmental & social equity
 - Transportation Metrics
 - Habitat and Hydrological Restoration/Preservation

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Guidelines

Introduction:

The purpose of these guidelines is to provide direction in applying the LEED Green Building Rating System for New Construction (LEED-NC 2.2) to projects at Grand Valley State University's main campus in Allendale, Michigan.

The AGMBC facilitates using LEED-NC as a performance standard for greening the design of a building or set of buildings within a campus setting. The AGMBC provides an opportunity for building owners to reduce the environmental impact of buildings by approaching green building in a broad context. Opportunities for reducing environmental impact may be spread over several buildings, a complex of buildings or an entire campus. Credits are available to each building that benefits from the shared amenities. This approach allows for economies of scale, enabling more opportunities to reduce the environmental impact of buildings and infrastructure.

This document complements the LEED-NC Building Rating System and the LEED-NC Reference Guide. This document should be used as a working document that is referenced frequently throughout the design process.

Credit discussion begins on Page 6. At Grand Valley State University (Allendale Campus), these Prototype LEED credits have been identified:

- A. These credits exploit the amenities available at campus building sites and the commitment GVSU has made to operational sustainability. These credits are the core of the standard credits to be achieved by all campus projects.
 - SSp1 Construction Activity Pollution Prevention
 - SSc1 Site Selection
 - SSc4.1 Alternative Transportation: Public Transportation Access
 - SSc5.1 Site Development: Protect and Restore Habitat
 - SSc5.2 Site Development: Maximize Open Space
 - SSc6.1 Stormwater Design: Quantity Control
 - SSc7.2 Heat Island Effect: Roof
 - SSc8 Light Pollution Reduction
 - WEc1.1 Water-Efficient Landscaping: Reduce by 50%
 - ID Credit Public Education
 - ID Credit Green Housekeeping

- B. Additional Credits. These credits are to be achieved in addition to the Prototype Credits when required as a part of the campus standard and/or when the building program is compatible with each of these credits. Each will be identified and discussed with respect to achievement at the GVSU campus.

The Certification Process for Multiple Buildings and within Campus Settings:

A project team utilizing this process simply registers its project under the standard LEED-NC program. A project already registered can choose to use the Application Guide at any time before certification submittal, but should do so as early as possible during the pre-design or design stage.

There are three approaches to certifying buildings in the campus or installation setting: at GVSU, Option 3 will be followed:

Option 1: Certifying a new building within a setting of existing buildings that are considered a campus; i.e., there is one owner or common property management and control.

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Option 2: Certifying a group of new buildings as a package where the entire building set will be rated as a package and only one rating received. These buildings may constitute the entire campus or be a subset of an existing campus.

Option 3: Certifying new buildings where each new building is constructed to a set of standards but will receive an independent rating based on achievement of credits beyond the standards specific to that building. These buildings may constitute the entire campus or be a subset of an existing campus.

Many campus-build entities establish design standards (e.g., campus master plans and specifications) that will be applied repeatedly to new buildings. These elements may be site- or building-specific. The campus-build process allows applicants to certify a prototype (or master plan) credit set that is intended for repetition on subsequent projects. The total credits beyond the standards may vary from building to building. Project teams will be permitted to designate prerequisites as prototypes.

Certification Review for the First Project: USGBC shall conduct a thorough and complete review of the first project, including prototype credits.

Certification Reviews For Subsequent Project(s): Subsequent projects shall be reviewed per the current process. It will be at the discretion of the review team whether or not a prototype credit will be selected as one of the up to six for audit. These projects will not be required to submit documentation on approved prototype prerequisites/credits unless selected for audit in the Preliminary LEED Review.

Potential Prototype Projects:

These projects currently under construction on the Allendale Campus may be able to use Prototype Credits approved

- LEED-NC v2.2 Student Housing 2008 and Honors College (2008)
- LEED-NC v2.2 2008 New Academic Building (2008)
- LEED-NC v2.2 Movement Sciences and Indoor Recreational Facility (2008)
- LEED-NC v2.2 Kirkhof Center Addition (2008)

Planning and Design Standards for new projects:

Intent

Provide design consultants with a descriptive tool that both educates and helps them implement sustainable design and construction features in their proposed design solutions.

Planning and Design Standards benefit the LEED-NC certified projects for two important reasons: First, the Standards will help design consultants and construction managers design and build sustainable buildings and adopt green building practices; second, the Standards will help in coordinating other LEED certifications, such as LEED for Existing Buildings.

Requirements

Publish a document that provides design consultants and construction managers with design and construction information that:

- Provides a description of the sustainable design and construction features incorporated in the project and delineates the project intent with respect to sustainability goals and objectives.

Strategies

- Provide a copy of Planning and Design Standards to design consultants and construction manager candidates.

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Credit Discussion

This section identifies several credits available and further identifies a set of Prototype Credits to be available at the Allendale, Michigan, campus of Grand Valley State University.

Once these Prototype Credits are approved for the Allendale campus, subsequently registered LEED projects wishing to include these credits in their applications need do so only by reference.

A registered applicant is eligible to request a Credit Interpretation Ruling (CIR) to determine whether a unique application of credit requirements maintain credit eligibility.

SUSTAINABLE SITES (SS) CREDITS

•SS Prerequisite 1: Construction Activity Pollution Prevention (Prototype Credit)

Intent

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.

Requirements

Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project. The ESC Plan shall conform to the erosion and sedimentation requirements of the Ottawa County Drain Commissioner.

The Plan shall describe the measures implemented to accomplish the following objectives:

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams.
- Prevent polluting the air with dust and particulate matter.

AGMBC Submittal Guidance

- Provide a central control plan for the entire GVSU Allendale campus that can be modified for each project.

Strategies (see the Erosion and Sedimentation Control Plan in the Appendix)

- Create an Erosion and Sedimentation Control Plan during the design phase of the project. Employ strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps and sediment basins.
- All GVSU projects must comply with this requirement. The Ottawa County Drain Commission's erosion and sedimentation control standards and codes are at least as stringent as 2005 EPA requirements.

•SS Credit 1: Site Selection (Prototype Credit)

Intent

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

Requirements

Locate project on property that meets all the tests identified in the LEED Reference Guide.

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The Allendale campus property was purchased in 1955 and development began in the 1960s. Part of the definition of prime farmland, as established by the United States Department of Agriculture in 1984, includes the distinction that the property must be available for farm uses, and cannot consist of urban built-up land. The existing campus property includes built-up land and cannot be classified as prime farmland. For properties purchased by GVSU since 1984 that currently consist of farmland, design consultants must research the existing site characteristics to determine applicability (see Appendix J – Campus Map).

•SS Credit 2: Development Density and Community Connectivity

Intent

Channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.

This credit does not apply to the GVSU Allendale campus. GVSU is not sited in an area with significant existing development density or community connectivity.

•SS Credit 3: Brownfield Redevelopment

Intent

Rehabilitate damaged sites where development is complicated by environmental contamination, reducing pressure on undeveloped land.

This credit does not apply to the GVSU Allendale campus.

•SS Credit 4.1: Alternative Transportation: Public Transportation Access (Prototype Credit)

Intent

Reduce pollution and land development impacts from automobile use.

A narrative, map, and shuttle schedule are required to meet the criteria set forth in the Reference Guide.

Requirements

Locate project within 1/4 mile of one or more stops for two or more public or campus bus lines usable by building occupants.

AGMBC Submittal Guidance

- Provide a central public transportation plan for the entire GVSU Allendale campus that can accommodate each project.

Strategies

- Perform a transportation survey of future building occupants to identify transportation needs.

•SS Credit 4.2: Alternative Transportation: Bicycle Storage & Changing Rooms

Intent

Reduce pollution and land development impacts from automobile use.

Requirements

CASE 1

For commercial or institutional buildings with a total gross square footage of less than 300,000 sq. feet, provide secure bicycle racks and/or storage (within 200 yards of a building entrance) for 3% or more of all building users (calculated on average for the year), AND, provide shower and changing facilities in the building, or within 200 yards of a building entrance, for 0.5% of Full-Time Equivalent (FTE) occupants.

CASE 2

For projects with a total gross square footage greater than 300,000 sq feet, provide secure bicycle storage for 3% of the occupants for up to 300,000 sf, then an additional 0.5% for the occupants for the space over 300,000 sf. Mixed-use buildings with a total gross square footage greater than 300,000 sq feet must apply this calculation for each use in the building. AND, provide shower and changing facilities in the building, or within 200 yards of a building entrance, for 0.5% of Full-Time Equivalent (FTE) occupants.

