Design and Construction Excellence 2.0 Guiding Principles

Department of Design and Construction

Bill de Blasio
Mayor

Dr. Feniosky Peña-Mora
Commissioner

Design and Construction Excellence 2.0 Guiding Principles

Beginning a Conversation

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Times Square

Design and Construction Excellence 2.0 Pre-Proposal Conference

Dear Colleagues,

Design and Construction Excellence 2.0 (DCE 2.0) brings together innovative design and construction strategies to build a thriving, dynamic, strong and just New York City for all. To enhance the value and effectiveness of DCE 2.0, we have developed a set of Guiding Principles. They provide an invitation to you, our design consultants, to advance design in New York City through the lenses of equity, sustainability, resiliency and healthy living. We encourage you to reflect upon them and make them your own.

Great design can meet the challenge of creating equitable buildings and spaces that are safe, sustainable, resilient and healthy. With your help, we will design and build them together.

We see these Guiding Principles as a conversation starter, offering ideas on which to reflect. We hope you will join the discussion and share your ideas with us so that we can effectively refine and evolve these Guiding Principles. Discovering their many possibilities is a journey we are taking together. It involves listening deeply and responding insightfully so that well-designed public buildings and civic infrastructure help build an enduring city for all New Yorkers.

I hope you enjoy this conversation, and working with all of us at DDC.

Sincerely,

Feniosky Peña-Mora

Dr. Feniosky Peña-Mora, Commissioner

Beginning a Conversation

Manhattan Districts 1/2/5 Garage
and Spring Street Salt Shed

Design and Construction Excellence 2.0

Design and Construction Excellence 2.0 (DCE 2.0) is a new commitment to deliver responsive, innovative and enduring buildings and infrastructure. With the launch of the Guiding Principles, the lenses of equity, sustainability, resiliency and healthy living become the essential frameworks within which Design and Construction Excellence addresses the key challenges that affect all New Yorkers.

Since its inception in 2004, DCE has represented the critical force needed to foster aesthetic, technical and functional innovation in public buildings. These projects have received extraordinary recognition, having won more than 150 awards throughout the last 12 years. Through partnerships with both world-renowned design and construction professionals and diverse, emerging local talent, DCE 2.0 delivers projects that exceed expectations, welcome citizens, reflect the city's diverse cultures, catalyze growth and enhance and protect neighborhoods.

As the foremost municipal design and construction agency in the nation, we know it is our charge to meet these challenges as we shape the growing communities of New York City. Together let us give form to the principles and aims that will shape the city of the future.

An Introduction to the Guiding Principles

SculptureCenter

Welcome to the Guiding Principles. They are intended to inspire the creativity of architects, engineers, landscape architects and allied professionals to address key challenges of our time. They are not meant to be prescriptive but to encourage the development of perceptive solutions that enhance performance ranging from minimizing emissions of greenhouse gasses to design that engages groups who may feel left out.

Though there are 20 principles and five aims for each, this document is not complete. Instead, it is a framing of essential aspirations to assist a reflective, thoughtful design process. With the launch of the Guiding Principles we invite design professionals, our agency partners and our professional staff to join us in a lively conversation over the coming months. Through your comments and at events to be scheduled in coming months, we encourage you to help us more fully understand the meaning and application of these principles and how they can be improved and applied.

What are Guiding Principles?

Guiding Principles encourage design teams to think deeply and creatively: to reflect and speculate; to launch new ideas in the quest to achieve superior building and infrastructure design. To better serve New Yorkers the four lenses of equity, sustainability, resiliency and healthy living give essential context to Design and Construction Excellence 2.0 (DCE 2.0).

The Guiding Principles offer a succinct yet inclusive means by which consultants can thoughtfully engage essential challenges as they turn project objectives into

effective, buildable designs. Working with the Guiding Principle priorities, design teams can open conversations with users and agency partners. These discussions can help forge agreement on strategies that can offer the most effective and far-reaching benefits for a given project. As principles, they are intended to give consultants wide latitude to develop designs that are energy efficient while dignifying the people they serve. Understanding the potential community impact of floods, for example, can be even more powerful if projects also support the community pride essential to successfully adapt to changing conditions. DCE 2.0 will serve client agencies—and ultimately New Yorkers—by helping to achieve a strong, just and growing city that anticipates challenges and creates opportunity.

Why Lenses?

The Guiding Principles invite designers to insightfully engage economic, social and environmental **equity**. New York can aspire to succeed for all when public buildings and civic infrastructure ease access and welcome citizens to services, opportunities and resources. Research shows that design can strengthen civic engagement and build the social capital that helps communities thrive. Libraries help students achieve and adults find jobs. Family Justice Centers offer comprehensive domestic violence services. Parks, museums, plazas and performance spaces can be designed to encourage people of different races, cultures, ages and abilities to meet, share wisdom and enjoy each other's company.

Recognizing the extraordinary urgency of climate change, the Guiding Principles look for a deeper commitment to environmental **sustainability**. Buildings are among the largest sources of greenhouse gas emissions, and public building design will lead the way in reducing them. To achieve the City's goal of cutting building emissions 80 percent by 2050, the Guiding Principles encourage new thinking in the design, construction and operation of buildings. Sustainability means more than reducing energy use and greenhouse gasses. Among many possibilities, projects can bring nature closer to city residents, while using natural systems (in the form of bioswales, for example) to slow flooding and filter polluted runoff.

The Guiding Principles for **resilience** set priorities for addressing the chief extreme threats and chronic hazards that threaten the City's infrastructure and buildings. Among these are coastal storms, flooding, extreme temperatures and human caused events. Investments that prevent damage and help people adapt to changing circumstances almost always cost far less than the toll tragedy takes. Resilience design can help buildings and infrastructure continue to serve during emergencies, and return to full service rapidly. Designing with resilience in mind also can avoid catastrophic failures related to chronic or long-term threats, like rising seas.

Thoughtful designs can help New Yorkers address health needs, key elements of our larger well-being. DDC's **healthy living** lens expands upon the City's established Active Design Guidelines to help bring greater access to fitness resources and nutritious food choices. Healthy living principles ask designers to consider research-tested design tactics that support mental health. These

include clear wayfinding, access to nature and other restorative elements. Prudent use of materials can avoid harm to the environment and assure users that the air they breathe is healthy.

Why Guiding Principles?

The Guiding Principles encourage transformative design. They ask design teams to deeply analyze the circumstances of each project to tease out the greatest opportunities, then build the design around realizing them. They invite designers to prioritize tactics that create the greatest benefits. Does the project truly serve an at risk population? Does it invite participation of those who feel a library or museum is not welcoming? Is the location subject to a unique hazard, such as erosion? With wide latitude to choose how Guiding Principle aims are included in projects, design teams can develop solutions that are well aligned to project objectives, yet exceed expectations.

How are Guiding Principles implemented?

The Guiding Principles will inform development of the project scope at early stages. As the project moves through the design phases, the design team will propose how best to realize the Principles, working with DDC's project managers, design liaisons and reviewers. The concepts agreed upon will be evaluated at milestones defined for DCE 2.0 at design, bid, construction and commissioning phases.

Next Steps

While these Guiding Principles are addressed to the architects, engineers, landscape architects and related professions, an extensive consultation process will improve them over the coming months.

In more comprehensively defining excellence, the Guiding Principles and DCE 2.0 make extraordinary design attainable, enabling quality construction better attuned to serving New Yorkers' needs in an era of unprecedented challenges with the optimism that great advances can be achieved.


Columbus Circle

Equity

High Bridge

Equity

Designing for equity is a paradigm shift that affirmatively promotes design for all. The built environment can powerfully advance everyone's participation in the life of the City. Design can improve access to essential services and places of work, socialization, recreation and culture, especially in underserved neighborhoods. Extraordinary design can harness latent local qualities, turning serviceable projects into magnetic and catalytic ones. Through sensitive engagement with New York's diverse communities and recognition of local histories, backgrounds, needs and voices, design teams can develop projects that measurably enhance well-being, neighborhood identity and social cohesion.

Guiding Principles:

1. Convey a sense of welcome to all

2. Ease access to resources

3. Strengthen communities

4. Respect histories and cultures

5. Evolve with needs and change

Equity:

Convey a Sense of Welcome to All

Design to invite. An appealing façade and entry can attract passersby to enter a public facility. The arrival and entry sequence might be ample and expressively display the services and programming within the structure.

Design to delight. People appreciate a public building with a unique presence that invigorates a neighborhood. Every facility can strive to be memorable and inspire civic pride.

Encourage use. Insightful design can legitimize use by everyone, especially populations who are often discouraged by insensitive design. Consider how facilities can convey a sense of safety and offer a place of refuge when needed.

Facilitate assembly. As the city grows denser, shared non-commercial indoor and outdoor public spaces become a more important means to connect with and strengthen community. Public facilities can accommodate opportunities for discussion, enjoying culture, congregation and recreation.

Support diverse activities. Public spaces can be flexible enough to allow people to engage in activities from quiet to loud, solitary to crowded, contemplative to active.

Design to Invite:

The proposed renovation of the East Flatbush Library opens itself more generously to the community by replacing its opaque façade with a transparent one that showcases the activity within the building.

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Design to Delight:

With its playful circular motifs, the Queens Theater in the Park echos the geometries of the New York State Pavilion from the 1964 World's Fair. The bold forms are used to display the theater's family oriented programming and increase its visibility within the landscape of Flushing Meadows-Corona Park.

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Encourage Use:

Through natural daylight, the word "search" appears projected onto the façade of the Glen Oaks Library. At street level, the same word, etched on the glass in many languages, invites visitors from diverse backgrounds to consider the building as their own.

