Sustainable Design Guidelines

for the

Menomonee River Valley

m i l w a u k e e ● w i s c o n s i n

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I. Site Design

Purpose: *Promote adaptive reuse of Valley lands that recognizes the ecological context, river influence, existing landmarks, building stock and industrial heritage, and improve existing infrastructure (sidewalks, streets, storm drainage).*

Sustainable site design should address water quality, quantity and floodplain issues, native species, open space that provides recreation, wildlife habitat, cultural and neighborhood connections; and alternative transportation, lighting and parking design.

1 Site Analysis & Planning

Site planning guidelines are intended to maximize the build out area and create a cohesive image for the Menomonee Valley.

A. Design all parking facilities and open spaces to work together to manage stormwater, create connections to the river and Hank Aaron State Trail [www.renewthevalley.org/hast] and improve the aesthetics of your site.

B. From the outset of the development project, integrate site, landscape and soil needs into architectural and construction sequences.

C. Preserve and enhance cultural resources that might exist on or near your property. Refer to the Menomonee Valley Cultural Resource Management Plan. [http://renewthevalley.org/files/pdf/CulturalResourcesPlan.pdf]

D. Maintain a ratio of total gross floor area to total lot area of no less than 25% for initial site build-out.

E. Build to street-fronting property lines, or to the setback of neighboring buildings. When buildings cannot be at property lines, minimize parking along the street frontage.

F. Do not construct within ten feet of any interior side lot line of the property. Side yards on the street side of corner lots shall have no minimum required width.

G. Attach signage to a vertical surface of the building or to a ground-mounted base. Do not post signs other than corporate identification signs, directional and educational or interpretive signs.

H. Where feasible, install utility lines underground.

2 Stormwater Management

Cost effective natural systems use water efficiently and enhance water quality.

A. Connect to regional stormwater treatment areas where available (Contact Menomonee Valley Partners for site specific information, 414-274-4655), or share stormwater management practices with neighboring parcels.

B. Design your stormwater conveyance system to use a connected series of vegetated swales and channels for stormwater infiltration in place of enclosed storm sewers.

C. Design your stormwater treatment system to avoid the direct concentrated discharge of stormwater into the river or canals. Use the techniques identified in Appendix 3 to capture and infiltrate stormwater up to a 2-year storm event without any discharge to surface water or municipal storm sewers.

D. Design landscape planting materials, soils and sub-soils for infiltration and evapotranspiration of rainwater. Note that soils and subsoils placed above a remedial cap can serve to store and evapotranspire collected stormwater.

E. Use drought resistant plantings, eliminating irrigation other than collected rainwater.

F. Consider using green roof systems to collect and evapotranspire rainwater, thus reducing runoff as well as heating and cooling loads.

3 Natural Landscape

Well designed landscaping with native species reduces water consumption and long-term maintenance costs and improves building energy efficiency and aesthetics.

A. Specify native plant and tree species for at least 80% of planted area. See Appendix 4 for tips on planning, installing, and maintaining a native landscape, as well as a list of locally native plants and invasive species.

B. Landscape all open areas, except those required for driveways, parking, or walks, not later than 6 months after occupancy.

C. Use deciduous shade trees, vegetative cover and exterior structures such as louvers, arbors and trellises to provide 30% shade over non-roof impervious areas within 5 years.

D. Where rooting area will be limited, use strategies such as connected planting beds, rooting breakouts under parking, or walkways floating on root-permeable soils to extend rooting space and increase plant vigor. Establish engineering specifications for these strategies, drainage patterns, and installation of structural soils as part of the building design and site grading plans.

E. Use Integrated Pest Management practices and appropriate plantings to eliminate the use of pesticides, herbicides and fertilizers.

4 Parking and Transportation

Well designed parking areas efficiently use space, accommodate pedestrians and are aesthetically pleasing.

A. Encourage transportation alternatives for employees and visitors by providing

- Bicycle racks and employee shower/changing facilities. Free bike racks are available from the City of Milwaukee. [http://www.mkedcd.org/business/busbike.html]
- Covered bus shelters or waiting areas.
- Pleasant, safe and accessible walkways.
- Preferred parking for carpools.

B. Provide a buffer of native plantings between parking areas and the river edge.

C. Do not locate parking or waste facilities within 10 feet of the front line of the property, and screen these areas from view. Contain all refuse in an appropriate receptacle further enclosed by a 6-foot fence of solid material.

D. Provide no more than two drive openings, and provide appropriate traffic control measures at all entrances to public rights-of-way.

E. Locate truck loading berths at the side or rear of the building.

F. Include on-street and shared parking resources in parking calculations. Minimize parking stall dimensions to 9’ x 18’, as smaller stalls will decrease the parking lot size and allow for a large building footprint.

