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A Green Checklist

Nowadays, you can't pick up a magazine or newspaper without finding some story about green buildings. All of those predictions in Urban Land articles that green was going mainstream were right.

More and more jurisdictions, tenants, and clients are requiring that new projects meet sustainable development criteria, and more and more developers, architects, and planners are scrambling to attach the "green" label to their facilities. But for those who think that all it takes to turn a project green are highly efficient HVAC systems, some low-flow toilets, and native plant landscaping, think again.

Every aspect of development—from site selection to furniture choices—must be green for a project to truly qualify as sustainable. In addition, while basic green development principles remain the same, many different organizations, from the U.S. Green Building Council to the American Society of Landscape Architects and the United Nations, are generating new green thinking. Hundreds of companies are inventing new technologies and products, like permeable hard-surface paving for parking lots and other hardscape, which impact groundwater recharge and stormwater management.

So, here's a Green Checklist to help guide the real estate industry through this Brave New World of profitable and responsible environmentally-friendly development.

The Right Team

Green is integrated into every aspect of a project—from site selection to roofing choices and construction—from its inception. Thus, collaboration among project team members is vital.

Each team member—from architects to engineers, contractors, and hydrologists—should be experienced in planning, designing, constructing, and operating a variety of green facilities. An inexperienced team could make mistakes on key components of green development, from how the roof should be engineered to what interior finishes should be used.

Site Analysis

Location is as important to green development as it is to traditional development, but often for different reasons. Environmental protection is, of course, important. LEED requires avoiding threatened or endangered species habitat, public parkland, prime farmland, and properties within 100 feet of wetlands and "areas of special concern" identified by state or local regulations.

Optimal green sites include brownfields and particularly infill properties, which not only protect existing open space and help prevent sprawl, they also have many of the features important to sustainable development, like access to public transit.

Which site is right? Conduct a comprehensive site analysis that studies both development suitability and environmental sensitivity.

Environment—Survey the property's geology, climate, topography, soils, hydrology, and biology to better understand what can, and cannot be built on the site, what environmental features have to be protected, and what mitigation measures will have to be incorporated into the site plan.

Water Conservation and Stormwater Management—Study the local and regional watershed and man-made hydrology infrastructure to understand potential drought and flooding concerns, which will have to be addressed in the site and development plans.

Open Space—Is open space adjacent to the site? This could provide view and recreational amenities for residents and workers. Can open space be restored and preserved on the site under consideration? This would greatly enhance a project's sustainability, while also providing tenant amenities.

Infrastructure—The site should already have, or be near, electric, gas, communication, water, and sewer utilities (another reason to look for infill properties and brownfields). Utilities that aren't immediately accessible require additional site development, which greatly expands the development footprint and budget.

Mix of Uses—Look for sites that are near a mix of amenities like restaurants, stores, shops, and local services, such as banks and dry cleaners, which will reduce the distances workers have to drive during lunch hours.

Parking—The site analysis should examine the proposed project's parking and loading requirements and the possibility of underground or structured parking development. Also look for sites that are adjacent to public, commercial, or community parking facilities that could share some of the project's parking load.

Transit Options—The site should be near alternative transportation options (bus, train, shuttles, pedestrian/bicycle corridors) to reduce vehicular use. LEED gives points to projects that are within one-quarter of a mile of two or more bus lines, or within half a mile of a commuter rail, light rail, or subway station.

Site Development

Green site development does everything from reducing earthwork and site grading compared to a standard project, to providing erosion and sediment control, minimizing the amount of a project's on-site infrastructure, even reducing light pollution, all of which earns LEED points.

Land Form and Grading—LEED limits site disturbance to less than 50 percent of a property. Strategies include locating buildings on less steep land and using contour grading to reduce erosion, protect the natural environment, and maintain natural hydrology processes.

Building Location and Orientation—Where you place buildings on a site, and how those buildings are oriented, are two of the most cost-effective means of creating a green project. Start by placing the building on a part of the site that can support intensive development, and that is near adjacent mixed uses and public transit like bus stops or a commuter train station. On previously developed sites, place facilities on already disturbed lands, like building foundations and parking lots.