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Support Diverse Activities:

Among many multi-purpose spaces at the Brooklyn Museum, the Beaux Arts Court is a double-height volume that supports diverse activities that all visitors can enjoy.

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Facilitate Assembly:

The recent expansion of the Queens Museum has incorporated several new classrooms and support spaces, allowing the museum to enhance its outreach to schools and the community. The design also includes informal areas for gathering, encouraging people to come together on their own terms.

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Equity:

Ease Access to Resources

Design for inclusivity. Consider how design can engage the needs of a diverse socioeconomic and multigenerational population. Go beyond programmatic requirements to consider the citizens who use facilities and who bring diverse needs and cultural expectations.

Account for unique needs. Truly inclusive design transcends ADA compliance and invites people with disabilities to fully participate in a dignified way.

Incorporate user-centered design. Consider the end users in the development of the design. Try to meet needs with one stop and well-integrated services.

Ease access to transportation. Consider the path from the facility to the nearest form of transport. Building entrances and infrastructure can be strategically located to encourage and facilitate the use of alternative transportation options.

Provide a clear sense of orientation. Consider how to achieve clear wayfinding throughout the project or building that is sensitive to impairment and language barriers. Architectural design can ease access, along with simple, clear signage and other navigation aids.

Design for Inclusivity:

The design of the Children's Library Discovery Center at the Queens Library welcomes children to intimate spaces, child-sized chairs, desks, reading nooks and social areas.

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Incorporate User-Centered Design:

The reception area of the Prevention Assistance and Temporary Housing Family Center incorporates the needs of users through a reception desk lowered to assist children and those with disabilities, clear orientation, abundant daylight and ample seating in the waiting area.

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Account for Unique Needs:

The design of the Bronx Museum of the Arts seamlessly integrates access for those with disabilities and adds dignity by making it intrinsic to the viewing experience.

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Provide a Clear Sense of Orientation:

The strategic location of skylights and clear signage in the central spine of the Mariners Harbor Library orients visitors to services and a back garden.

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Ease Access to Transportation:

The uniquely shaped canopy at Fordham Plaza anticipates a vibrant public space that offers clear and easy access to diverse transit options.

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Up Close:
Respectful, Dignified Design

Ease Access to Resources

It is easy to minimize the impact of dignified design for people with special needs; however, these measures are essential aspects of the equal access dialogue. Co-locating services for individuals with physical and cognitive impairments facilitate active, independent and effectual involvement and participation. DDC is committed to the design of public spaces that offer equal access of services and provide a safe, dignified and welcoming environment for everyone. Design can address the needs of all users in a way that allows everyone to participate in the life of the facility with grace and pride. The law requires the accommodation of those with disabilities, but insightful design can dignify the experience. An example can be found in the special treatment of the corners of the 9/11 Memorial that provides a dignified platform for those using a wheelchair, walking frame or baby stroller to see into the symbolic pools.

Equity:

Strengthen Communities

Bolster neighborhood pride. Design can embody a locality's unique identity but also transcend it using architecture that is magnetic and therefore catalytic, drawing visitors, attention and ultimately, investment.

Address unmet needs. Consider how facilities can be valued resources for neighborhoods, not just individuals. Look for opportunities to fill critical gaps in services, amenities and safety.

Strengthen community capital. Emphasize the functions that inspire civic engagement, social cohesion, education and neighborhood stability. Plazas, public streets and public areas in buildings can accommodate a multitude of community building events in a way that inspires idea sharing and collaboration.

Design spaces to unite. Look for ways to break down physical and social dividing lines. The design of streets, parks, plazas, community rooms and gathering spaces informed by equity invites people to congregate and engage.

Encourage knowledge sharing. Formal and informal knowledge exchange is critical to strong communities. Ask whether settings can be developed for intergenerational exchange or skills development.

Design Spaces to Unite:

The High Bridge, closed for more than 40 years, now serves as a pedestrian link between the Bronx and Manhattan, bringing together long-separated communities and fostering a sense of pride.

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Strengthen Community Capital:

The 40th Police Precinct is designed to strengthen civic engagement through the introduction of a prominently placed multipurpose community meeting room.

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Address Unmet Needs:

The Flatbush Caton Market supports community development by incubating growth off-street for local former street vendors and micro-entrepreneurs.

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Bolster Neighborhood Pride:

The Meadow Canopy at the Staten Island Children's Museum creates a public space where local residents can share special moments with their children.

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Encourage Knowledge Sharing:

Corona Plaza exists not only as a gathering place, but also as a community resource in which local people and institutions can extend learning into the public realm. The pop up library, sponsored by the Queens Museum, brings educational development into the neighborhood.

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Equity:

Respect Histories and Cultures

Promote neighborhood culture. Design can recognize significant cultures and historic contributions and in that way contribute to identity and character. Such an evocation can nest amid the multitude of cultural expressions found in every neighborhood.

Learn from local voices and stories. Profound insight into community history and unmet needs can be revealed through deep engagement with key stakeholders. Consider the use of a collaborative design process that helps bring local understanding into design aspirations.

Incorporate local ecology. The natural environment, such as waterfronts and important designated landscapes can enhance the project's sense of place.

Use locally engaged art. Encourage the creation of art that is reflective of the culture and spirit of the community. Art in public spaces can help people forge a connection to place.

Express historic contributions. Artworks, memorials and commemorations are means to express remarkable community influences, which can often be best appreciated and understood through art.

Promote Neighborhood Culture:

The newly designed glass façade creates a more prominent entrance to the Schomburg Center for Research in Black Culture. With its nationally known resources, it reminds neighbors and passersby of the important culture and identity of Harlem along Malcolm X Boulevard.

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Learn from Local Voices and Stories:

The Weeksville Heritage Center sits on the site of the historic African American village in Brooklyn for which it is named. Through in depth engagement process with the Center's experts and collection, a modern building was created that reveals hidden elements of the site.

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Incorporate Local Ecology:

The Queens Botanical Garden Visitor & Administration Center highlights environmental features of the site and is sensitively integrated into the landscape.

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Use Locally Engaged Art:

The names of national epics are carved into the front steps of the Queens Library at Flushing to engage the diversity of languages spoken in the community. The steps invite sitting for up-close examination.

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Express Historic Contributions:

The design of the Harriet Tubman Memorial Plaza in Harlem honors a leader of the Underground Railroad that secretly conveyed slaves to freedom.

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Equity:

Evolve with Needs and Change

Address community evolution. Social dynamics, including serial transformation of neighborhoods by the vitality of waves of immigration, can require the rethinking of service priorities and design preconceptions. Public buildings and spaces can be amenable to diverse interpretations over time.

Design places to evolve. Strive to anticipate programmatic change. Public spaces that can adapt over the day, the week, and the year with temporary events can successfully address vital issues and neighborhood change.

Inspire community stewardship. Consider how best to design to instill a sense of ownership that encourages community members to participate in the maintenance and upkeep of public structures and spaces over time.

Nurture economic empowerment. Entrepreneurship can be supported through the design of spaces that allow for diverse forms of commercial enterprise. Such places can be adaptable to the future growth of small businesses.

Design for growth. Considering opportunities for future growth of facilities, especially within existing footprints or sites, helps agencies quickly adapt to changing opportunities and service demands.

Address Community Evolution:

The wooden pavilions for La Casita Community Garden host neighborhood celebrations reflecting Puerto Rican culture, yet are flexible enough to transform for use by other groups for a variety of purposes.

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Inspire Community Stewardship:

A community group inspired the creation of the Langston Hughes Community Library and Cultural Center, which opened in 1999. Community members have kept this cultural center vital with donated artwork and substantial programming.

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Nurture Economic Empowerment:

With its regular markets, La Plaza de las Americas realizes the aspirations of local entrepreneurs by providing an attractive environment for community-based commercial enterprise. The water fountain represents the source of life.

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Design for Growth:

A study is considering how an existing outdoor space at The Langston Hughes Community Library and Cultural Center can be adapted to accommodate expanded programming. The new elements could be demountable so that the library can continue to host its broad range of neighborhood-focused events.

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Case Study: Times Square

Evolve With Needs and Change: Design Places to Evolve

Times Square encourages a multitude of activities, collective cultural experiences and social connections. It is the symbolic center of the City, where people can sit on red-lit steps and gaze at the passing throngs. Everyone can gather to celebrate, and to have their collective voices heard, with New Yorkers mixing with visitors from around the world. The square is dynamic in the possibilities of events that it can host, but also as a meeting place for all kinds of people. Now people can linger for coffee at movable chairs and fixed benches and move around more safely and comfortably, thanks to much expanded pedestrian space. The square's reconstruction celebrates the City's aspirations for all the public buildings and places we build, with the goal of assuring that they are participatory, democratic and enduring.

Sustainability

Weeksville Heritage Center

Sustainability

New York City is continuing to move aggressively to reduce its impact on the environment—meeting tomorrow's needs without compromising resources available to future generations. DDC is helping the City rapidly minimize greenhouse gas emissions through dramatically reduced building energy use in both new construction and renovation. On building sites and infrastructure projects, DDC designs thread natural systems and habitats throughout the five boroughs to manage stormwater and bring the many benefits of nature to citizens. The City has set a high bar, pledging a reduction in greenhouse gas emissions of 80 percent from 2005 levels by 2050, and reducing commercial waste 90 percent by 2030—with municipal buildings leading the way.