CASE 3

For residential buildings or the residential portion of a mixed-use building, provide covered storage facilities for securing bicycles for 15% or more of building occupants in lieu of changing/shower facilities.

AGMBC Submittal Guidance:

- Provide central bicycle storage and changing facility plans for the entire GVSU Allendale campus that can be modified for each project.

Strategies (see the Transportation Management Plan Sample in the Appendix)

- CASES 1 and 3 are the primary application for the entire GVSU Allendale campus but three cases may apply to depending on the project size and type.
- Provide occupants separate dedicated bicycle storage and shower/changing facilities.
 - To comply with the intent of this credit it is possible to minimize the number of dedicated showers required by providing a written policy that ensures employee access to health club showers or other such shared facilities if available in the future on the GVSU Site.
- Provide student guidance or website that provides strategies for bicycle commuting, and a regional map.
- AGMBC: Place bicycle storage facilities within 50 feet of frequently used entrances. Transient occupancy is to be included when calculating bicycle storage capacity. Consider using a uniquely designed bike rack that can be easily recognized throughout the campus.
- Consider submitting a CIR to gain approval for centralized campus showers even when 200+ yards away. This may be a practical application to a university campus. Consider strategies for users that enable sharing common accommodations.

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•SS Credit 4.3: Alternative Transportation: Low Emitting & Fuel-Efficient Vehicles

Intent

Reduce pollution and land development impacts from single occupancy vehicle use.

Requirements

OPTION 1

Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total vehicle parking capacity of the site.

OR

OPTION 2

Install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site (liquid or gaseous fueling facilities must be separately ventilated or located outdoors).

AGMBC Submittal Guidance:

- Each building is to provide project-specific data.

Strategies

- Provide preferred parking for alternative-fuel vehicles both for building occupants and the transient population. Consider establishing an agreement with a local commercial alternative fueling supplier sharing the costs and benefits of refueling stations for students, staff and faculty.
- Fleet purchases of fuel may be considered to gain sufficient purchasing leverage to encourage a local fueling station near the GVSU Allendale campus site to provide alternative fuels such as ethanol or biodiesel.
- Consider offering incentive programs for participating staff.
- **AGMBC:** Centralized parking may more readily accommodate 5% preferred parking for low-emitting fuel efficient vehicles.

•SSc4.4: Alternative Transportation: Parking Capacity

Intent

Reduce pollution and land development impacts from single occupancy vehicle use.

Requirements

OPTION 1 — NON-RESIDENTIAL

- Size parking capacity to not exceed, minimum local zoning requirements,
- AND, provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.

OR

OPTION 2 — NON-RESIDENTIAL

For projects that provide parking for less than 5% of FTE building occupants:

- Provide preferred parking for carpools or vanpools, marked as such, for 5% of total provided parking spaces.

OR

OPTION 3 — RESIDENTIAL

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- Size parking capacity to not exceed minimum local zoning requirements, AND, provide infrastructure and support programs to facilitate shared vehicle usage such as carpool drop-off areas, designated parking for vanpools, or car-share services, ride boards and shuttle services to mass transit.

OR

OPTION 4 — ALL

Provide no new parking.

AGMBC Submittal Guidance

- **OPTION 1:** No applicable zoning requirements exist. Each building is to provide project-specific data.

Strategies

- Minimize parking lot/garage size.
- Consider sharing parking facilities with adjacent buildings.
- Consider consolidation of parking under buildings or in multilevel parking structures to minimize the construction footprint, stormwater infrastructure, parking lot maintenance costs and increase the potential for site density and open space.
- Provide a Transportation Management Plan with alternatives to the use of single occupancy vehicles.

**•SSc5.1: Site Development: Protect and Restore Habitat
(Prototype Credit)**

Intent

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements

On greenfield sites, limit all site disturbance to 40 feet beyond the building perimeter; 10 feet beyond surface walkways, patios, surface parking and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

OR

On previously developed or graded sites, restore or protect a minimum of 50% of the site area (excluding the building footprint) with native or adapted vegetation. Native/adapted plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Note: At the Pew Campus in Grand Rapids, consideration should be given to projects earning LEED SS Credit 2. Using vegetated roof surfaces may apply the vegetated roof surface to the credit calculation if the plants meet the definition of native/adapted.

AGMBC Submittal Guidance

- Enter aggregate data in the submittal template as appropriate.

Strategies (see the Green Site Management Plan in the Appendix)

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- The use of a vegetative roof system for SSc7.2 may contribute to the achievement of this credit strategy.
- An Innovation in Design (ID) point may be earned for this credit if a minimum of 75% of the site area is restored or protected (excluding the building footprint) with native or adapted vegetation on previously developed or graded sites.
- Civil Engineering consultant can provide documentation for this strategy to assess whether the entire GVSU Allendale campus can be used to demonstrate compliance vs. the site-by-site approach. With proper landscaping materials, it appears this calculation can be used by all projects as a prototype credit.
- **AGMBC:** Consider aggregating any restored previously degraded parts of the site as larger areas for habitat.

•SSc5.2: Site Development: Maximize Open Space (Prototype Credit)

Intent

Provide a high ratio of open space to development footprint to promote biodiversity.

Requirements

OPTION 1

Reduce the development footprint (defined as the total area of the building footprint, hardscape, access roads and parking) and/or provide vegetated open space within the project boundary to exceed the local zoning's open space requirement for the site by 25%.

OR

OPTION 2

For areas with no local zoning requirements (e.g., some university campuses, military bases), provide vegetated open space area adjacent to the building that is equal to the building footprint.

OR

OPTION 3

Where a zoning ordinance exists, but there is no requirement for open space (zero), provide vegetated open space equal to 20% of the project's site area.

ALL OPTIONS:

- For projects located in urban areas that earn SS Credit 2, vegetated roof areas can contribute to credit compliance.
- For projects located in urban areas that earn SS Credit 2, pedestrian oriented hardscape areas can contribute to credit compliance. For such projects, a minimum of 25% of the open space counted must be vegetated.
- Wetlands or naturally designed ponds may count as open space if the side slope gradients average 1:4 (vertical: horizontal) or less and are vegetated.

AGMBC Submittal Guidance

- Enter aggregate data in the submittal template for multiple buildings.
- Provide documentation demonstrating the percentage of the site that has been conserved or restored in a natural state for the life of the buildings.

Strategies

- Perform a site survey to identify site elements and adopt a master plan for development of the project site.

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- Select a suitable building location and design the building with a minimal footprint to minimize site disruption and to optimize open space and natural landscape.
- Strategies include stacking the building program, tuck-under parking and sharing facilities with neighboring buildings to maximize open space on the site.
- An Innovation in Design (ID) point may be earned for this credit by projects that demonstrate that they have doubled the amount of required open space required for credit achievement.
- Dedicate a percentage of the entire GVSU Allendale campus to be conserved or restored in a natural state for the life of the buildings. A portion of this space can be attributed to each site or a composite of all sites may be considered for a common compliance strategy for all projects.
- The Civil Engineering consultant should provide documentation for this strategy to assess whether the entire GVSU Allendale campus can be used to demonstrate compliance vs. the site-by-site approach. With proper landscaping materials, it appears this calculation can be used by all projects as a prototype credit.

Resources

Lady Bird Johnson Wildflower Center Native Plant Database

The Lady Bird Johnson Wildflower Center website educates people about the environmental necessity, economic value, and natural beauty of native plants. The Native Plant Information Network has a diverse array of scientifically accurate native plant materials and resources.

www.wildflower.org

Michigan Department of Natural Resources – Michigan Native Plant Species

www.michigan.gov/dnr/0,1607,7-153-10370_12146_12213---,00.html

•SSc6.1: Stormwater Design: Quantity Control (Prototype Credit)

Intent

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration and managing stormwater runoff.

Requirements

OPTION 1 — EXISTING IMPERVIOUSNESS IS LESS THAN OR EQUAL TO 50%

Discharge Rate and Quantity

Implement a stormwater management plan that prevents the post-development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity for the one- and two-year 24-hour design storms.

OR

Stream Channel Protection

Implement a stormwater management plan that protects receiving stream channels from excessive erosion by implementing a stream channel protection strategy and quantity control strategies.