G. Use concrete pavement rather than asphalt where possible to keep parking areas cool.

H. Incorporate green spaces into parking areas to break up large expanses of concrete.

I. Consider using porous paving systems to extend the life of the pavement, allow for stormwater infiltration, reduce maintenance costs, and reduce the urban heat island effect in summer. See Appendix 3 for additional guidance on using porous paving systems.

5 Site Lighting

Effective and efficient site lighting improves aesthetics, reduces energy use and maintenance, and preserves the night sky.

A. Provide site lighting appropriate for the security needs of the site while maintaining an overall “low-lighting profile” for the complex.

B. Use high efficiency lighting (metal halide or high pressure sodium lamps) with low cut off angles and down-lighting for landscaping.

C. Utilize reflective-type lighting fixtures to reduce or eliminate glare and provide safer, more human-scaled nightscapes.

D. Allow zero direct-beam exterior lighting at the property line.

E. To reduce dependence on high-wattage electrical lighting at night, use light colored or reflective edges along driveways or walkways.

II. Building Design and Energy Use

Purpose: *Generate operating cost savings by designing for energy efficiency and ensuring that the building is capable of operating in accordance with its design.*

Building design should address energy efficiency, daylighting techniques, building commissioning, improved systems controllability and improved aesthetics.

1 Building Design

Thoughtful building design creates a uniform and inviting sense of place for employees and customers.

A. Ensure that the scale and design of new buildings are compatible with adjacent buildings. At pedestrian areas of the building, use awnings, landscaping, windows and doors to lower the scale of the building.

B. Design a principal façade and obvious entrance parallel to the street edge. Do not face blank walls towards public streets.

C. Utilize brick (reclaimed or new), architectural pre-cast concrete panels, decorative concrete block or cut stone. Corrugated sheet metal, vinyl siding, reflective glass and imitation stone siding are discouraged.

D. Screen sources of mechanical noise, odors and loading operations from public open space areas and adjacent properties.

E. Locate utility meters and exhaust vents on the side or rear of building.

F. Screen or locate roof-top mechanical equipment so it is not visible from the street.

G. Design to accommodate areas for recycling of waste materials. Provide a centralized ground-floor location for collection and storage of recyclables.

H. Where possible, orient buildings along an east-west axis for maximum daylighting benefits.

2 Energy Efficiency

Simple energy-saving techniques and technologies generate significant operating cost savings.

A. Design for energy performance that improves upon State of Wisconsin Building Code [http://www.commerce.state.wi.us/SB/SB-DivCodesListing.html] by 25%, and demonstrate energy efficiency using hourly simulation tools. See Appendix 5 for guidance on meeting this objective for Office, Assembly/Manufacturing and Warehouse spaces. Additionally, consider the following strategies:

   - Group spaces for similar functions or requirements to concentrate similar heating and cooling demands, and use non-program spaces as climate buffers.
   - Use thermal mass such as masonry or concrete to moderate interior temperatures and to achieve desired R-value in foundation, walls and roof.
   - Design air-lock entrances to reduce heat loss or gain.
   - Use Energy Star Roof-compliant, high reflectance and high emissivity roofing to reduce heat retention in summer, unless using a green roof.

B. Specify Energy Star [www.energystar.gov] equipment and appliances.

C. Consider separate circuitry to isolate HVAC, lighting and plug loads, enabling operations and maintenance staff to monitor energy use on site.

3 Daylighting and Interior Lighting

Daylighting and efficient interior lighting reduce energy use and create a pleasant, productive work environment.

A. Maximize daylight in your building through the appropriate use of the following strategies:
   - Maximize window height, and use roof monitors, clerestory windows, skylights, and light-pipe technology to transmit light to spaces not reachable by other means.
   - Balance glazing color for view, daylight and energy performance. Note that City of Milwaukee zoning ordinance requires that street level glazing must be at least 65% transparent.
   - Use interior windows, light shelves and low partitions to bring daylight deeper into the space, manage glare, and balance light levels.
   - Use south-facing windows with appropriate overhangs to reduce summer sun and admit winter sun.

B. Supplement daylighting with highly efficient electric light distribution that improves visual quality while reducing electricity use. For instance:
   - Rely on low ambient lighting levels for general illumination (predominantly light reflected from the ceiling where achievable) boosted by high quality, flexible task lighting. For general office space and non-critical manufacturing task areas, consider achieving a lighting power density (LPD) goal of between 0.8 and 1.0 watts/ft2.
   - Use high efficiency lamps and luminaires with electronic ballasts.
   - Employ efficiency-based controls such as dimmers, occupancy sensors, and lumen maintenance controls.
   - Wire luminaires parallel to walls with windows so they can be dimmed or turned off by row.