Guiding Principles:

1: Use natural resources responsibly

2: Promote sustainable urban ecology

3: Minimize energy use and reduce greenhouse gas emissions

4: Encourage responsible water use

5: Design holistic, integrated systems

Sustainability:

Use Natural Resources Responsibly

Choose renewable materials. Try to choose materials from responsibly managed or recycled sources as much as possible. Wood is the most common renewable material, but both steel and aluminum are among many materials that can be sourced from recycled stock and recycled again at the end of the project's useful life. Seek to limit the extraction of virgin materials.

Consider material lifecycles. Take into account how climate change and other evolving phenomena affect the replacement cycle and performance needs of products and assemblies. Consider life cycle analysis of key components that takes into account the full range of impacts beginning with extraction and ending with recyclability or demolition.

Adapt existing structures. Adaptive reuse of structures can capture enormous embodied energy and avoid waste while bringing new utility to culturally important buildings and sites.

Avoid toxins in materials. A rigorous analysis to minimize toxins may benefit users with special sensitivities, such as children and the elderly. Consider evaluating scientific consensus on harmful substances such as dioxins emissions from PVC and the ongoing presence of lead in pipes and paint.

Optimize waste management. Seek to minimize waste in construction operations. Consider how to ease recycling and advance other resource conservation practices for those who will use the project once in service.

Adapt Existing Structures

The 22nd Police Precinct operates from a landmarked, converted 1871 horse stable in Central Park. The slate and copper roofing was restored along with Victorian stonework. A new vaulted roof spans a former courtyard to form a lobby.

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Consider Material Lifecycles

A 200-foot-long wall that shields the Department of Transportation's Sunrise Yard from neighbors expressively reclaims brick, stone and concrete. Etched along the surface is the phrase, "Gravel, sand & pebbles with clay as if crushed together," referring to a nineteenth century ink drawing of the geologic layers on the site.

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Choose Renewable Resources:

The addition to the Carnegie-era NYPL Stapleton Library branch makes prominent use of glued laminated timber framing, a renewable material that adds visual warmth to the interior. Materials representing 20 percent of the cost were manufactured regionally.

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Avoid Toxins in Materials

Because its chief users are children, the Williamsburg Child Care Center, in Brooklyn, minimized toxic materials and reduced off-gassing of volatile organic compounds (VOCs) with materials such as fly ash concrete, ceiling tiles made from wood fiber, cellulose insulation and self-cleaning walk-off mats at the entrances.

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Optimize Waste Management

The Sims Municipal Recycling facility in Brooklyn, a project built by the Department of Sanitation and the Economic Development Corporation, represents the rapid evolution in recycling practice by handling many types of items once consigned to landfills.

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Sustainability:

Promote Sustainable Urban Ecology

Create or extend viable habitats. Even in high-density urban settings, opportunities abound to create habitats for plants and animals. These can include bird friendly planting areas, restoring culverted streams to a natural state or replacing bulkheads with a natural waterway edge. Look for opportunities to create multiple benefits, such as a wetland that serves recreation, erosion control and stormwater control purposes.

Use natural landscape elements. Consider including bioswales, riparian landscapes and green streets to filter pollutants and aid infiltration, minimizing the release of waste into the sewer system.

Use landscapes to hold floodwaters. The runoff from severe rain can be held in landscaped basins, street bioswales, widened streams and recessed playgrounds. These can be sized to hold runoff until capacity in the drainage system becomes available, reducing one of the City's most severe pollution problems.

Reduce heat island effect. Green or blue roofs, tree canopies and plantings in public spaces and streetscapes are among many tactics that can dissipate severe heat, which is predicted to worsen. Canopies, porches and external shades are also elements that reduce solar loads on buildings.

Control site lighting. Consistent with use and safety, seek to design site lighting to reinforce natural habitat health and reduce impact on the night sky. Well-designed low-level lighting can enhance night visibility.

Create or Extend Viable Habitats:

The renovation and 10,000 square foot expansion of the Parks Department's Queens headquarters at the Olmsted Center in Flushing Meadows Park is on a low-lying site near railyards and extensive sports facility parking. The project added wildlife attracting wetlands, retention areas, rain gardens and a raised water channel system that displays to visitors the stormwater it treats.

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Use Landscapes to Hold Floodwaters:

The Staten Island Bluebelt is a system of natural corridors that drain 16 watersheds across 12,000 acres. It effectively manages stormwater runoff and controls flooding with restored natural streams, constructed wetlands and detention ponds. Since the 1990s, it has provided diverse wildlife habitats and communal open spaces.

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Use Natural Landscape Elements:

The Brooklyn Botanic Garden Visitor Center includes planted water infiltration areas and employs earth sheltered construction. The green roof visually extends the garden landscape.

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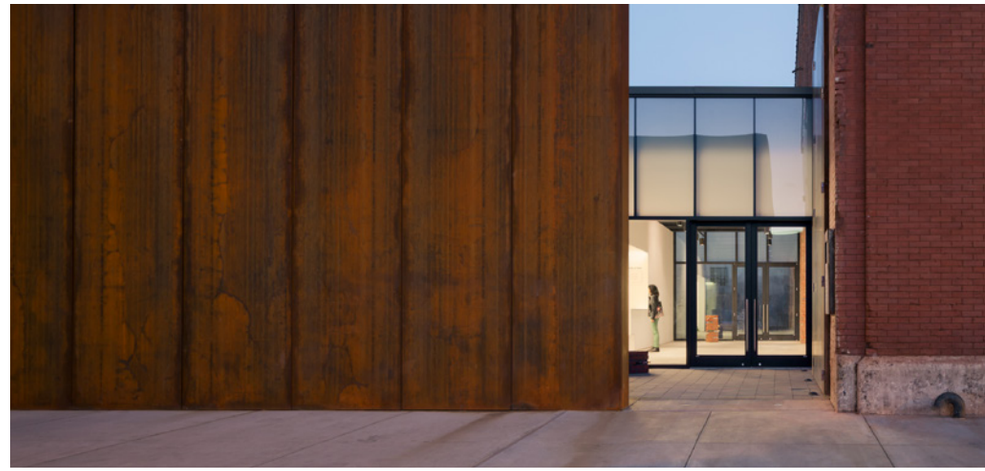

Reduce Heat Island Effect:

The Bronx-based non-profit Osborne Association, with the Department of Environmental Protection, installed green roof segments and rock-filled trays to detain stormwater. The combined system dissipates solar heating of the primary roof surface while weighing less, permitting such installations on buildings that cannot sustain the weight of a green roof.

^ ^

Control Site Lighting:

The SculptureCenter in Long Island City operates from a brick trolley barn that was renovated for exhibitions. With its low-rise surroundings giving way to tall residential buildings, the sensitive lighting of the courtyard and restored exterior welcome nighttime visitors, yet controls light diffusion that would disturb neighbors.

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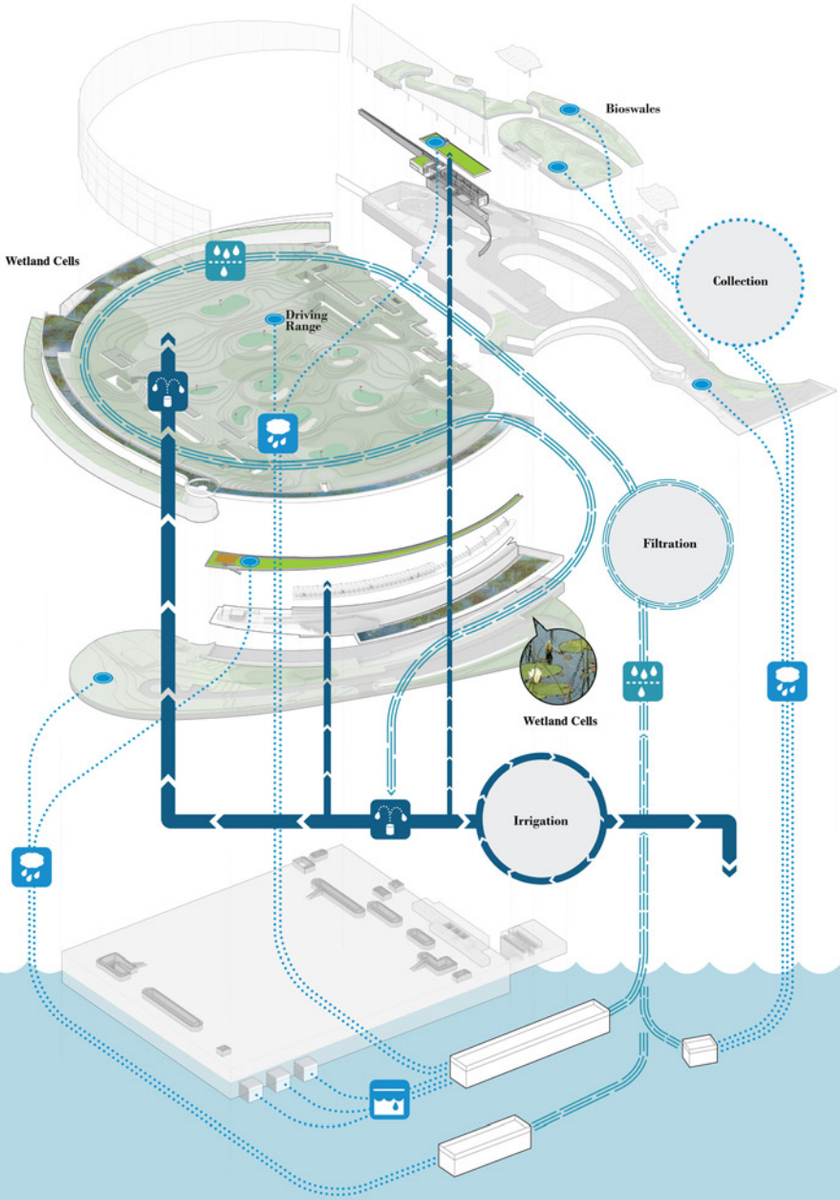
Case Study:
Croton Water Filtration Plant

Promote Sustainable Urban Ecology: Use Natural Landscape Elements, Reduce Heat Island Effects

A golf driving range sits atop a new plant that filters as much as 290 million gallons of water each day. Located in Van Cortlandt Park in the Bronx, the range replaces part of a golf course that was removed to build the plant. Runnels, bioswales, constructed wetlands and settling ponds ring the driving range, demonstrating responsible use of water. These systems will naturally treat runoff from the plant's nine acre roof, as well as groundwater and water collected from parking lots and access roads. The cleansed water will irrigate the driving range roof and the golf course.

