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CONSTRUCTION STANDARDS

Survival of the Greenest: How LEED Can Evolve to Protect Against Hurricane Sandy



BY STANLEY N. ALPERT

Introduction.

Hurricane Sandy was a shock to our lives and our buildings and infrastructure. Current green building standards do not specifically focus on preventing damage from the effects of hurricanes, in particular storm surges. Yet the interconnection between the built environment and the social, economic, and environmental damage caused by monster storms is undeniable. Present Leadership in Energy and Environmental Design (LEED) standards indirectly tend to reduce the damage from major storms and there are regional priority credits that may apply. However, methods to mitigate the damage such as wetland buffers, increased natural drainage, environmentally sensitive storm barriers, and more are not prominent in LEED's point system. LEED does not require climate adaptation strategies to obtain certification. In light of Sandy, the U.S. Green Building Council (USGBC) should consider in its next versions of LEED rewarding builders with LEED points for a series of measures that will render residen-

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tial and commercial buildings and their occupants safer from storms, at once benefitting the environment and the economy.

Adaptation, Not Mitigation. Hurricane Sandy's costs could top \$50 billion. And it should not be forgotten that the cost ignores the deaths caused by the storm, millions left without power, tens of thousands left homeless, and the suffering of people forced into shelters. Two months after Sandy walloped New York and New Jersey, it was reported that almost one-fifth of Rockaway residents surveyed were still not in their homes, almost 10 percent were still without electricity, almost one-third were without heat, more than four out of five homeowners who had wet sheetrock in their homes still had it there or had to pay out-of-pocket for its removal, and almost two out of three still had mold or paid out-of-pocket for mold removal and remediation.¹

There are some, such as the former New York/New Jersey Baykeeper, who contend that compared to \$50 billion in damage, a more modest roughly \$10 billion to construct wetlands and oyster reefs, enforce flood hazard building restrictions, plan for a retreat from flood hazard areas, and place appropriate sea gates would protect New York City's infrastructure from a repeat of such an expensive fiasco.²

Water damage is one issue. Management of water resources is another. One study points out that climate change may result in earlier spring snowmelts, lower summer stream flows in snow-dependent areas, increased risk of droughts, increased risk of flooding, increased competition for water (just look to California or Arizona), warmer water temperatures in lakes and riv-

¹ *Forgotten: How the City has Failed People in the Rockaways*, NY Communities for Change (2013).

² *Transition New York City Bioregion: Preparing Our Island City and its Bioregion for a Bright Green Future*, Andrew Willner, Sustainability Solutions (2012).

ers, and changes in the actual quality of the water.³ Infrastructure may be affected by more frequent and more intense landslides, washouts, and flooding. There likely may be increased costs for the construction and maintaining of coastal property erosion controls. Climate change also will likely increase the likelihood of wildfires, invasions of pests, dying trees, and degradation of surface level air quality.

The larger impacts raise political and planning issues. For example, there is talk in New York City of a long list of infrastructure investments, supported, for example, by current Council Speaker and mayoral candidate Christine Quinn. She supports construction of “hard infrastructure,” like sea walls, bulkheads and flood gates, and “soft infrastructure” like sand dunes, wetlands, and embankments. She called for new efforts to protect power plants and substations from 20-foot storm surges, burying utility wires, and the storm-proofing of refineries and fuel storage facilities. She said there should be generators at all gas stations. Among other things she also supports more green streets, green roofs, and bluebelts (for best stormwater management practices). She even suggests new rules requiring buildings to be built above flood levels. The cost of all this could exceed \$20 billion.⁴

But what are individual developers and real estate owners to do? At the green building level, steps can be taken to protect buildings and also to minimize the larger impact from extreme storms.

Most green building measures regarding global warming address reducing greenhouse gas emissions to try to prevent or reduce climate change, meaning mitigation. For example, the most prominent green building system, LEED, encourages the creation of green buildings, and it results in smart building design that is more energy efficient, with a lower carbon footprint, among other salutary features such as water use reduction, indoor air improvements, and more. “Adaptation,” by contrast, means making adjustments to our built environment and infrastructure in response to expected climate events and their impacts, whether severe or not. In the case of hurricanes at the level of Sandy, nothing less than survival is at stake.

There is, of course, some crossover. On-site renewable energy reduces a building’s carbon footprint and at the same time injects resiliency to power outages that may allow electricity to continue to flow during the emergency. LEED points need to be targeted and granted to reward both beneficial aspects.