OR

OPTION 2 — EXISTING IMPERVIOUSNESS IS GREATER THAN 50%

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Implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the two-year 24-hour design storm.

AGMBC Submittal Guidance

- Enter aggregate data in the Submittal Template.
- Demonstrate that centralized stormwater management strategies using “distributed technologies” achieve credit performance requirements.

Strategies (see the Stormwater Management Plan Sample in the Appendix)

- Design the project site to maintain natural stormwater flows by promoting infiltration.
- Specify vegetated roofs, pervious paving, and other measures to minimize impervious surfaces.
- Reuse stormwater volumes generated for landscape irrigation.
- Provide a master plan for stormwater management for the entire GVSU Allendale campus. This provides economy of scale and affords greater opportunities for clustering buildings, increasing natural settings and applying distributed management techniques cost effectively.
- The master plan should address how the phasing of projects will be accommodated
- The Civil Engineering consultant should prepare documentation for this strategy to assess whether the entire GVSU Allendale campus can be used to demonstrate compliance vs. the site by site approach. With the proper application of landscaping strategies and reuse of stormwater for irrigation, it appears this calculation can be used by all projects as a prototype credit.

•SSc6.2: Stormwater Design: Quality Control

Intent

Reduce or eliminate water pollution by reducing impervious cover, increasing on-site infiltration, eliminating sources of contaminants, and reducing pollution from stormwater runoff.

Requirements

Implement a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and treats the stormwater runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).

AGMBC Submittal Guidance

- Aggregate data for the entire GVSU Allendale campus will not be compiled. Each building is to provide project-specific data.

Strategies (see the Stormwater Management Plan Sample in the Appendix)

- Use alternative surfaces (e.g., vegetated roofs, pervious pavement or grid pavers) and nonstructural techniques (e.g., rain gardens, vegetated swales, disconnection of imperviousness, rainwater recycling) to reduce imperviousness and promote infiltration thereby reducing pollutant loadings.
- Use sustainable design strategies (e.g., Low Impact Development, Environmentally Sensitive Design) to design integrated natural and mechanical treatment systems such as constructed wetlands, vegetated filters, and open channels to treat stormwater runoff.
- Provide a master plan for storm water management for the entire GVSU Allendale campus. This provides economy of scale and affords greater opportunities for clustering buildings, increasing natural settings and applying distributed management techniques cost effectively.
- The master plan is to address how the phasing of projects will be accommodated

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- The Civil Engineering consultant should prepare documentation for this strategy to assess whether the entire GVSU Allendale campus can be used to demonstrate compliance vs. the site by site approach. With the proper application of landscaping strategies and reuse of stormwater for irrigation it appears this calculation can be used by all projects as a prototype credit.

Whole Building Design Guide (WBDG)

The WBDG web-based portal provides practitioners with one-stop access to up-to-date information on a wide range of building-related guidance, criteria, and technology from a whole-building perspective. A portion of the site describes a Low Impact Development (LID). This is an alternative site design strategy that uses natural and engineered infiltration and storage techniques to control storm water where it is generated.

<http://www.wbdg.org/design/lidtech.php>

•SSc7.1: Heat Island Effect: Non-Roof

Intent

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirements

OPTION 1

Provide any combination of the following strategies for 50% of the site hardscape (including roads, sidewalks, courtyards and parking lots):

- Shade (within 5 years of occupancy)
- Paving materials with a Solar Reflectance Index (SRI)² of at least 29
- Open grid pavement system

OR

OPTION 2

Place a minimum of 50% of parking spaces under cover (defined as under ground, under deck, under roof or under a building). Any roof used to shade or cover parking must have an SRI of at least 29.

AGMBC Submittals Guidance

- Aggregate data for the entire GVSU Allendale campus will not be compiled. Each building is to provide project-specific data.

Strategies

- These strategies, though laudable, will in most cases add cost to projects within the entire GVSU Allendale campus site. The potential for favorable economic benefits is greater for projects in high-density urban areas. Although projects may not choose to pursue this credit some strategies are cost-neutral and may be worth consideration.
- Shade constructed surfaces on the site with landscape features and utilize high-reflectance materials for hardscape.
- Consider replacing constructed surfaces (i.e., roof, roads, sidewalks, etc.) with vegetated surfaces such as vegetated roofs and open grid paving or specify high-albedo materials to reduce the heat absorption.
- Consider undercover parking.

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•SSc7.2: Heat Island Effect: Roof
(Prototype Credit)

Intent

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirements

OPTION 1

Use roofing materials having a Solar Reflectance Index (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface.

OR

OPTION 2

Install a vegetated roof for at least 50% of the roof area.

OR

OPTION 3

Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria:

$$(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) \geq \text{Total Roof Area}$$

ROOF Type	SLOPE	SRI Required
Low-Sloped Roof	≤ 2:12	78
Steep-Sloped Roof	> 2:12	29

AGMBC Submittals Guidance

- Aggregate data for the entire GVSU Allendale campus will not be compiled. Each building is to provide project specific data.

Strategies

- Consider installing high-albedo and/or vegetated roofs to reduce heat absorption. Provide specifications for any vegetative roof system used at the GVSU Allendale Campus and reflective roof systems for other projects on the site.
- An Innovation in Design (ID) Credit can be earned if 100% of the project's roof area is comprised of a green roof system.
- The use of a vegetative roof system to achieve this credit may enhance energy efficiency as well as contributing to the achievement of other credits such as SSc5 & SSc6.

Resources

Michigan State University - Vegetative Green Roof Research Program

<http://www.hrt.msu.edu/greenroof/index.htm>

Vegetative Roof Independent Clearinghouse

<http://www.greenroofs.com>

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•SSc8: Light Pollution Reduction
(Prototype Credit)

Intent

Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction and reduce development impact on nocturnal environments.

Requirements

AGMBC: Develop an exterior lighting master plan that includes the project site and surrounding buildings in a comprehensive manner addressing the safety and security issues of the entire GVSU Allendale campus by sharing exterior lighting amenities while minimizing light pollution and energy consumption. The lighting master plan must show that it incorporates the credit requirements as well as the following:

- How the plan will reduce light trespass and night sky access and the specific projects fit with the overall design.
- How safety, security and comfort will be enhanced by the use of the master plan.

FOR INTERIOR LIGHTING

All non-emergency interior lighting, with a direct line of sight to any openings in the envelope (translucent or transparent), shall have its input power reduced (by automatic device) by at least 50% between the hours of 11 p.m. and 5 a.m. After-hours override may be provided by a manual or occupant-sensing device, provided that the override lasts no more than 30 minutes.

OR

All openings in the envelope (translucent or transparent) with a direct line of sight to any non-emergency lighting shall have shielding (for a resultant transmittance of less than 10%) that will be controlled/closed by an automatic device between the hours of 11 p.m. and 5 a.m.

AND

FOR EXTERIOR LIGHTING

Only light areas as required for safety and comfort. Do not exceed 80% of the lighting power densities for exterior areas and 50% for building facades and landscape features as defined in ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.

All projects shall be classified under one of the following zones, as defined in IESNA RP-33, and shall follow all of the requirements for that specific zone:

LZ1 — Dark (Park and Rural Settings)

LZ2 — Low (Residential areas)

LZ3 — Medium (Commercial/Industrial, High-Density Residential) GVSU Designation

Design exterior lighting so that all site- and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal footcandles 15 feet beyond the site. Document that no more than 5% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

LZ4 — High (Major City Centers, Entertainment Districts)

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AGMBC Submittal Guidance

- Provide an exterior lighting master plan that addresses the project site and buildings and infrastructure showing how overall light pollution is reduced.
- Provide a design narrative from the responsible party that demonstrates what measures have been implemented for the registered LEED buildings to meet the provisions of the exterior lighting master plan at the entire GVSU Allendale campus site.
- Use the LZ3 zone designation for the GVSU Allendale campus site calculations.

Strategies

- Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution.
- Minimize site lighting where possible and model the site lighting using a computer model.
- Consider technologies to reduce light pollution such as full-cutoff luminaires, low-reflectance surfaces and low-angle spotlights.