WATER COLLECTION AND FILTRATION



Sustainability:

Minimize Energy Use and Reduce Greenhouse Gas Emissions

Optimize site conditions. Designs could take advantage of orientation to capture desirable daylight, solar heat and breezes. Explore means to minimize exposure to undesirable solar gain and glare through building shape and shading (by adjacent buildings, screening devices and plantings, for example).

Use passive tactics. Look to integrate highly insulated exterior walls and roofs, daylight to minimize electric lighting and natural ventilation where feasible. Coordinate these tactics to minimize the size of the HVAC plant and achieve the lowest energy use per square foot.

Use renewable sources. To achieve best energy and greenhouse gas emission performance, try to augment efficiency measures with renewable energy sources such as solar, solar thermal, geothermal, wind and fuel cells.

Optimize systems. Taking into account passive tactics and renewable sources used in the project, look at mechanical systems for greenhouse gas emissions and energy savings. Link systems design to enhanced commissioning operations and maintenance procedures to achieve superior ongoing performance.

Minimize secondary electrical loads. Consider load shifting tactics, especially when peak demand energy can be substantially reduced. Plug loads can be significantly lowered by shared, minimized use of office appliances, from copiers to coffeemakers.

Optimize Site Conditions:

A glass gallery opens the Weeksville Heritage Center, a LEED Gold building, to views of a group of houses that comprise an African American historic site. The gallery windows largely face north, and are shaded by adjacent wings. They act as a thermal buffer since the passageway is mainly used for internal movement rather than programs.

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Minimize Secondary Electrical Loads:

In the Department of Transportation's Sunrise Yard facility, sunlight all but replaces electrical lighting for daytime use, which shifts lighting loads to non-peak hours.

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Use Renewable Sources:

The Bronx River Greenway River House is designed to be powered with a 48 kilowatt array of photovoltaic panels mounted on the daylight roof monitors. The PV system is projected to supply 60 percent of the total energy used by the building.

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Use Passive Tactics:

A screen wall made of galvanized steel and mesh wraps the Bronx River Greenway River House. It hosts seasonal vines that modulate temperature and provide shade in summer while allowing sun into the building in winter. The wall is highly insulated and the sawtooth roof draws daylight deep inside.

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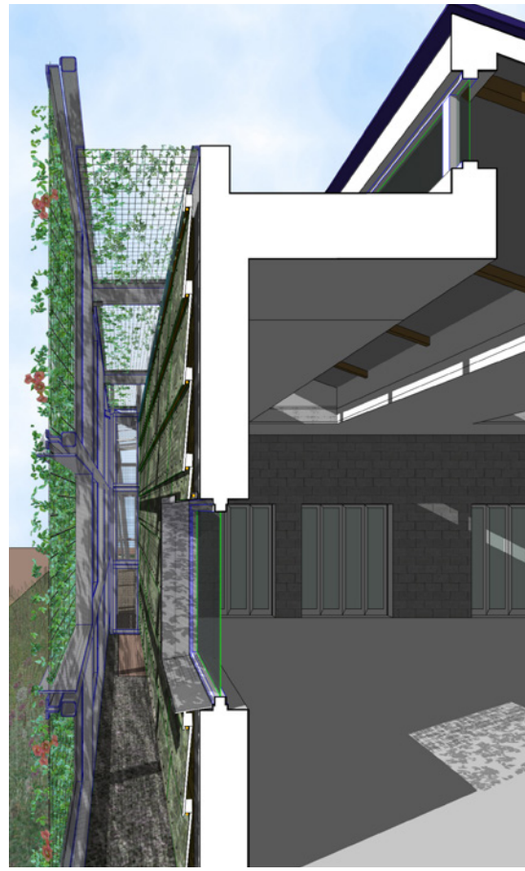
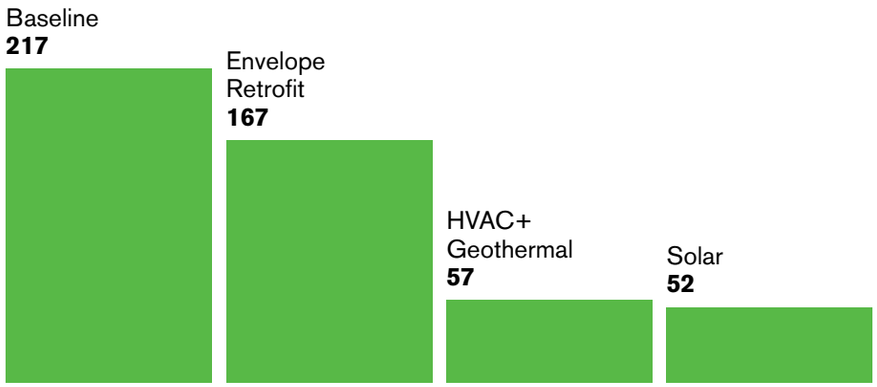


Case Study:
Bergen Building

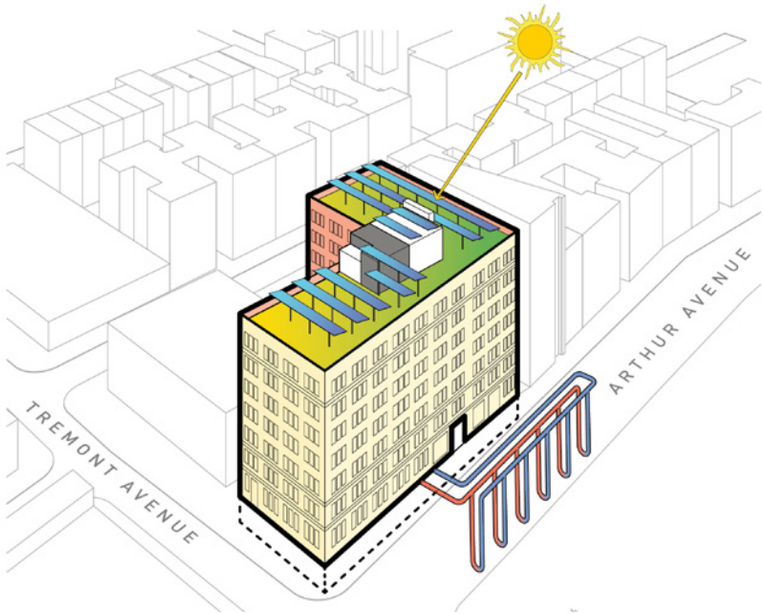
Minimize Energy Use and Greenhouse Gas Emissions: Optimize Site Conditions, Use Passive Tactics, Use Renewable Sources

A low energy pilot study for the Department of Citywide Administrative Services and DDC determined that the seven story Bergen Building—originally built in 1916 as a 134,000-square-foot office building—could lower its energy use by as much as 76 percent. The tactics studied included triple glazed windows and extensive insulation, increasing R-values to more than 16 on street fronting walls (from an existing 3.45) and achieving R-30 on rear walls with the installation of a terracotta panel rainscreen over exterior insulation. Above an R-30 roof, a PV array of 456 panels would be arranged to permit green roof areas. Upgraded lighting and mechanical systems would become even more efficient with the addition of geothermal heating and cooling.



Energy Use Intensity (EUI): energy use per floor area
-165 (-76%)

Low Energy in the Bergen Building

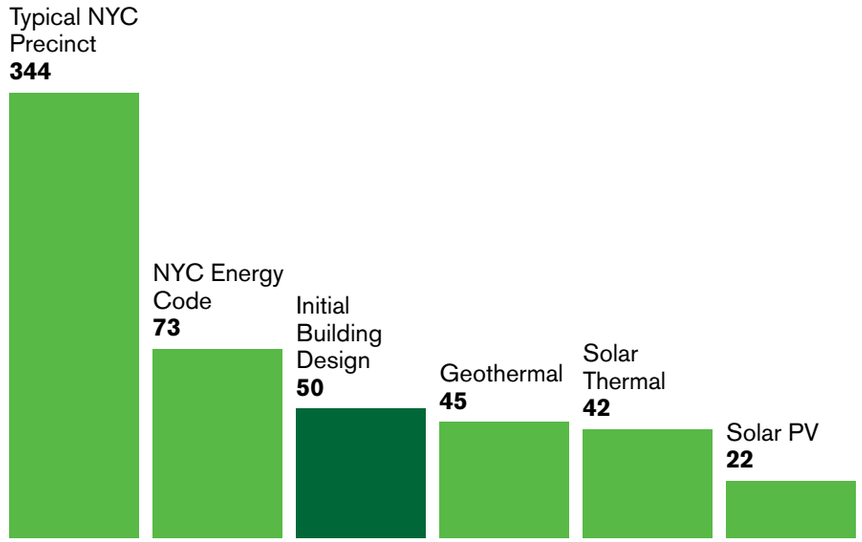


Case Study:
40th Police Precinct Station House

Minimize Energy Use and Greenhouse Gas Emissions: Optimize Site Conditions, Use Renewable Sources