4 Alternative Energy

Alternative conventional and renewable energy sources reduce your energy costs and your impact on natural resources.

A. Purchase power generated from renewable sources (solar, wind, biomass, or low-impact hydro sources) through We Energies' Energy for Tomorrow Program. [http://www.we-energies.com/house/electric_services/energy_for_tomorrow/index.htm]

B. Consider closed-loop ground-source (geothermal) heating and cooling.

5 Building Commissioning (Quality Control)

Building Commissioning is a systematic and documented process of ensuring that the owner's operational needs are met, building systems perform efficiently, and building operators are properly trained. Commissioning can be applied in new construction, post construction and existing buildings.

A. Contract with an independent commissioning authority from the beginning of the design process to review design options and expected operation of building and its component systems.

B. Have commissioning agent train building staff to operate and maintain the building.

C. Ensure that energy measures are installed and operating one year after completion of construction.

D. Use long-term continuous measurement of performance for building and site systems.

III. Materials and Resources

Purpose: *Reduce impact on natural resources as well as reduce costs, increase performance and improve aesthetics and the working environment.*

Selection of building materials and resources should involve consideration of available and renewable natural resources in addition to more traditional criteria such as cost, durability, performance, and aesthetics.

1 Exterior and Interior Materials

Using building materials with low life cycle costs, high-recycled content and low toxicity reduces environmental impacts.

A. Reuse existing building shells and components where feasible.

B. If on-site reuse is not possible, create a demolition management plan that identifies opportunities to reuse, recycle or sell salvaged materials.

C. For historic buildings (constructed before 1935), make changes to exterior in accordance with US Department of the Interior Rehabilitation Guidelines. [http://www2.cr.nps.gov/tps/standguide/index.htm]

D. Use with Wisconsin Green Building Alliance's Wisconsin Built Directory [http://www.wgba.org/newdata/DirSearch.asp] to locate sources of the following building materials, and achieve the following goals:

   - Use 25% materials with post-consumer and post-industrial recycled content.
   - Use 20% materials and products that are manufactured within a radius of 500-mile radius.
   - Specify US Forest Stewardship Council-certified wood-based materials and products for 25% of all wood used in the project.

E. Specify mold- and moisture-inhibiting construction materials.

F. Use low-VOC sealants and adhesives. For standards, see the California South Coast Air Quality Management District Rule #1168 [http://www.aqmd.gov/rules/reg/reg11/r1168.pdf], and California Bay Area Air Quality Management District Regulation 8, Rule 51 [http://www.baaqmd.gov/dst/regulations/rg0851.pdf].

G. Use paints and coatings that are certified by Green Seal for VOC and chemical component limits.

H. Use carpet systems that meet the requirements of the Carpet and Rug Institute's Green Label Indoor Air Quality Test Program. [http://www.carpet-rug.org/drill_down_2.cfm?page=8&sub=6]

I. Use composite wood and agrifiber products that do not contain added urea-formaldehyde resins.

J. Specify building materials (e.g. insulation, carpet pad) that do not use CFC's or HCFC's as foaming agents or in other parts of the manufacturing products.

K. Use CFC-free HVAC&R equipment.

2 Water Conservation

Off-the-shelf technologies can significantly reduce water consumption and associated costs.

A. Employ whole-building design strategies and use the following high-efficiency plumbing fixtures to reduce aggregate water use:

   - Specify lavatory faucet aerators.
   - Specify low-flow electronic sensor faucets in lavatories or provide lavatories with pedal controls.
   - Consider waterless urinals as a way of reducing first cost in plumbing risers and to reduce water consumption.

IV. Construction & Demolition

Purpose: *Improve construction and demolition waste management practices to reduce waste, costs and environmental impacts of demolition and construction activities and transform wastes into resources.*

The materials in Appendix 6 are designed to assist you in managing Construction and Demolition waste.

1 Waste and Recycling

Reduce, Reuse and Recycle construction and demolition waste to protect on-site materials and reduce environmental impacts.

A. Reuse existing building shells and components. Salvage materials for reuse or resale.

B. Implement a Construction or Demolition Waste Management Plan to recycle and/or salvage at least 50% of construction, demolition and land clearing waste. Include waste reuse and recycling in project specifications. Calculations can be done by weight or volume, but must be consistent throughout. This plan should cover:

- Identification of a Plan Manager.
- Identification of opportunities to reduce site disturbance and minimize environmental impact of construction activities.
- A list of materials to be separated for recovery and designation of areas for collection.
- A plan to educate workers about separation requirements
- Procedures for waste auditing.
- On-site soils management, including areas of concern, types of contamination and disposal or encapsulation methods.
- List sorting/separation/tracking rules.