WATER EFFICIENCY (WE) CREDITS

•WE Credit 1.1: Water Efficient Landscaping: Reduce by 50% (Prototype Credit)

Intent

Limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

Requirements

Reduce potable water consumption for irrigation by 50% from a calculated mid-summer baseline case. Reductions shall be attributed to any combination of the following items:

- Plant species factor
- Irrigation efficiency
- Use of captured rainwater
- Use of recycled wastewater
- Use of water treated and conveyed by a public agency specifically for non-potable uses

AGMBC Submittal Guidance

- Design landscaping with climate-tolerant plants that can survive on natural rainfall quantities after initial establishment.
- Coordinate land contours with the Stormwater Management Plan to direct rainwater retention and runoff through the site to give vegetation an additional water supply. Minimize the amount of site area covered with turf, and coordinate with the Green Site Management Plan for use of such techniques as mulching, alternative mowing and composting to maintain plant health.
- Coordinate with the Stormwater Management Plan to identify non-potable sources of water for irrigation.

Strategies

Perform a soil/climate analysis to determine appropriate plant material and design the landscape with native or adapted plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high-efficiency equipment and/or climate-based controllers. (See the Green Site Management Plan and the Stormwater Management Plan in the Appendix.)

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•WE Credit 1.2: Water-Efficient Landscaping: No Potable Water Use or No Irrigation

Intent

Eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

Requirements

Achieve WE Credit 1.1.and:

Use only captured rainwater, recycled wastewater, recycled greywater or water treated and conveyed by a public agency specifically for non-potable uses for irrigation.

OR

Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within one year of installation.

AGMBC Submittal Guidance

- Each building is to provide project-specific data, including appropriate documentation supporting the design of the rainwater collections system, landscape design and the extent of the supplemental temporary irrigation system.

Strategies (see the Green Site Management Plan Sample in the Appendix)

- Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Consider using stormwater, greywater and/or condensate water for irrigation.

•WE Credit 2: Innovative Wastewater Technologies

AGMBC Submittal Guidance

- There are no plans to apply aggregate data for central waste treatment technologies for this site, but it remains a future option.

Strategies

- Alternative compliance path. Use high efficiency technologies such a dual flush water closets and water-free urinals to reduce potable water use by at least 50%.

•WE Credit 3.1: Water Use Reduction: 20% Reduction

•WE Credit 3.2: Water Use Reduction: 30% Reduction

Intent:

Maximize water efficiency within tenant spaces to reduce the burden on municipal water supply and wastewater systems.

Design Requirement:

Employ strategies to use 20% (for one point) or 30% (for a second point) less water than EPACT 1992 baseline. Achieving 30% savings is recognized as Exemplary Performance and can earn an Innovation and Design Credit.

AGMBC Submittal Guidance

- There are no current plans to aggregate campus water savings, but it is a future option.

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- A balanced gender ratio is assumed, and usage rates must be established.

Strategies:

- Low-flow shower heads for bicycle changing area and exercise facilities.
- Low-flow toilets for public restrooms.
- Waterless or low-flow urinals in employee and public restrooms.
- Dual-flush toilets for employee restrooms.
- Faucet aerators for faucets in employee restrooms, kitchen prep areas and public restrooms.

Resources

Water Use and Conservation:

www.waterplowpress.com

www.waterwiser.org

ENERGY AND ATMOSPHERE (EA) CREDITS

AGMBC Submittal Guidance

- When designing a group of buildings, orientation and site utilization can have a major impact on energy consumption. Consider grouping buildings to take advantage of passive tempering and renewable energy systems appropriate to regional constraints.
- Each project must independently meet the requirements listed for the following credits:

Resources

Building Orientation Links:

<http://www.wbdg.org/design/index.php?cn=3.8.1&cx=0>

<http://www.eere.energy.gov/buildings/info/design/integratedbuilding/buildingconfiguration.html>

Sun Angle Calculator Links:

<http://susdesign.com/sunangle/>

<http://www.susdesign.com/sunposition/index.html>

•EA Prerequisite 1: Fundamental Commissioning of the Building Energy Systems

Intent

Verify that the project's energy-related systems are installed, calibrated, and perform as intended.

Requirements

Engage commissioning team to review design intent, verify installation, functional performance, training and O&M documentation - (include requirements in specifications).

Strategies (see the Commissioning Plan Sample in the Appendix)

- Get the Commissioning Agent involved early in the project during schematic design
- Define commissioning scope and third-party or extra commissioning goals

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Resources

Commissioning Information:
<http://www.peci.org/commissioning.htm>
<http://www.bcxa.org/>

•EA Prerequisite 2: Minimum Energy Performance

Intent

Establish the minimum level of energy efficiency for the tenant space systems.

Requirements

- Design building to comply with ASHRAE/IESNA Std. 90.1-2004.
- Use Energy Modeling as a design tool during schematic design. Use modeling to optimize building systems design by balancing mechanical equipment and high-efficiency building envelope features that minimize first costs and provide a performance benchmark.
- The EPAct Tax credits can be applied to buildings with proper energy modeling software and high-efficiency energy design and construction techniques.

•EA Prerequisite 3: Refrigerant Management

Intent

Reduce ozone depletion.

Requirements

Design zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion prior to project completion.

Strategies

- When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC refrigerants and provide a replacement schedule for these refrigerants.
- For new buildings, specify for the base building new HVAC equipment that uses not CFC refrigerants.

•EA Credit 1: Optimize Energy Performance

Intent

Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

AGMBC Submittal Guidance (see the Energy Strategy in the Appendix)

- A campus-wide Energy Management Plan would include strategies and policies for minimizing energy use and maximize the benefits of energy purchasing. These strategies include identification of a campus energy reduction goal, energy modeling and comparative analyses during schematic design, building system monitoring and post-occupancy surveys and monitoring.
- Note that the current USGBC requirement (for LEED-NC projects registered after of June 26, 2007) is that each project must earn at least two points on this credit.

Resources

Building Energy Performance Simulation Program Information:
www.sbicouncil.org/store/e10.php?PHPSESSID=fda65f421e42bc28b1ce7fe25e589561
www.doe2.com

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•EA Credit 2: On-Site Renewable Energy

Intent

Encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental and economic impacts associated with fossil fuel energy use.

AGMBC Submittal Guidance

- A campus-wide strategy for consideration may be the use of solar-powered light poles for parking areas, pathways and other connective routes between buildings.

Resources

Michigan Energy Office

http://www.michigan.gov/cis/0,1607,7-154-25676_25774---,00.html

Michigan Wind Working Group

http://www.michigan.gov/cis/0,1607,7-154-25676_25774-75767--,00.html

Shortcut to igreenbuild renewable energy article:

<http://www.igreenbuild.com/coreModules/content/contentDisplay.aspx?contentID=2772>

•EA Credit 3: Enhanced Commissioning

See discussion of EA Prerequisite 1 (above).

•EA Credit 4: Enhanced Refrigerant Management

See discussion of EA Prerequisite 3 (above).

•EA Credit 5.1: Measurement & Verification

Intent

Provide for the ongoing accountability of building energy consumption over time.

AGMBC Submittal Guidance

- Develop and implement a campus-wide Measurement & Verification (M&V) Plan consistent with guidelines from *International Performance Measurement & Verification Protocol, Volume III: Concepts and Options for Determining Energy Savings in New Construction, April, 2003*.

•EA Credit 6: Green Power

Intent

Encourage the development and use of grid-source renewable energy technologies on a net-zero pollution basis.

Requirements

- Provide 35% of the building's electricity from renewable sources by engaging in at least a two-year renewable energy contract.

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MATERIALS AND RESOURCES (MR) CREDITS

•MR Prerequisite 1: Storage & Collection of Recyclables

Intent

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirements

Provide an area dedicated to the storage and sorting of recyclable materials - must accommodate paper, corrugated cardboard, glass, plastics and metals.

AGMBC Submittal Guidance

- A central sorting and collection area or facility serving multiple buildings will meet the intent of this credit as long as provisions are made for the collection of the recyclable materials within each building.

Strategies

- Provide storage space for recyclables with easy access both for employees and guests.
- An example for guest recycling: newspaper recycling bins in the corridors and lobbies.
- Educate employees and guests on the recycling policy.
- Consider composting – local.
- Establish a hazardous waste plan including lamp recycling. See suggested ID credit for exemplary performance in recycling strategies.
- Continue efforts with all GVSU Allendale campus students, staff, and faculty to provide central collection areas on the site and to collectively provide the waste volumes necessary to create an economic advantage for waste diversion and recycling.
- Employ the H2E calculator as appropriate.