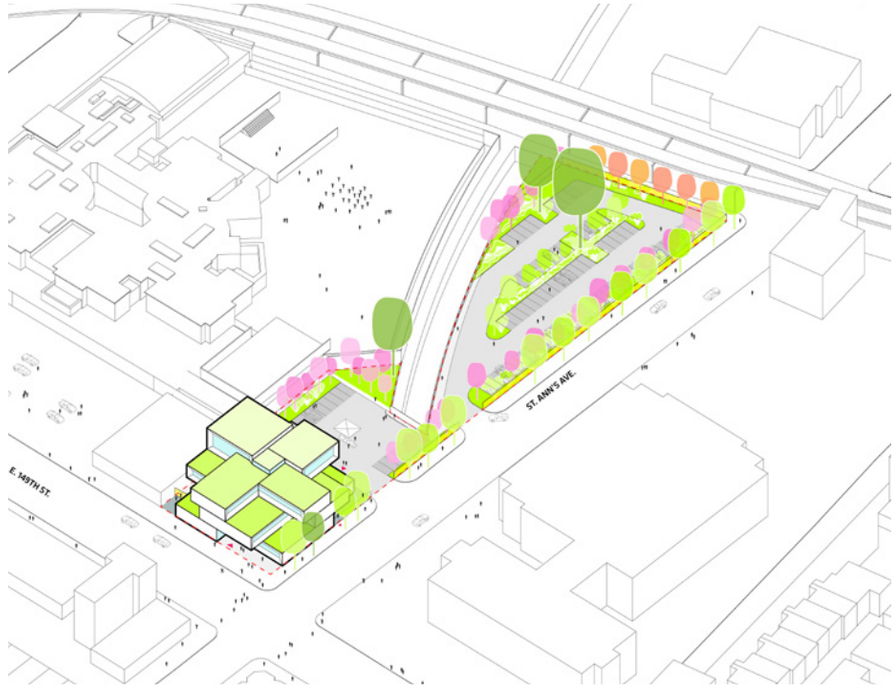
A design for the new NYPD 40th Police Precinct Station House in the Bronx was the subject of a low energy pilot study to determine the feasibility of achieving an extremely low Energy Utilization Intensity (EUI, a measure of energy use per square foot). The preliminary design of the 43,500-square-foot building was already highly efficient, projected to use 31 percent less energy than a code compliant design, and emitting 30 percent less carbon dioxide, even though the building will be continuously occupied. Only 15 percent of its sandblasted concrete exterior is glazed, much of it applied on street facing elevations as an inviting neighborhood presence. The walls are insulated to R-30 and the roof to R-45. The Lighting Power Density (LPD) had already been reduced by 25 percent and hot water flow by 30 percent.

The pilot study revealed that geothermal heating and cooling would further reduce energy consumption by 6.4 percent. The inclusion of a solar thermal water heating system could result in a 41 percent hot water energy savings and a 4.7 percent building energy savings. A solar PV array, mounted above an adjacent parking lot, together with the other tactics, could bring energy sourced from the grid to an extraordinarily low 22 EUI.



Energy Use Intensity (EUI): energy use per floor area

Low Energy in the 40th Precinct



Sustainability:

Encourage Responsible Water Use

Conserve fresh water. Investigate reducing the amount of water used in buildings through fixture choice and programming. Look to minimize fresh water use for irrigation through water sensitive planting, stormwater retention and water recycling.

Capture rainwater. Runoff can be used for retention, infiltration and irrigation. Keeping water out of the municipal drainage system is especially important in areas where stormwater and sewage combine.

Reclaim gray water. Consider how to reuse water from sinks and other sources not severely contaminated when permitted.

Treat water on-site. Where possible, filter runoff using bioswales and other natural system treatment methods. Such tactics can be especially helpful when runoff would otherwise enter natural streams and other waterways.

Monitor water consumption. Consider meters to benchmark and set goals to meet conservation targets. Electronic dashboards that make usage information widely available often encourage users to conserve.

Conserve Fresh Water:

Though the renovation of the historic Bronx Zoo Lion House included extensive use of water features in exhibitions, the project saves 59 percent of fresh water consumption through low-flow fixtures, among other tactics. It reduces water waste by 30 percent through filtration to minimize water changes.

<< page 60

Reclaim Gray Water:

The 1.5 acre productive roof over the Department of Environmental Protection's Remsen Yard acts like a 1.5 acre watershed. It collects rainwater, which is treated and used for truck washing, maintenance and to irrigate landscaping. The design reduces site water use by more than 40 percent.

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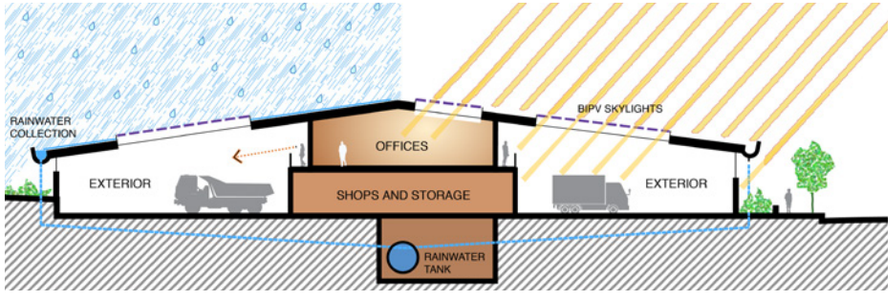

Treat Water On-Site:

The 121 St Police Precinct Station House on Staten Island treats water on-site with bioretention areas, stormwater management and drought resistant landscaping, along with vegetative swales.

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Capture Rainwater:

The playground at P.S. 261 in Brooklyn, is a green infrastructure retrofit project that features a rain garden, synthetic turf field, permeable pavers, trees (for bioinfiltration) and subsurface storage. The playground captures the first inch of rainfall from 23,000 square feet of formerly impermeable surfaces. It was constructed with a public-private partnership.

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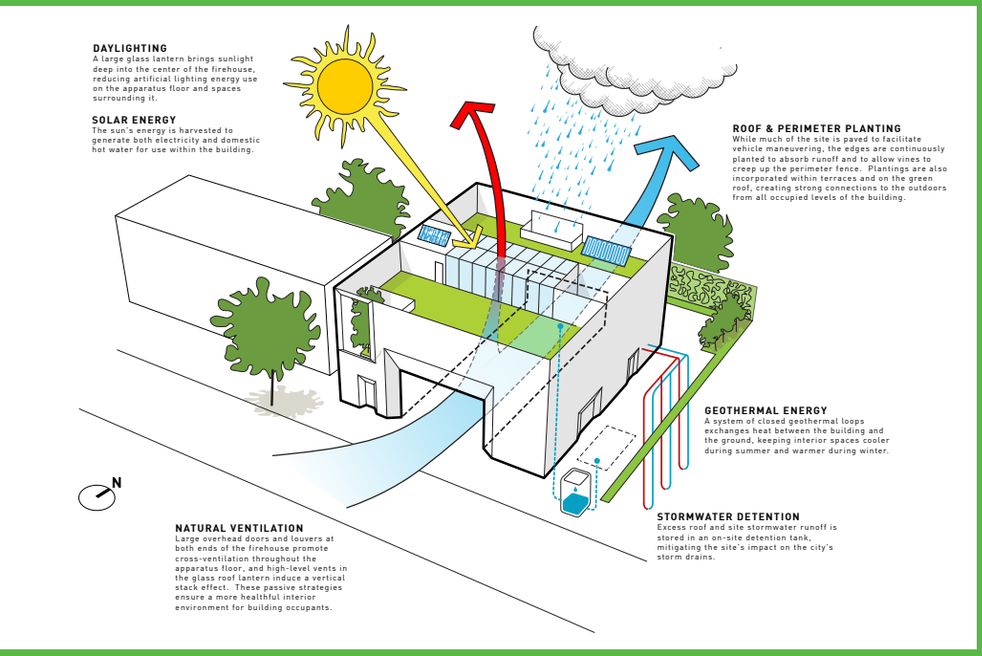
Sustainability:

Design Holistic, Integrated Systems



Leverage site and envelope response. Site tactics (the reduction of building heating and cooling loads through orientation and shading) can amplify energy efficient envelope design (highly insulated, with daylight and breeze capture). These tactics, carefully coordinated, can create improved indoor and outdoor environments while reducing energy use and GHG emissions at modest or no cost.

Design with users in mind. Design that encourages energy efficient user habits can increase benefits and reduce costs. Staff could be encouraged to adjust shades and open windows when conditions merit. Explore a cooperative means of helping people learn to operate their buildings for maximum effectiveness and amenity as well as performance.

Bring sustainable urban ecology inside. Planting schemes and rainwater capture could be used within a building, both to create a more pleasing environment and to humidify and filter air.

Optimize campus solutions. At the scale of campuses or districts, many environmental strategies deliver substantial benefits at low cost. These include combined heat and power (CHP), such as sustainably sourced fuels, large-scale solar and wind, as well as advanced waste-to-energy, water recycling, habitat advancing water retention and biological water treatment facilities.

Improve commissioning. Optimizing system performance, including commissioning and periodic retro-commissioning, may improve energy performance as well as staff and user satisfaction. Systems could make performance readily measured against design intent and ease problem identification.

Leverage Site and Envelope Response:

Located in Brownsville, FDNY Rescue Company 2 is a new precast concrete firehouse that makes use of a green roof, geothermal HVAC system, solar hot water and natural lighting. Breezes enter through open apparatus doors when weather permits, rising full height through a central atrium. Recessed openings, lined in red terracotta panels, shade the glass areas they surround.