Climate, daylighting, and views will determine how buildings should be oriented on a site. In cooler climates, give buildings a north-south orientation to make the most of the sunlight's warmth, which reduces HVAC requirements. A north-south orientation also brings natural daylighting to the building interior, which reduces artificial lighting use and energy consumption. In hot climates, give buildings an east-west orientation (put sunshades on the western façade) to avoid interior solar heat gain, which reduces air conditioning requirements.

Buildings can also be oriented to take advantage of prevailing winds, which supports natural ventilation, or to protect buildings and users from the wind. Finally, buildings should be oriented to make the most of outdoor views (an important green component), whether they are of a garden, a mountain, or a wonderful skyline.

Density—Build up, not out, to limit the development footprint and provide or create as much open space as possible. Both LEED-NC (new construction) and LEED-CS (core and shell) require a minimum density of 60,000 square feet per acre for urban development projects.

Parking—Surface parking lots leave little room for open space and other amenities, they are an aesthetic blight, they often create stormwater runoff problems, and they are massive heat islands (asphalt and other dark, non-reflective surfaces on roofs, walkways, patios, roads, and parking lots which absorb sunlight and heat, and then slowly release the heat, which increases surrounding temperatures by as much as 10 degrees, increasing HVAC loads and water consumption).

Structured parking is more expensive, but it significantly reduces the development footprint and heat islands, and it makes the project more aesthetically attractive.

Utilities Planning—Green projects reduce energy consumption and use alternative technologies to generate power on-site, from photovoltaic systems to wind turbines, natural gas micro-turbines/fuel cells, and cogeneration stations. One of the newest trends is "Zero Net Energy" buildings, which combine energy efficiency with on-site energy generation to produce all the energy they require.

Utilities planning includes on-site wastewater treatment and a stormwater management system that generates no net increase in the rate and quantity of stormwater runoff from the site.

Open Space Planning—LEED recommends exceeding local code open space requirements by more than 25 percent. How can a development afford to set aside so much space in this era of high land costs?

Make the project's open space serve multiple uses. Native vegetation can be turned into buffers, screens, shade canopy, usable open space, and stormwater management systems. An urban forest can be planted in and around a business campus to reduce heat islands, act as visual buffers or wind screens, provide wildlife habitat and view amenities, and also beautify the campus.

Landscape Architecture

Landscape architecture is one of the most effective green strategies, providing a myriad of sustainable benefits at relatively low cost.

Erosion Management—Landscape architecture strategies, like bio-engineering—the use of groundcovers, shrubs, and trees—and live-staking the site with deep-rooted plants will help hold the slopes, prevent erosion, and beautify the project.

Water Conservation—LEED requires that landscaping water consumption be reduced by 20 to 50 percent. Successful strategies include the use of native and/or drought-tolerant plants, installing water-conserving irrigation systems and grey water recycling systems to provide irrigation water, and constructing retention ponds that store stormwater for later irrigation use.

Stormwater Management—Bioswales, water detention basins, landscaped open space, gravel filters, and other landscape strategies all help to reduce the velocity and amount of stormwater flow, and they also help remove pollutants from stormwater.

Heat Island Mitigation—A building is a heat island. Use green screens (metal lattices planted with vines and/or climbing flowers) to shade the south and west walls, which reduces interior heat gain and beautifies the building. Mature trees can shade building walls, patios and plazas, pedestrian walkways, roadways, and parking lots.

Green Roof—A building's roof is one of the largest heat islands on a site. A green (landscaped) roof, however, absorbs solar heat just as a park or meadow would, dramatically reducing the roof surface and air temperatures compared to a standard building. A green roof also insulates the building, reducing the amount of heat penetrating the interior in Summer (which lowers air conditioning usage) and reducing the amount of heat loss in Winter.

A green roof also provides stormwater management. The plants absorb and store rain, reducing runoff, and they filter pollutants from stormwater runoff. Many green roofs have a stormwater collection system to support the rooftop irrigation system and other grey water uses in the building, like toilet flushing, car washing, even a firefighting reservoir.