•MR Credit 1.1, 1.2, and 1.3 Building Reuse

Intent

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirements

Maintain at least 75% (based on surface area) of existing building structure and envelope.
Maintain at least 95% (based on surface area) of existing building structure and envelope.
Use existing interior non-structural elements in at least 50% (by area) of the completed building.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

Strategies

- Consider reuse of existing, previously occupied buildings, including structure, envelope and non-structural interior elements.
- Remove elements that pose contamination risk to building occupants and upgrade components that would improve energy and water efficiency such as windows, mechanical systems and plumbing fixtures.
- Quantify the extent of building reuse.

- MR Credit 2.1: Construction Waste Management: Divert 50%
- MR Credit 2.2: Construction Waste Management: Divert 75%
- Exemplary Performance Credit: Construction Waste Management: Divert 95%

Intent

Divert construction, demolition, and land-clearing debris from landfill disposal. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.

Requirements

Establish construction waste management plan to recycle and/or salvage at least 50%(for one point), 75% (for second point) or 95% (for Exemplary Performance Credit) of construction, demolition and land-clearing waste.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

Strategies (see the Construction Waste Management Guidelines in the Appendix)

- Develop a waste management plan.
- Involve the waste hauler in the planning.
- Identify materials (including packaging materials).
- Identify where the materials can be reused within the new building.
- Identify salvage services such as Inner City Christian Federation, Habitat for Humanity, Home Repair Services and Pitsch Companies. Also identify regional salvage businesses.
- Possible materials: wood to be re-milled, carpet, glass, brick, metals, appliances, plastics, concrete, misc. woods, ceiling tile, roofing material and asphalt recycling.
- Investigate-hauling and material criteria for local/regional waste management resources.
- Identify hazardous materials such as old paints, cleaning products, pesticides or electronics and dispose of properly with Ottawa County Requirements.
- Prepare a site for waste-separation activities.
- Include waste-handling requirements in all project documents, contracts and purchase orders.
- Clearly label waste/recycling receptacles.
- Create a penalty program for contamination of recyclable materials by contractors.
- Identify hazardous materials such as old paints, cleaning products, pesticides or electronics and dispose of properly with Ottawa County Requirements.

- MR Credit 3.1 and 3.2: Materials Reuse: 5% and10%

Intent

Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.

Requirements

Use salvaged, refurbished or reused materials such that the sum of these materials constitutes at least 5% (or 10%), based on cost, of the total value of materials on the project. Mechanical, electrical and plumbing components and specialty items such as elevators and equipment shall not be included in this calculation.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

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Strategies

- Identify opportunities to incorporate salvaged materials into building design and research potential material suppliers.
- Consider salvaged materials such as beams and posts, flooring, paneling, doors and frames, cabinetry and furniture, brick and decorative items.

•MR Credit 4.1 Recycled Content, Specify 10%

•MR Credit 4.1 Recycled Content, Specify 20%

Intent

Increase demand for building products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials.

Requirements

Post-consumer recycled content plus 1/2 post-industrial recycled content is at least 10% (for first point) of 20% (for second point) of total value of materials.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

Strategies

- Possible materials: concrete, steel, brick, wheat board, ceramic tile, ceiling tile, carpet & cushion, office furniture, insulation, glass, drywall and plastic laminate.
- Furniture is not required to be included in the calculation.
- There is a LEED default of 25% post-consumer recycled content for steel.

•MR Credit 5.1: Regional Materials: 10% Extracted, Processed & Manufactured Regionally

•MR Credit 5.1: Regional Materials: 20% Extracted, Processed & Manufactured Regionally

Intent

Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

Requirements

Use a minimum of 10% of building materials and products that are extracted and manufactured within a 500 mile radius.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

Strategies

- Identify building materials and research manufacturing locations.
- Furniture is not required to be included in the calculation.
- Salvaged, recovered or recycled content materials may be counted as locally extracted as long as the source of these materials is within 500 miles of the project.
- Identify regional sources for primary building materials such as concrete, steel and glass

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and determine manufacturing locations. Early planning is essential to establish the potential for use of local/regional products and materials to earn the points for MRc5.1 and MRc5.2. Given the scale of a project it may be possible to find local manufacturers for many of the materials required for this project. With careful planning there is very good potential for achievement of these credits.

•MR Credit 6: Rapidly Renewable Materials

Intent

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements

Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) for 2.5% of the total value of all building materials and products used in the project, based on cost.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

Strategies

- Establish a project goal for rapidly renewable materials and identify products and suppliers that can support achievement of this goal.
- Consider materials such as bamboo, wool, cotton insulation, agrifiber, linoleum, wheatboard, strawboard and oak.
- During construction, ensure that the specified renewable materials are installed.

•MR Credit 7: Certified Wood

Intent

Encourage environmentally responsible forest management.

Requirements

A minimum of 50% of wood based materials and products must be certified in accordance with the Forest Stewardship Council's Principles and Criteria.

AGMBC Submittal Guidance

- Each project must independently meet the requirements for this credit.

Strategies

- Identify materials and research FSC certified products.
- Possible materials: structure, carpentry (rough and finish), veneer, trims, doors and furniture.
- Exclude salvaged and refurbished materials as well as the value of the post-consumer recycled wood fiber portion of any product from the calculations.
- Furniture is not required to be included in the calculation.

MR Resources

Michigan Department of Environmental Quality
Recycling/Pollution Prevention Strategy
http://www.michigan.gov/deq/0,1607,7-135-3585_4130---,00.html

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Michigan Recycling Coalition
<http://www.michiganrecycles.org/>

Recycled Content Product Database
<http://www.ciwmb.ca.gov/rcp/>

Resource Efficient Building Elements Guide
<http://www.crbt.org>

Environmentally Preferable Purchasing Program Office of Pollution Prevention and
Toxics U.S. Environmental Protection Agency
www.epa.gov/oppt/epp

Global Ecolabelling Network
www.gen.gr.jp

Life Cycle Inventory Database
www.nrel.gov/lci/

Sustainable Products Purchasing Coalition
www.sppcoalition.org

Hospitals for a Healthy Environment (H2E) Self-Assessment Guide (for evaluation of a
facility's waste stream)
www.h2e-online.org/pubs/selfasmt.pdf

INDOOR ENVIRONMENTAL QUALITY (EQ) CREDITS

AGMBC Submittal Guidance

- Each project must independently meet the requirements for the following prerequisites and credits.
- EQ Prerequisite 1: Minimum IAQ Performance
- EQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control
- EQ Credit 1: Outdoor Air Delivery Monitoring
- EQ Credit 2: Increased Ventilation
- EQ Credit 3: Construction IAQ Management Plan, During Construction
(see the sample Indoor Air Quality Management Plan in the Appendix)
- EQ Credit 4.1: Low-Emitting Materials, Adhesives & Sealants
- EQ Credit 4.2: Low-Emitting Materials, Paints & Coatings
- EQ Credit 4.3: Low-Emitting Materials, Carpet Systems

- EQ Credit 4.4: Low-Emitting Materials, Composite Wood & Agrifiber Products
- EQ Credit 5: Indoor Chemical & Pollutant Source Control
- EQ Credit 6.1: Controllability of Systems, Lighting
- EQ Credit 6.2: Controllability of Systems, Thermal Comfort
- EQ Credit 7.1: Thermal Comfort, Design
- EQ Credit 7.2: Thermal Comfort, Verification
- EQ Credit 8.1 Daylight & Views, Daylight 75% of Spaces
- EQ Credit 8.2 Daylight & Views, Views for 90% of Spaces

INNOVATION IN DESIGN PROCESS (ID) CREDITS

AGMBC Submittal Guidance

- An innovation credit is warranted if activities and or programs inspired by a LEED project are applied to the campus as a whole, thus delivering correspondingly larger environmental benefit. The following strategies noted as prototype may apply.
- For other strategies, each project must independently meet the requirements.
- At a minimum, each credit earned under the Innovation and Design category (other than credits earned by demonstrating Exemplary Performance) must include these components:
 - The intent of the proposed innovation credit.
 - The proposed requirement for compliance.
 - The proposed submittals to demonstrate compliance.
 - The design approach (strategies) that might be used to meet the requirements.

•ID Credit 1.1: Green Building Education (Prototype Credit)

Intent

Use the project space as a learning tool about sustainable building strategies and solutions for students, staff, faculty, guests and the larger community.

Requirements

Develop a comprehensive signage program; a manual, guideline or case study; and the development of an outreach program or guided tour.

Strategies

- *Two* of the following three elements must be included in the educational program: a comprehensive signage program; the development of a manual, guideline or case study; and the development of an outreach program or guided tour. (LEED-NC CIR, IDc1.1, inquiry date 9/24/01; please review the entire CIR).