<< page 64

Design with Users in Mind:

The renovation of the Staten Island Children's Museum at the Snug Harbor Cultural Center added interactive components to explain how buildings can harvest the natural resources of wind and sun. As more structures incorporate passive tactics that involve users in the operation of their buildings, building system information, such as that whimsically displayed here, could become a common means to cue people to open windows and lower shades.

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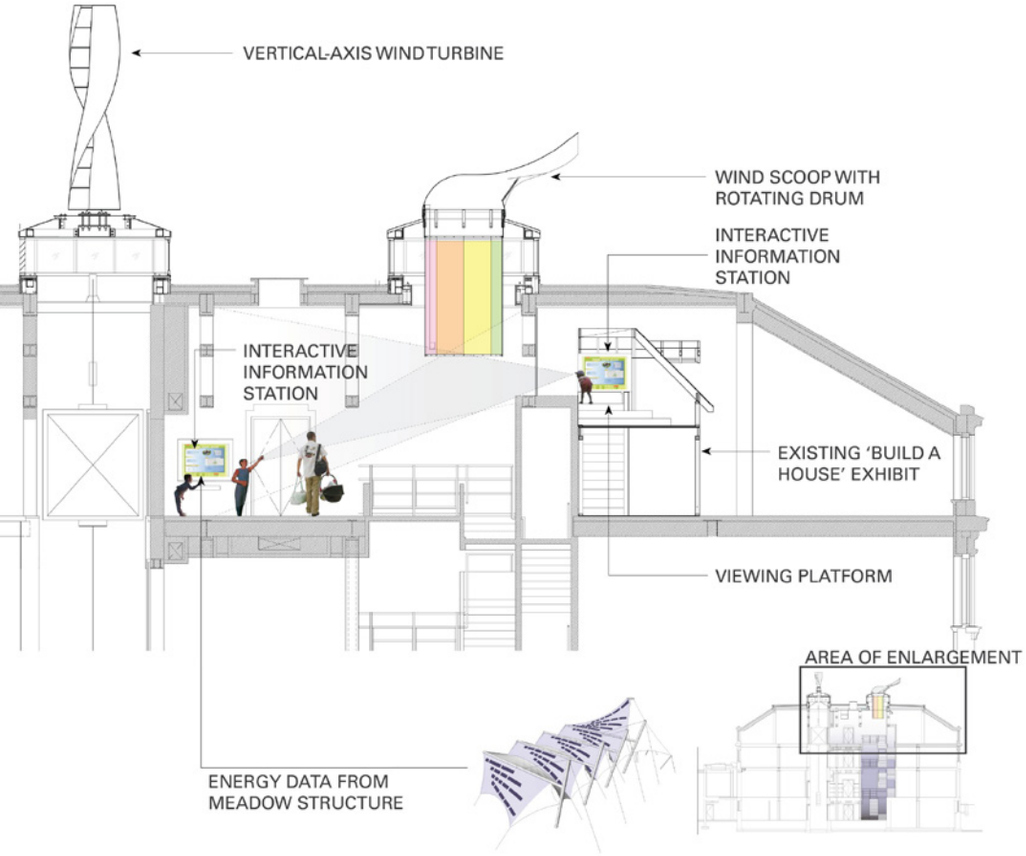

Optimize Campus Solutions:

A two acre bridge structure adds 160,000 square feet of new research space over the FDR Drive in Manhattan without increasing impermeable surface. It extends the Rockefeller University campus from East 64th to East 68th street. It includes green roofs that become publicly inviting extensions of the existing landscape, offering sweeping river views. Additional improvements will green the riverside esplanade.

^

Bring Sustainable Urban Ecology Inside:

The David Rubenstein Atrium at Lincoln Center, a privately owned public space, attracts passersby and ticket buyers with a pair of plant walls twenty feet high located at either end of the passage. Sixteen skylights, bring natural light into this LEED Gold space.

>

Resiliency

Rockaway Beach

Resiliency

Resilience design, broadly speaking, delivers projects capable of adapting to change. Resiliency means preparing the City's public buildings and infrastructure to maintain service, and rapidly rebound from extreme events—needs Hurricane Sandy demonstrated. The chief known hazards to the City's built environment are storms and flooding of increased frequency and greater severity, extreme heat, extreme cold and human caused tragedies. Many of these risks will loom larger as the effects of global warming become more obvious. Some resiliency challenges develop over time, such as hazards from sea level rise and critical systems that are not maintained. These varied conditions call on design teams to also take into account evolving threats in terms of the lifecycle of investments, so that projects do not become obsolete prematurely. When needs are identified early, design for resilience can often be integrated at low cost. Design can not only make us safe, but can also build communities, enhance neighborhoods and invite investment. Well-coordinated tactics that can evolve and adapt over time will achieve robust buildings, infrastructure, neighborhoods and services.

Guiding Principles:

1. Prepare for extreme events

2. Secure against human induced threats

3. Achieve coordinated hazard response

4. Choose flexible tactics that can evolve

5. Bolster community capacity to adapt

Resiliency:

Prepare for Extreme Events

Design for emergencies. The key short-term hazards include severe storms, flooding, extreme heat, extreme cold, high winds and human caused events. Design tactics can include site protection, structural reinforcement, floodable spaces and the location of vulnerable spaces and systems away from threats.

Design for long-term threats. Erosion, rising sea levels, rain intensity and critical infrastructure failures have high potential to compromise the City's resiliency. The design of building elements should take into account the risks inherent in systems, building assemblies and operations.

Address multiple hazards. Pay special attention to events that trigger secondary effects. Among these are floods and fires accompanying storms, and electrical grid failure related to extreme heat and cold, as well as rain intensity. Think of responses that address relevant hazards with a minimum of means.

Use robust materials. For projects in vulnerable areas, think of materials, products and details that will degrade minimally after extreme events as well as assemblies that will not be weakened or deformed by repeated exposure to hazards, some of which are salt water, extreme temperatures, high winds and storm surges.

Reduce microclimate effects. Analyze buildings and sites for opportunities to reduce microclimate effects. Such tactics as refractive materials, green roofs and tree canopies prove especially useful during extreme heat events—especially those accompanied by power failures—by bringing ambient temperatures below harmful levels.

Design for Emergencies:

The Ocean Breeze Track & Field Athletic Complex is elevated on a flood vulnerable site on Staten Island. The indoor athletic facilities and the building's critical utilities—including the generator and transformer—are located 20 feet above sea level. Ocean Breeze harvests stormwater to recharge surrounding wetlands, reducing demand on combined sewers.

<< page 72

Use Robust Materials:

The heavy, reinforced concrete walls of the Spring Street Salt Shed protect the 5,000 pounds of road salt within, but are also able to withstand repeated flooding without damage. The metal gates are both non-corrosive and heavy enough to keep out floating debris.

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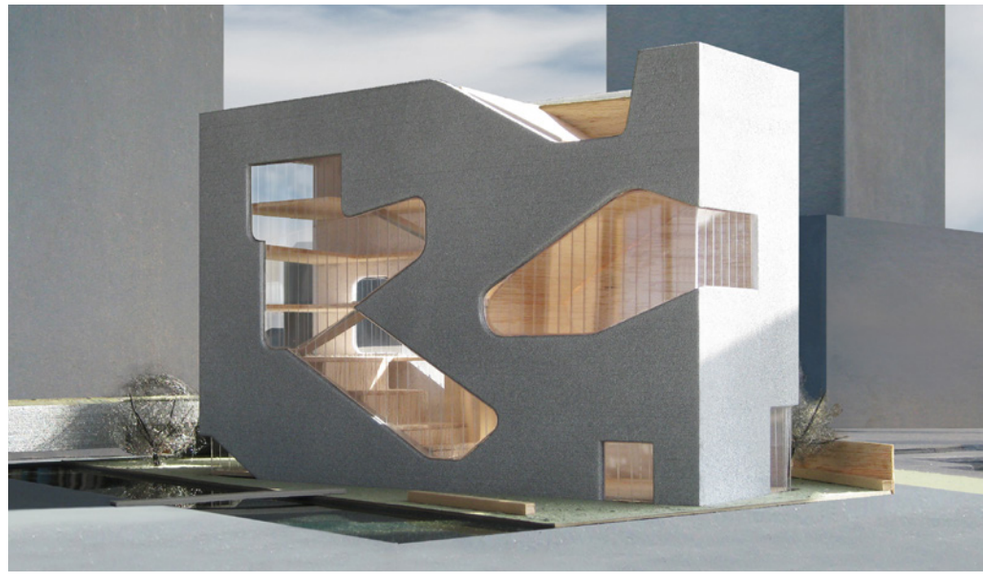

Design for Long-Term Threats:

Because of the site's vulnerability to flooding and sea level rise, the riverside Hunters Point Community Library's vulnerable facilities are located above the 500 year flood elevation. First floor finishes can survive flooding.

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Reduce Microclimate Effects:

Green roofs are among tactics that can reduce heat island effect. The 1.5 acre green roof that tops the Department of Sanitation's Manhattan Districts 1/2/5 Garage removes heat and collects rainwater, which is reused to wash trucks.

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Case Study:
East Side Coastal Resiliency

Prepare for Extreme Events: Address Multiple Hazards
Achieve Seamless Hazard Response: Coordinate Response Over Time

The East Side Coastal Resiliency (ESCR) Project, which covers 2.2 miles along Manhattan's East River, is one of New York City's largest resilient design initiatives. With extensive involvement of the community, as well as public and private stakeholders, the project will protect low-lying neighborhoods from storm flooding, while revitalizing the waterfront and bringing in new, diverse recreational uses. The landscape will act as a barrier to keep water out of low-lying nearby streets. The plan will offer greater public access to the waterfront, with pedestrian bridges and street-level entrances that will prevent floodwater entry through the use of gates that can be deployed. DDC will also coordinate with Con Edison to protect a power plant near the waterfront, and permit its continuous use through a flood. The ESCR design takes into account more severe storm surges and anticipates future sea level rise.