2 Erosion and Dust Control

Appropriate control measures protect air and water quality.

A. Follow Wisconsin Administrative Code NR 216 [http://folio.legis.state.wi.us/cgi-bin/om_isapi.dll?clientID=75132&infobase=code.nfo&jump=ch.%20NR%20216] and City of Milwaukee Chapter 290 [http://cc-code.milwaukee.gov/code/volume2/ch290.doc] regardless of the size of disturbance.

B. Decrease work during high winds and spray loose soils with water.

3 Pre-Occupancy Controls for Indoor Air Quality

Protection of mechanical equipment and building materials during construction will ensure healthy indoor air quality after occupancy.

A. Protect stored on-site or installed absorptive materials from moisture damage and mold, and replace all filtration media immediately prior to occupancy.

B. Install wet materials before dry in construction sequence to reduce indoor air pollutants.

C. Consider a two-week flush of systems at 100% outside air before occupancy.

V. Indoor Environmental Quality

Purpose: *Provide a healthy and productive environment for facility occupants; increase the comfort and alertness of occupants; improve productivity and reduce absenteeism.*

Good indoor environmental quality encompasses such factors as temperature and relative humidity, adequate ventilation, visual comfort, and noise control.

1 Indoor Air Quality

Indoor air quality affects occupants' health, which can impact absenteeism rates and employee productivity.

A. Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality, and approved Addenda (see ASHRAE 62-2001, Appendix H, for a complete compilation of Addenda) using the Ventilation Rate Procedure.

B. Replace all filtration media immediately prior to occupancy using filtration media that have a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-1999.

C. Increase ventilation to exceed air change effectiveness of 0.9 per ASHRAE 129-1997.

D. Provide for the use of natural ventilation in transition seasons. Take advantage of cross ventilation, prevailing winds and stack effects when possible.

E. Provide direct exhaust for all spaces that generate moisture and pollutants, including manufacturing, toilet and locker rooms, copy rooms and rooms where chemicals and cleaners are stored.

F. Provide mats or grills at entry areas to control dirt and dust.

G. Prohibit smoking in the building.

H. Consider a carbon dioxide monitoring system in spaces of variable occupancy to provide feedback on space ventilation performance. Specify initial operational set point parameters to ensure indoor carbon dioxide levels do not exceed outdoor levels by more than 530 ppm at any time.

2 Acoustic Quality

Improved acoustic quality ensures high employee productivity, attention span and minimizes stress.

A. Maintain a maximum interior Noise Criteria of 35 decibels in occupied areas. Ceiling panels and carpeting can assist in absorbing sound.

B. Place acoustic buffers (corridors, lobbies, stairwells, storage rooms, etc.) and sound-insulated partitions between noise-producing spaces and noise-sensitive areas.

C. Place vibrating equipment on isolation pads and enclose in sound-absorbing walls, floors and ceilings.

D. Maintain a maximum external decibel reading of 50 db at property line.

E. In areas of high ambient noise, specify windows rated at an STC of 40 or better.

F. In other areas, specify windows rated at 35 or better.

VI. Operations and Maintenance

Purpose: *Ensure the building operates at its designed efficiency, reducing costs and increasing occupant productivity over the full life of the facility.*

1 Operations Manual and Monitoring

A building that is operated in accordance with its design and construction will maintain its value and continue its high performance.

A. Prepare an Operations & Maintenance manual, including monitoring of energy use, luminaire and filter maintenance, in accordance with ASHRAE 4-1993. This plan should clearly describe the principles of design intentions, O&M procedures, and should be accessible to building occupants.

B. Schedule regular systems review and maintenance.

C. Prepare an operational waste prevention and recycling plan.

D. Design to accommodate areas for recycling of waste materials.

2 Facility Maintenance

Proper housekeeping and operations activities can protect the health and comfort of occupants and decrease the impact of the building on the environment.

A. Maintain healthy and efficient custodial operations using Green Seal [http://www.greenseal.org/certproducts.htm] or equivalent cleaning products.

B. Frequently inspect for fungus and molds.

C. Form an in-house "Green Team" to raise awareness of workplace associated environmental concerns.

D. Provide centralized ground-floor location for collection and storage of recyclables. Train occupants on recycling procedures and consider incorporating recycling facilities such as compactors, chutes or other technologies to accommodate predicted volumes.

E. Do not store materials, products or equipment outdoors, except finished product in transit and company-owned vehicles.

3 Maintenance and Stewardship of Site and Landscape Elements

Proper long term maintenance of landscape elements will maintain their aesthetic beauty and financial value.

A. Prepare and implement a landscape care and maintenance manual or plan to ensure long-term viability of plantings. This should identify any long-term sequencing actions that are intended by the landscape designer.