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•ID Credit 1.1: Integrated Design

Intent

Achieve an effective collaborative design process and outcome by engaging the multiple design disciplines, as well as users, constructors, facility managers and operations personnel.

Requirements

- Assemble a design team to perform integrated functions
- Team members must represent at least three of the following disciplines:
 - architectural/residential design
 - landscape design, civil engineering, habitat restoration, land planning
 - green building/sustainable design
 - mechanical or energy engineering
 - building science or performance testing
- Actively involve members mentioned above in at least three of the following:
 - Conceptual/schematic design
 - LEED planning
 - Preliminary design
 - Energy/envelope design or analysis
 - Design development
 - Final design, working drawings or specifications
 - Construction
- Conduct regular meetings with team members on project updates, challenges, solutions and next steps.

Strategies

Use cross-discipline design and decision-making, starting early in the process and continuing throughout to take advantage of interrelationships between systems. Include representation early on in the design process from all end-user stakeholders, including administration, facilities planning staff, facilities operations staff, faculty and students. Provide for feedback from all participants.

(See American National Standards Institute, Green Guide for Health Care, Integrative Design Collaborative).

ID Credit 1.1 Transportation Management Plan

Intent

To reduce pollution and land-development impacts from the use of private motor vehicles by encouraging public, shared and non-motor transportation options.

Requirements

Develop a comprehensive transportation management plan that demonstrates a quantifiable reduction in personal automobile use through the implementation of multiple alternative options.

CIR Requirements:

- LEED-NC CIR IDc1.1 (4/7/03 - 5/9/03) provides guidance for documenting a Transportation Management Plan. The CIR includes the following criteria: The project is likely to be awarded the innovation point as long as: (1) SS Credits 4.1, 4.2, and 4.3 are achieved; (2) the commitment requirements listed in the CIR are met; and (3) all commitments are adequately and officially documented.
- The CIR also requests documentation for the following:

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- a. A regional carpool database with personalized match lists;
- b. Official documentation for at a least a five-year commitment to the programs;
- c. Documentation for the number of employees that are initially provided personalized trip information; and
- d. Documentation of the policies/procedures that ensure the same service for new employees.

Strategies:

- Demonstration for the bus line that was developed and its success in reducing single-occupant vehicle travel.
- Financial incentives such as discounted bus fares for employees
- Usage of low-emitting and fuel-efficient fleet vehicles
- Preferred parking for low-emitting and fuel-efficient vehicles
- Alternative-fuel refueling stations
- (See LEED-NC CIR IDc1.1: 4/7/03 - 5/9/03)

**•ID Credit 1.1: Green Housekeeping
(Prototype Credit)**

Intent

To avoid exposure of employees and guests to hazardous materials and to provide a high level of indoor air quality.

Requirement

Create a comprehensive green cleaning program.

Strategies (see the Green Housekeeping Plan Sample in the Appendix)

- Demonstrate that a comprehensive green cleaning/housekeeping program is in place with clear performance goals including: a statement of purpose, the contractual or procedural requirements for operations staff, a clear set of acceptable performance standards by which to measure and documentation of the program's housekeeping and environmental cleaning solution specifications. (See LEED-NC CIR, IDc1.1 inquiry date 4/8/04.)

•ID Credit 1.1: Reduced CO₂ – Concrete CIR

Intent

Diminish the life-cycle CO₂ emissions associated with site-cast concrete by replacing large quantities of Portland Cement with fly ash.

Requirement

Replace 40% by volume of Portland Cement with fly ash on average for all site-cast concrete used on the project including piers, caps, grade beams, slabs-on-grade, floors, tilt-up walls, retaining walls and site concrete. A minimum of 40% reduction by weight for all cast-in-place concrete must be demonstrated against standard baseline mixes. Applicant must demonstrate that cast-in-place concrete makes up a significant portion of the work on the project.

Submittals

- Quantity of total cubic yards of cast-in-place concrete for the project.
- Standard 28-day strength concrete mix designs from the concrete producer, in accordance with ACI 301, for each concrete mix required for the project: (2500 psi, 3000

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psi, 5000 psi, etc.) and quantity of Portland cement for each mix in pounds per cubic yard.

- Quantity of Portland cement reduced and/or replaced for each mix in pounds per cubic yard.
- Temperature on each day of placement if cold-weather concrete mix is used.
- Calculation demonstrating that a minimum 40% average reduction has been achieved over standard concrete mix designs for the total of all cast-in-place concrete.

Strategies

- Baseline mixes shall be standard, 28-day strength regional mix designs.
- Replace a portion of the Portland cement with a pozzolanic material. Pozzolans allowed for displacement of Portland cement are fly ash, ground granulated blast furnace slag (ggbfs), silica fume and rice hull ash.
- Assume an increase in the number of days required to achieve strength requirement; 4000 psi concrete at 90 days requires less Portland cement than 4000 psi at 28 days.
- (Please see LEED-NC CIR, IDc1.1 inquiry date 12/6/2002).

•ID Credit 1.1

Common Options. These additional project-specific credits recognize Exemplary Performance for:

- SSc5.1: Site Development: Protect and Restore Habitat 75%
- SSc5.2: Site Development: Maximize Open Space 40%
- SSc7.2: Heat Island: Vegetated Roof 100%
- WEc1: Water Use Reduction 30%
- MRp1: Storage and Collection of Recyclables Campus-Wide Recycling Rate of 40% (See LEED-NC v 2.1 CIR: 8/8/05-9/6/05)
- MRc4: Recycled Content 30%

Intent

Exceptional performance above the requirements set by the LEED Green Building Rating System.

Requirements

Meet twice the base requirements of the credit or, in the case of multi-tiered credits, the next tier.

Strategies

Although all these credits are not needed to maximize the Innovation in Design category, projects should strive to achieve all of these Exemplary Performance credits to demonstrate leadership in sustainability and to enrich the public perception of GVSU's sustainability efforts. Each of these can be obtained at little or no added incremental cost to the project.

•ID Credit 2: LEED™ Accredited Professional

Intent

To support and encourage the design integration required by a LEED Green Building project and to streamline the application and certification process.

Requirement

At least one principal participant of the project team is a LEED-Accredited Professional.

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APPENDICES

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Appendix A

Erosion and Sedimentation Control Plan (see attached sheet)

- Create an Erosion and Sedimentation Control Plan during the design phase of the project. Employ strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps and sediment basins.
- All GVSU projects must comply with this requirement. The Ottawa County Drain Commission's erosion and sedimentation control standards and codes are at least as stringent as 2005 EPA requirements.
- The attached example should be used as a guide to developing a model Erosion and Sedimentation Control Plan.

Appendix B

Stormwater Management Plan

(See GVSU's Stormwater Management Plan on file).

GVSU created a campus storm water master plan for the Allendale Campus in 2007. The plan included background information on the impacts of storm water runoff on the campus, an analysis of the campus storm water system and hydraulic modeling, an evaluation of potential storm water improvements and recommendations of storm water management alternatives. Current storm water management initiatives are focused on restoring the campus storm water runoff to predevelopment conditions. These efforts included developing alternatives for a sustainable approach to long-term storm water runoff that will restore historic drainage patterns, educate existing and future students on the importance of storm water management and create better ecosystems within the campus ravines and the downstream receiving waters.

Sustainable storm water management techniques on campus projects have included porous pavement parking lots, rain gardens, green roofs, wetland creation, and storm water reuse in the campus irrigation system. Each building project is encouraged to employ these techniques and others to achieve LEED SSc6.1: Stormwater Design: Quantity Control.

Appendix C

Green Site Management Plan (Scope)

Maintenance Equipment.

- Address Federal, State, City and Industry standards for inspections, operators, safety, emissions, noise level and condition.
- Require equipment inspection before each use.
- Prohibit fuel or oil leakage; establish action plan to mitigate.
- Identify operating standards; establish action plan to mitigate.

Plantings

- Identify characteristics and size of each campus area, such as undeveloped, re-vegetated, landscaped, vegetated roof and fire-susceptible.
- Identify approved plants, nutrition, irrigation and pruning/cutting.

Animal and Vegetation Pest Control

- Identify native wildlife and patterns of behavior and habitat, including natural barriers.
- Monitor soil conditions and how they affect pests.
- Monitor status of unhealthy and/or dead plant material.
- Identify and employ natural predators when possible.