Resiliency:

Secure Against Human Induced Threats

Integrate design for security. In projects that require extraordinary security measures, the design team should strive to seamlessly incorporate tactics, many of which need not be visible, and integrate them to permit unified operation. Security requirements can be consistent with the architectural expression of the design.

Avoid fortified-looking design. The design can strike a balance between usability, welcoming space and public safety. Excessively fortified-looking design induces fear, encourages avoidance, repels investment and sometimes precipitates attacks on nearby unprotected targets.

Analyze critical facilities. Examine capability of facilities, if they have not already been deemed essential, to ensure that extreme events do not compromise functionality. Relocation of programs or strengthening building components are among tactics that may be necessary for projects designated to be at high risk.

Consider emergency phase needs. Design teams are encouraged to assess needs at different disaster stages, such as emergency phase, short-term recovery, and long-term rebuilding. For immediate disaster response, the design may include planning for the provision of aid, refuge and emergency services.

Design for potential evacuation. Some buildings, sites and programs may demand unique design solutions to anticipate the need for local or citywide evacuation. Evacuation schemes can be reflected in a project's egress, circulation and first responder access.

Design for Potential Evacuation:

The circulation core of the Medgar Evers College Academic Building 1 is designed with an aluminum and glass curtain wall that brings a significant amount of natural light into its main stair which also serves for emergency egress. The building's openness and transparency assists first responders in locating people in need.

<< page 78

Integrate Design for Security:

To stymie vehicle bomb attacks in the Battery Park City development, several tactics are almost invisibly incorporated into the landscape, including street geometry designed to slow vehicle speeds. Benches can halt vehicles as do earth-backed walls, grass-covered berms and paving that collapses under the weight of wheels.

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Avoid Fortified-Looking Design:

Planted berms sculpted into facets and curves disguise their function to protect the Public Safety Answering Center II from bomb blasts. The landscape helps the building blend into the surroundings, while a small tree arbor beckons visitors entering a green-roofed entry pavilion.

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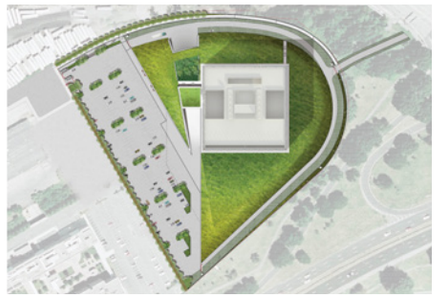

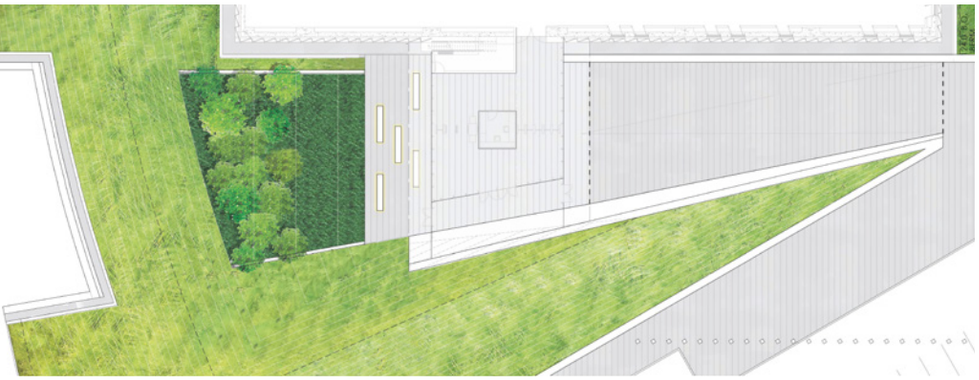

Consider Emergency Phase Needs:

The FDNY Rescue 2 Firehouse will enhance the Company's training program by organizing the building around a large interior space that extends from the ground to roof level. Training elements are incorporated throughout the design.

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Analyze Critical Facilities:

The New York City Office of Emergency Management Headquarters has been designed to resist both natural and human-induced threats. Safety features include critical functions located away from the exterior. Power and telecommunications system redundancies permit operation continuously through emergencies.

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Resiliency:

Achieve Coordinated Hazard Response

Analyze infrastructure for service continuity. When a building or infrastructure system is vulnerable to failure in an extreme event, consider how to achieve continuity of service, using strategies such as on-site energy generation or back up generation.

Reduce potential for grid strain. Large buildings, campuses and energy-intensive facilities can help reduce electrical grid failure with temporary load shedding and load shifting tactics. Low energy schemes that rely on passive measures or renewable resources can diminish power outages and critical infrastructure disruptions.

Coordinate response over time. Given the dynamic nature of extreme and chronic events, the design of systems could take into account the risks likely to develop during their useful life—the effect of rising seas, for example.

Anticipate transport system risks. Consider facilities design in terms of transport mode failure (rails, buses, tunnels, airports, interruptions in the vehicle fuel supply chain). Extreme events can strand people away from home, or prevent essential staff from reaching their workplace.

Minimize emergency systems maintenance. Day-to-day maintenance of systems used only in an emergency can be overlooked. If systems are designed to minimize maintenance and operational complexity, they are less likely to fail.

Anticipate Transport System Risks:

MTA subway ventilation gratings raised above anticipated flood levels protect the underground rights of way from flooding and also provide seating.

<< page 82

Minimize Emergency Systems Maintenance:

Normally stored, a deployable panel system can rapidly be installed to create a flood barrier within the Manhattan Districts 1/2/5 Garage. Because it is mechanically simple, it is likely to be reliable even if seldom used.

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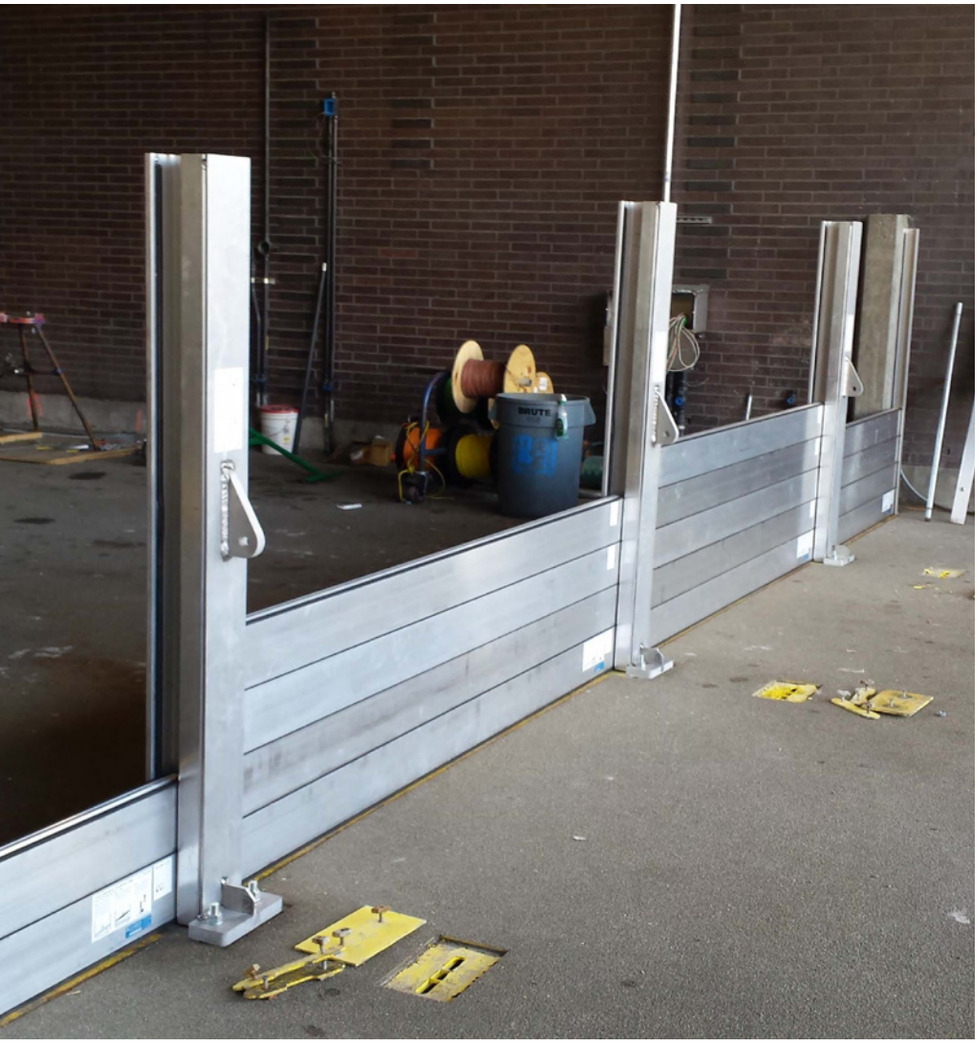

Analyze Infrastructure for Continuity of Service:

The Broad Channel project will elevate three streets subject to flooding. This project will decrease the severity and amount of time that the roads are flooded.