Brief Introduction to LEED. LEED was created by the USGBC to encourage the creation of green buildings, and it has been very successful in spearheading a move toward smart building design that is more energy efficient, with fewer toxins and cleaner indoor air, smarter use of water resources, and the creation of far more pleasant working and living environments. Other systems of denoting a building as green, such as the Environmental Protection Agency’s (EPA) Energy Star, Green Globes, passive buildings, or net-zero energy

may be very attractive to a developer depending on the case, yet LEED has emerged as the most prominent of the standards. LEED is a point system, by design permitting many different ways of getting to a certain level of green certification. A building is LEED-certified at 40-49 points, LEED Silver at 50-59 points, LEED Gold at 60-79 points, and LEED Platinum above 80. USGBC has several categories of LEED certification, including for New Construction and Major Renovation, Core & Shell, Commercial Interiors, Schools, Healthcare, Retail, Existing Buildings: Operations and Maintenance, Homes, and Neighborhood Development. For purposes of Sandy adaptation, note that LEED applies to new construction of buildings and also to modifications of the existing stock.

Many states and municipalities across the country already require or provide legal incentives for LEED certification, in the case of both government building projects and even private developments. In just the latest example, New York state recently gave authority to municipalities to provide a real estate tax exemption for improvements to real property that achieve LEED certification, or substantially equivalent standards.⁵

The points are earned from a menu of green development ingredients. A building’s energy measures can earn up to 35 points, including, for example, optimizing energy performance which can earn up to 19, and on-site renewable energy which can earn up to seven. But substantial points can be earned in other ways. Choosing a “sustainable site” can earn up to 26 points, including five for developing in a denser area where the community is well connected for walking, and six for good access to subways or buses. Quality in the indoor environment can earn up to 15 points, including one point each for various types of materials that have low emissions of volatile organic compounds. Wise use of materials and resources, such as re-using a building, can earn up to 14 points. Water efficiency can earn up to 10 points, including points for use reductions such as gray water systems and efficient landscaping.

In addition, at present, Regional Priority Credits (RPCs) allow for recognition of geographically specific environmental priorities. RPCs are existing LEED credits that USGBC regional councils and chapters have designated as being particularly important for their areas. If an RPC is earned, then a bonus point is awarded to the project’s total points. A specific location – referenced by ZIP Code – has six RPCs per rating system. To the extent a region contains prominent flood zones these credits can capture some climate adaptation measures.

Future Versions of LEED. The LEED systems are always being considered by USGBC with an eye to revising them. In the aftermath of Sandy specific storm adaptation measures should be built in and given ample credit levels both for new buildings and renovations.

Developing credits for climate adaptation fit into two categories. “No regrets” strategies generate social or economic benefits whether or not there is climate change. For example, exterior shading devices such as movable awnings, by reducing heat from the sun during warm weather save energy and money even while they overcome the need for more aggressive air conditioning systems. “Resilient” strategies, such as designing rain

³ *Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments*, Center for Science in the Earth System, in association with ICLEI – Local Governments for Sustainability (2007).

⁴ *Chris Quinn’s Kitchen Sink Approach to Post-Sandy Infrastructure Investment*, Capital New York (Nov. 13, 2012).

⁵ New York S.2034/A.2080 (Jan. 9, 2013).

water runoff without gutters, allow a system to absorb severe disturbances without losses. For landscaping, minimizing impervious surfaces always allows for natural drainage (no regrets) and protects the building and neighborhood during major floods (resilience).⁶

Just a few exemplars of adaptation measures for which LEED may expressly reward real estate developers and owners include:

- Credit for techniques that involve building above the flood line.

- Rather than using typical meteorological yearly data (TMY), adapting HVAC systems to cover a range of potential temperature extremes, high and low. Extreme heat events, for example, will require more powerful air conditioning systems.

- Planning for pavement, which is affected by temperature, precipitation, freezing and thawing, must reflect reduced life expectancies and a greater likelihood of buckling during heat waves.

⁶ *Green Building and Climate Resilience: Understanding Impacts and Preparing for Changing Conditions*, University of Michigan and U.S. Green Building Council (2011).

- Building materials that are designed for greater durability under anticipated climate changes. They should also be more easily replaceable after flooding. They may need to be more pest resistant, as for example, the range for termite habitat increases.

- Roofing and building envelope strategies should address the impacts of high wind and extreme precipitation.

- At the macro level, stormwater management systems must be redesigned with greater capacity and publicly-owned sewage treatment works designed to reduce overflow pollution events. But at the building level, LEED could allocate increased points to effectively managing the stormwater runoff on the individual building site.

- Accommodating for the northward shift of plant hardiness zones when designing the building's landscaping.⁷

Measures such as the above and surely many others on the green building level may help us as a society to ensure that the next Sandy is less devastating. Of course this is not to the exclusion of the larger infrastructure projects that are also an imperative.

⁷ *Id.*