Landscape Waste

- Identify types of waste and acceptable methods for re-use and/or natural disposal.

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Irrigation Management

- Coordinate with Campus Stormwater Management Plan.
- Utilize the highest-efficiency equipment possible.
- Coordinate usage with existing and forecast weather patterns.
- Monitor system operation for maximum effectiveness, including weaning areas from coverage.

Fertilizer Usage

- Balance irrigation, soil texture, biology, temperature and fertilizer applications.
- Identify and balance Campus standard for appearance and over-use of fertilizer.
- Inspect and monitor soil conditions to insure a match with plant materials and fertilizer.

Cleaning of Building Exteriors

- Identify sustainable cleaning materials for all exterior building surfaces for routine and special (graffiti, vehicle exhaust, chemical spill) procedures.
- Investigate contracted services for routine and special cleaning.

Paints and Sealants used on Building Exteriors

- Identify sustainable materials for all exterior building surfaces and furniture.
- Investigate contracted services for routine and special cleaning.

Management to Minimize Wildfire Hazard

- Schedule brush clearance on a regular basis.
- Manage fuel level reduce hazards.
- Post warnings to identify susceptible areas.

Appendix D

Commissioning Plan

A commissioning plan is a document that outlines the organization, schedule requirements, allocation of resources and documentation requirements of the commissioning process.

The purpose of the commissioning plan is to provide direction for the commissioning process, particularly providing resolution for issues and providing details that cannot be, or were not, fully developed during design, such as scheduling, participation of various parties, actual lines of reporting and approvals, coordination, etc.

The commissioning plan should list the objectives to be achieved through commissioning, such as: ensuring that equipment is installed properly, verifying and documenting proper performance of equipment and systems, ensuring that operation and maintenance documentation left on site is complete and ensuring that Owner's operating personnel are adequately trained.

The plan should list the systems to be commissioned, and main contact information for primary members of the commissioning team; e.g., the Owner, Commissioning Authority and the General, Mechanical, Temperature Controls, Electrical and Test, Adjust, Balance Contractors.

Further, the commissioning plan should describe all written work products that will be produced and used throughout the commissioning. Included in these descriptions must be assignment of the parties responsible for their completion and the required time frames for their completion.

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Appendix E
Energy Strategy

A

Initiative	General Description	Utility	Source	Methodology	Specific Comments
Pricing and Purchasing	<ul style="list-style-type: none"> Monitor energy pricing Track GVSU consumption and use various purchasing strategies and contracts. A committee made up of VP of Finance. & Administration, AVP Budget, AVP Business Affairs, AVP Facilities Services and Energy Engineer may be involved with part/all of the associated tasks. 	<ul style="list-style-type: none"> Natural Gas Electricity Water Fuel Oil Steam 	<ul style="list-style-type: none"> Broker - Reliable Energy State Consortium Wolverine Power Cooperative Local Municipality Various KCHC 	<ul style="list-style-type: none"> Blend 20, Winter Blend 10% of annual requirements Secure pricing at lower-than-utility pricing. Work closely with officials to hold pricing down. Closely monitoring pricing and availability. Long-term contract. 	<ul style="list-style-type: none"> Secures future incremental gas nominations. Second time university has taken advantage of ROA. Switched to #2 oil for functional benefits and more competition near the end of the contract; reviewing options.
Standards	<ul style="list-style-type: none"> Continuously updating GVSU design Standards and revising them to incorporate LEED protocols. 		<ul style="list-style-type: none"> LEED, USGBC, Consultants 	<ul style="list-style-type: none"> Design buildings, both architecturally and through engineering, for LEED accreditation. 	<ul style="list-style-type: none"> sample areas: lighting, heat recovery, occupancy, water use, HVAC controls
Conservation Measures and Projects	<ul style="list-style-type: none"> Implement new energy savings policies and install new energy conservation projects. 	<ul style="list-style-type: none"> Various 	<ul style="list-style-type: none"> GVSU Staff and Consultants 	<ul style="list-style-type: none"> Policies, Studies, HVAC Systems, Technology, Equipment, Schedules. 	<ul style="list-style-type: none"> Administration in the last two years has provided \$1.1 M for energy project with usual paybacks of 3 years or less.
Campus-wide involvement	<ul style="list-style-type: none"> Educating energy awareness at all levels from administration to students. 	<ul style="list-style-type: none"> Various 	<ul style="list-style-type: none"> GVSU Faculty, Staff, Students 	<ul style="list-style-type: none"> Dean-level participation and approval, student awareness campaigns, promotions, contests, sharing energy tips, advertisements 	<ul style="list-style-type: none"> HVAC temperature set points, shutting off lights, etc.
Preventive Maintenance	<ul style="list-style-type: none"> Ongoing process to improve frequency and timeliness of preventive maintenance 		<ul style="list-style-type: none"> GVSU Staff 	<ul style="list-style-type: none"> Work Orders, TMA Software Reminders, Observations, etc. 	
Alternative Energy	<ul style="list-style-type: none"> Continuing to monitor developments in the various fields of alternative energies. 	<ul style="list-style-type: none"> Various 	<ul style="list-style-type: none"> GVSU Staff and Consultants 	<ul style="list-style-type: none"> Fuel Cell, Photovoltaics, Biomass, Ice Storage, Wind. 	

Appendix F

Construction Waste Management Plan (sample)

A. Develop and implement a waste management plan in accordance with ASTM E 1609.

B. Collection: Implement a recycling/reuse program that includes separate collection of waste materials of the following types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

1. Land-clearing debris
2. Asphalt
3. Concrete and masonry
4. Metal (ferrous and non-ferrous)
5. Wood; nails and staples allowed
6. Debris
7. Glass; colored glass allowed
8. Paper (bond, newsprint, cardboard and paper packaging materials)
9. Plastic (Types 1-7; confirm acceptability by local recycling facility)
10. Gypsum
11. Non-hazardous paint and paint cans
12. Carpet
13. Insulation
14. Others as appropriate

C. Recycling and Reuse: Maximize recycling and reuse of materials.

1. Recycling/reuse on project site.
2. Recycling/reuse off project site: The following is a partial list for Contractor's information only. For more information, contact the State Department of Environmental Quality and the local Integrated Solid Waste Management Office.
 - a. Habitat for Humanity, a non-profit housing organization that rehabilitates and builds housing for low-income families. Sites requiring donated materials vary.
 - b. Michigan Department of Environmental Quality; 517-373-1322.
 - c. Michigan Recycling Coalition (MRC). The MRC is an organization whose members consist of recycling coordinators and professionals in Michigan; 517-485-WRIN (9746) or 517-371-7073

D. Handling

1. Clean materials that are contaminated prior to placing in collection containers. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination and other substances deleterious to recycling process).
2. Arrange for collection by or delivery to the appropriate recycling or reuse facility.
3. Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations. Coordinate with appropriate Specification Section.

E. Composting: In accordance with State Extension Service recommendations and as follows:

1. Moisture content: Maintain between 35% and 60%.
2. Carbon to nitrogen (C/N) ratio: Maintain at approximately 30 to 1 by weight.
3. Do not compost meat or dairy products on site.
4. Where the proposed Waste Management Plan incorporates composting of plastics, assess the potential effect of each type of plastic to be included on the composting process in accordance with ASTM D5509 and ASTM D6002.