A green roof has many more benefits, from improving air quality by filtering out pollutants to providing a relaxing break space for building tenants.

Building Design—Exterior

A wide variety of cost-effective design strategies will create a green building.

Shape—A long and narrow building shape maximizes natural daylighting and ventilation for workers. A more circular shape—such as that for London's Swiss Re Tower (known as The Gherkin)—brings natural daylight to every part of a building.

Façade—Large windows with Low-E (low emission) glazing bring abundant natural daylight into the building interior without solar heat gain and glare. Operable windows support natural ventilation in temperate weather. Arcades and sunscreens protect the eastern, western, and southern façades, particularly windows, from solar heat and glare. For high-rise buildings, use a double curtainwall to bring natural daylight into the building interior, vent heat out the top of the tower, and capture warm air to help heat the building in Winter.

Roof—Select an Energy Star (light colored, light and heat reflecting) roof to reduce air conditioning requirements and conserve energy, or install a green (landscaped) roof.

Paving—The U.S. has more than 50,000 square miles of impervious paving, which exacerbates heat islands and climate change, flooding, and wildlife loss, and it prevents the re-supply of underground aquifers. Select permeable paving products for patios, plazas, pedestrian pathways, roadways, and parking lots.

Building Design—Interior

Daylighting—Natural daylighting and outdoor views should reach 75 to 90 percent of a building's interior spaces. Design strategies include large windows, clerestories, skylights, light monitors, lightshelves, and even a central atrium. Or, locate fixed elements like stairs, mechanical systems, and restrooms in the central core to create a flexible and open perimeter that will bring more natural light to work areas.

Artificial Lighting—Interior lighting can comprise 20 to 25 percent of a building's direct energy use. Install light-sensitive and motion-detector lighting sensors and controls to reduce artificial lighting use. Replace standard T-8 lamps with T-5 lamps, which conserve energy, generate less heat, and give off more light.

HVAC—Select highly efficient HVAC systems—such as a raised floor thermal displacement system—that do not use hydrochlorofluorocarbon (HCFC), Halon, or chlorofluorocarbon (CFC)-based refrigerants which deplete the ozone. Individual climate controls in offices and at work stations will reduce HVAC use.

Water Conservation—Reduce building water consumption with technologies like water-conserving plumbing such as low-flow faucets and waterless urinals which are more sanitary than standard urinals. More and more green buildings have grey-water recycling systems that convert rain water and wastewater into new uses from landscape irrigation to toilet flushing.

Building Materials and Furnishings—Green building materials reduce the use of natural resources and create a healthier and safer workplace for tenants and employees. Recycling, for example, saves natural resources. A wide variety of building materials ranging from heavy steel to carpeting, acoustic tiles, and furniture now have recycled content.

Specify low- and zero-VOC paints which don't off-gas the toxins of standard paints. Use rapidly renewable materials, like bamboo for flooring, and insist on wood-based materials certified by the Forest Stewardship Council (FSC).

Select alternative materials like strawboard made from wheat (rather than formaldehyde-laced particle board), cotton- or soybean-based insulation, and natural linoleum made from jute and linseed oil (rather than standard vinyl flooring packed with a host of toxins).

LEED gives points for all of these choices.

Green Construction

How you construct a green building is just as important as what you construct. Green construction techniques include reusing existing resources, like concrete from a site's previous structure that can be used for roadway and sidewalk paving. LEED gives points for recycling demolition and 50 to 75 percent of construction waste.

Coordinate the sequencing of wet and dry activities to avoid contaminating dry materials that would absorb moisture and become a breeding ground for mold or bacteria growth. Flush the ductwork and entire HVAC system with outside air to remove any construction debris left over from the original manufacturing process.

Green requirements don't end when you complete a building. Implement a sustainable landscape maintenance plan that uses toxin-free organic or biological fertilizers and weed and pest control products. Create a building interior cleaning program that uses only green products to protect the indoor air quality.

Continuously monitor the performance of the building systems to assure that they are meeting project goals. Upgrade the building systems to improve even more the building's efficiency and sustainability.

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