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Appendix G
Indoor Air Quality Plan

- I. Hold IAQ Management Meeting
 - A. Review contractor responsibilities during construction.
 - B. Review overall process for obtaining LEED (version 2.2) Credit EQ3.1 "Construction IAQ Management Plan During Construction."
- II. Contractor Responsibilities During Construction
 - A. HVAC System Protection:
 1. Keep air-handling systems OFF during construction.
 2. Seal return and supply duct openings with plastic throughout construction.
 - a. Any ducts found contaminated (dust, debris, etc.) will be required to be cleaned.
 3. If it is not possible to keep air-handling systems off, then the following must be observed:
 - a. Run air handling units only after all return side (AHU casings and ductwork) have been sealed.
 - b. Shut down the return sides of HVAC systems during heavy construction or demolition work. This can be done using dampers.
 - c. Return air openings must be covered with MERV 8 filter media.
 - d. Upgrade central AHU filters where major loading is expected to occur.
 4. Do not use mechanical rooms for storing construction or waste materials.
 5. Install a minimum of MERV 13 filters in air handling units where contaminated outdoor air is run through the unit.
 - B. Source Control:
 1. Sources include the following:
 - a. Dust from: concrete, drywall, insulation.
 - b. Odors from: adhesives, paint, sealants (duct sealant), solvents, cleaning agents, fuels, caulking, carpeting, wall coverings.
 2. Construction materials/solvents, for which no acceptable (low VOC) alternatives are available, will require implementation of other control measures to minimize building contamination (see Pathway Interruption, below).
 - C. Pathway Interruption (if necessary):
 1. Isolate work areas to prevent contamination of clean or occupied spaces.
 2. To prevent contaminated air (VOC, construction dust, paint fumes) from entering clean areas:
 - a. Ventilate clean areas using 100% outside air and exhaust the room air directly outside during installation of VOC emitting materials.
 - b. Use pressure differentials and barriers between work areas and non-work areas.
 - c. Housekeeping.
 3. Promote cleaning in building spaces to remove contaminants.
 4. Protect building materials from weather and store in a clean area.
 5. Clean coils and fans and replace filters before performing Test, Adjust, and Balance (TAB) procedures.
 6. Provide regular cleaning of construction site (the following is required by specification):
 - a. Monthly cleaning prior to completion of building frame.
 - b. Weekly cleaning by all contractors until the final weeks.
 - c. Daily cleaning by all contractors during final month.
 7. Prior to use of return air ductwork without intake filters, clean up and remove dust and debris generated by construction activities.
 - D. Scheduling to Reduce Absorption of VOCs Into Building Materials:
 1. Complete painting, sealing and coating before installing ceiling tiles, carpets, insulation, gypsum products and fabric-covered furnishings.
- III. Intermittent Flush-Out
 - A. Is not required, but will increase the likely success of satisfactory air contaminant testing.

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- B. Use a minimum of MERV 13 filter media in air handling units.
 - C. Begin as soon as possible (once building is substantially enclosed).
 - D. Use 100% outdoor air and keep return air system sealed off.
 - E. Use portable fans to circulate air into closets, corners, and other potentially dead spaces to increase the effectiveness of the flush-out.
 - F. Use of permanent HVAC systems during construction should be evaluated for the following:
 - 1. Will use of the systems initiate the warranty period on the equipment used?
 - 2. Are AHU systems designed to adequately condition 100% OA (avoid bringing in excess humidity during summer months)?
 - 3. Flush out during cold weather might be quite costly to perform as heating 100% OA during winter months would cause increased energy use. This must be taken into consideration by whomever must pay for the heat and may determine when an intermittent flush-out is used.
- IV. Air Contaminant Testing
- A. IAQ consultant to perform prior to occupancy.
 - B. Testing shall not start until:
 - 1. All construction substantially complete (i.e., heavy use of VOC emitting materials is complete, dust generating activities are complete, all carpet is installed).
 - 2. HVAC systems have been tested, adjusted and balanced for proper operation.
 - 3. New HVAC filtration media has been installed.
 - 4. Prior to building occupancy (recommend 2 weeks prior to occupancy to allow for air testing results to be processed).
 - C. Air sampling requirements are as follows:
 - 1. Windows and doors closed.
 - 2. HVAC system is running normally, bringing in a minimum level of outdoor air.
 - 3. Samples taken from each air handling zone and not be less than one per 25,000 sq. ft. or for each contiguous floor area (whichever is larger).
 - D. Air contaminant concentration limits:
 - 1. 4-Phenylcyclohexene – 6.5 micrograms per cubic meter.
 - 2. Total Volatile Organic Compounds (TVOC) – 500 micrograms per cubic meter.
 - 3. Particulates (PM10) – 50 micrograms per cubic meter.
 - 4. Formaldehyde – 50 parts per billion.
 - 5. Carbon Monoxide – 9 parts per million and no greater than 2 parts per million above outdoor levels.
- V. Site Visits
- A. IAQ consultant will make site visits throughout construction to monitor adherence to the above requirements and document LEED required construction IAQ management measures.
- VI. Corrective Action
- A. IAQ consultant will notify construction manager in writing of any case where consultant identifies the Contractor's Responsibilities described above.
 - B. Construction Manager will resolve the issue and will confirm resolution to IAQ consultant in writing (e-mail, fax, mail or hand delivery).
- VII. Final Documentation
- A. Following construction, IAQ consultant will provide necessary documentation for the project to receive LEED Credit 3.1, including:
 - 1. Providing a signed LEED Letter Template.
 - 2. Provide a copy of the project's IAQ Management Plan.
 - 3. Confirm if the permanently installed air handling equipment was used during construction.
 - 4. List all filtration media (manufacturer, model #, MERV rating, location of installed filter) installed during construction and confirm that each was replaced prior to final occupancy.
 - 5. Provide photographs indicating adherence to the requirements and including brief description of the important design approaches employed during building construction.

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Appendix H

Green Housekeeping Plan (sample)

Intent:

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment.

Requirements: (Per LEED-NC CIR, IDc1.1 inquiry date 4/8/04.)

Demonstrate that a comprehensive green cleaning/housekeeping program is in place with clear performance goals, including:

1. A statement of purpose describing what the policy is trying to achieve from a health and environmental standpoint, focusing on cleaning chemicals and custodial training at a minimum.
2. A contractual or procedural requirement for operations staff to comply with the guidelines, including a written program for training and implementation.
3. A clear set of acceptable performance level standards by which to measure progress or achievement, such as Green Seal standard GS-37 or California Code of Regulations, Title 17 Section 94509, VOC standards for cleaning products.
4. Documentation of the program's housekeeping policies and environmental cleaning solution specifications, including a list of approved and prohibited chemicals and practices. Demonstrate that the products used in the project are non-hazardous, have a low environmental impact, and meet the criteria set forth in #3 above. Concentrated cleaning products should be utilized when available.

Submittals:

1. The project's Green Housekeeping Statement of Purpose (see below)
2. The Green Housekeeping Description
3. Cleaning company's training document
4. The project's Green Housekeeping performance standards and policies (see below)
5. Manufacturers' documentation such as cut sheets or Material Safety Data Sheets for the cleaning products

Potential Technologies and Strategies:

Coordinate a partnership between the project team, owner/tenant and the janitorial service to develop a green housekeeping program for the project space. Provide documentation that the program is comprehensive and the cleaning products meet either Green Seal standard GS-37 or other VOC standards for cleaning products.

Narrative:

The building owner has committed to a Green Housekeeping Program. ABC cleaning company is contracted to implement the Green Housekeeping program. In addition to this document, we have included the following for review:

- The Green Cleaning Description for the property
- The training document
- Manufacturers' cut sheets or MSD Sheets for the cleaning products

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Statement of Purpose:

The purpose of the building owner's green housekeeping policy and strategy is to continue improvements accomplished while building the LEED-Registered project. Using green housekeeping products and procedures and properly trained staff (see below) will ensure that building occupants and janitorial staff will not be exposed to potentially hazardous contaminants.

Cleaning Procedures and Performance Standards

A description of the cleaning activities is provided in the contract.

Products/components that are not to be used on the site:

Aldehydes: Formaldehyde and Glutaraldehyde
Ammonia
Chlorine Bleach
Phosphates

Acceptable Products:

All cleaning products must meet Green Seal Standard GS-37, Industrial and Institutional Cleaners or California Air Resources Board Regulation for Reducing VOC Emissions from Consumer Products. MSD Sheets or manufacturers' cut sheets are attached.

All hand soaps must meet Green Seal Standard GS-41A, Institutional Hand Cleaners.

All janitorial paper products must meet Green Seal Standard GS-01, Tissue Paper / Green Seal Standard GS-09, Paper Towels and Paper Napkins.

All plastic trash bags must meet US EPA Comprehensive Procurement Guidelines.

Appendix I

Additional Campus Plans

Many sustainable activities on campus demonstrate interest and commitment to be directed toward the development of additional plans, some of which can support the achievement of LEED Credits. Such plans include the following:

- Transportation Management Plan
- Water Use Reduction and Irrigation Plan
- Green Purchasing or Environmentally Preferable Purchasing Plan
- Campus Recycling Plan
- Campus Waste Management Plan
- Exterior Lighting Management Plan

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Appendix J
Campus Map (see attached sheet)

The existing campus property includes built-up land and cannot be classified as prime farmland. For properties purchased by GVSU since 1984 that currently consist of farmland, design consultants must research the existing site characteristics to determine applicability.