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Case Study:
FDNY Zerega Avenue EMS Station

Achieve Seamless Hazard Response: Reduce Potential for Grid Strain
Choose Flexible Tactics that Evolve: Design for Fast Recovery

A power failure would only affect non-essential services of the Zerega Avenue EMS Station in Castle Hill. A generator raised above flood level provides emergency power redundancy. A photovoltaic system with battery storage powers controls. Translucent side walls insulate while letting in daylight to assure off-grid work light. Even interior hallways can be lit by light-harvesting tubes. Rooftop solar thermal panels and an insulating green roof supply hot water for showers and for cleaning hazard suits. The suits are laid on a metal grating mezzanine where heat from vehicles below can assist drying. Operable windows assure natural ventilation as needed. The green roof helps irrigate an adjacent community garden.

Resiliency:

Choose Flexible Tactics That Can Evolve

Prioritize multilayered approaches. Improvements that protect shorelines or other vulnerable areas could be designed to delay or preclude the need for property owners to make costly adaptation investments. If waterside protections are comprehensive, raising individual buildings may not be necessary.

Design for fast recovery. Consider how to make critical buildings or infrastructure facilities operative during disasters and capable of recovering swiftly. Low energy facilities with renewable power, on-site water systems and highly insulated buildings can extend the usefulness of places of refuge.

Use adaptable natural system solutions. Strategically include adaptable natural defense strategies to reduce risk from storms. Armoring tactics, such as sea walls, can be used in special circumstances but may not adapt as conditions change. Constructed water management landscapes may prove easier to alter over time.

Design sustainable site responses. Insightfully design green infrastructure intended for everyday stormwater management to counter effects of extreme weather, such as excess heat and rainfall. Resiliency-focused water management is especially important in areas where overflows from combined stormwater and sewage infrastructure must be managed.

Design to include information systems. Distribution of information is vital before, during and after extreme events. Consider including systems like free Wi-Fi in buildings and public spaces to facilitate a stable emergency and recovery communication infrastructure.

Prioritize Multilayered Approaches:

Boardwalks rebuilt along a 14 mile coastal stretch of the Rockaway Peninsula after Hurricane Sandy include comfort stations with wave energy-absorbing steps, rock revetments to slow and direct flood water flows and landscaped basins to retain water during storms.

<< page 88

Design Sustainable Site Responses:

The Dutch Kills Green park at Queens Plaza replaces an asphalt lot near a heavily used transportation intersection. It is a small-scale landscape that can handle stormwater and periodic floodwaters. Bioswales slow the flow of runoff, while depressed planted areas, spanned by bridges and gathering places, retain more water for infiltration and irrigation, minimizing flows into the combined sewer system.

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Use Adaptable Natural-System Solutions:

Hunters Point South Park is located on 11-acres of Queens waterfront. It uses extensive bioswales, infiltration gardens, a circular water retaining basin and natural edges. These elements slow flooding and retain stormwater.

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Design to Include Information Systems:

Commercial telecom kiosks are one kind of communications device that can be adapted to help people in an emergency. If not dependent on the electrical grid, they can broadcast information, allow people to access maps and services and charge mobile devices.

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Resiliency:

Bolster Community Capacity to Adapt

Engage the most vulnerable populations. Look to assess the needs of residents at higher risk—older adults, socially isolated and the poor—as they bear more of the effects of extreme events. Ask how facilities can make essential services readily accessible to these communities.

Help communities adapt. Project design can bolster community resilience by making spaces available and programming possible for neighborhood groups. These can bring together stakeholders to anticipate disasters and to unite to respond to them. Consider building types that can host activities that boost community capacity.

Respond to unique needs. Streets and buildings can use a variety of tactics to help those with physical impairments during extreme events and aid those who must shelter in place. The design of large sites can ease access and wayfinding to places of refuge that are identifiable.

Explore use for mobilization. For places vulnerable to repeated disasters and extreme weather events, it may be necessary to designate or design places where communities can mobilize, resources can be delivered and people can find assistance. These designated areas can be prominent so that they become part of people's everyday activities.

Anticipate places of refuge. Public buildings can become key assets for the surrounding neighborhood during or after a disaster. Designers can consider how to convert multipurpose spaces into places of refuge. Quickly installed temporary facilities can be essential in cases of large-scale displacement.

Help Communities Adapt:

The existing Far Rockaway Library served its community as a refuge and supply depot after Hurricane Sandy. The new project will be built on a site with an elevation higher than the current floodplain. The design evolves a traditional library program to provide more spaces for community services that can be adapted for emergency needs.

<< page 92

Explore Use for Mobilization:

Flexible covered areas, like this pavilion in Far Rockaway Park, could be adapted to multiple needs of the community. After extreme events, people can assemble in these visible locations for aid and assistance.

^

Engage the Most Vulnerable Populations:

The Leonard Covello Senior Center is undergoing renovations to create a gathering place for the senior community. The multipurpose dining room's design added personal elements that could create emotional bonds between the users and the space. The center can be adapted to assist its target population before, during and after an emergency.

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Anticipate Places of Refuge:

A modular post-disaster housing prototype was developed after Hurricane Sandy using prefabricated elements. It is being studied to see how advanced housing technologies might quickly deliver temporary housing to those displaced by a disaster.

>

Respond to Unique Needs:

The new storm-resistant lifeguard and comfort stations at beach locations in Queens, Brooklyn and Staten Island can be useful as information hubs before and after a major storm. These prefabricated structures are built with solar panels, raised above anticipated flood levels and are reinforced to survive high winds. Because they are also accessible to the disabled, they can provide services and information to many populations after a storm.

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Healthy Living

Brooklyn Children's Museum Rooftop

Healthy Living

DDC collaborated with other city agencies and outside stakeholders on *Active Design Guidelines* which showed that design can encourage—and even make pleasurable—active lifestyles. Physical activity can reduce such prominent health problems as chronic obesity and diabetes. With Healthy Living as a Guiding Principle, DDC widens its lens, encouraging its design teams to think about aspects in the built environment that aid mental health. These include access to nature, a sense of clarity and safety in public places (which reduces anxiety), and exercise, because physically active people tend to enjoy better mental health.

Guiding Principles:

1: Support mental health and well-being

2: Strengthen social interaction and engagement

3: Reduce environmental nuisances

4: Encourage physical activity as part of everyday use

5: Promote healthy choices

Healthy Living:

Support Mental Health and Well-Being

Maximize connection to nature. Take advantage of opportunities to bring views and ready access to parks and green open spaces into streetscape and building projects. Experiencing nature is directly linked to improved mental health, reduced stress and overall improved well-being.

Create therapeutic environments. Consider designing to emulate biophilic and naturally calming elements. Think of using natural light, plants, running water and views of nature to enhance people's experience. Access to nature, calming restorative environments and public places that feel safe all contribute to well-being.

Offer empowering choices. Look for opportunities to provide movable furniture, experiential art and features that allow people to use public spaces and buildings as they see fit. Design that invites participation and choice can feel empowering.

Be responsive to people's needs. Create welcoming, unintimidating environments. Consider the population that will most likely use a space to ensure positive experiences and make people feel that they are valued.

Promote perceptions of safety. The presence of clear wayfinding, appropriate lighting, natural surveillance and art can reduce crime and vandalism, and increase the safety of the environment, which enhances quality of life for everyone.

Maximize Connection to Nature:

To take advantage of its location at the edge of a park, the Queens Library at Elmhurst includes two glass reading room viewing cubes, and lines a connecting corridor with views out to a green roof. Green, patterned glass artworks inside filter the view while drawing in daylight.

<< page 100

Create Therapeutic Environments:

An outdoor public garden courtyard hidden within the Noguchi Museum in Astoria offers a surprising and calm oasis in a part of the city lacking in greenery.

v

Offer Empowering Choices:

Movable seating and frequent public events in Diversity Plaza in Jackson Heights allow people to adapt the environment to suit their own desires.

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Be Responsive to People's Needs:

Juvenile probation centers, such as this one located in Jamaica, Queens, need not resemble places of detention, which can instill frustration, even depression. The space encourages focus on a better future with giant word puzzles and open-ended questions.

^

Promote Perceptions of Safety:

The openness through several levels of the Metropolitan Transportation Authority's Fulton Center allows travelers to easily find their way through a highly complex transit hub. Wayfinding and pleasure are aided by a tapered dome overhead that showers the station with daylight. The design not only reduces confusion, it augments safety by broadening sightlines for security personnel.

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Up Close:
Biophilic Design and Mental Health

Support Mental Health and Well-Being: Maximize Connection to Nature, Create Therapeutic Environments

Biophilic design is a way of connecting the places we inhabit to our primordial desire to live with natural elements. It can take the form of nature itself with features such as plants, running water, natural light and views to natural landscapes. Natural forms can be referenced, as in curvilinear or organic shapes. Biophilic design can emulate natural functions by using elements that bring light and shadow into buildings as the sun moves, or allow buildings to breathe through natural ventilation. Connecting with nature, physically or visually, on a daily basis is linked to improved mental health, reduced stress and overall improved well-being.

Healthy Living:

Strengthen Social Interaction and Engagement

Design for opportunities to interact. Public spaces can be designed to ease casual meetings as people move through their everyday routines and daily lives. Communities with naturally high levels of social interaction can grow to be stronger, healthier and more resilient.

Design spaces to reduce social isolation. Inviting meeting places for diverse groups can ease social connection. Diminishing the isolation of vulnerable and elderly groups can create cohesive communities and long-term health and safety benefits.

Introduce humor and playfulness. An amusing encounter becomes an occasion to make a personal connection. Design that draws people to share—their wisdom, experience and values—is design that builds well-being.

Consider the unique needs of populations. All people have unique needs, which are sometimes not obvious. Considering end-users, especially those often overlooked, can help transform life possibilities and reweave social bonds.

Accommodate group recreation. Provide space for multigenerational and multicultural recreation to entice social activity. Consider placing such opportunities in unused areas or in spaces that can be flexible, such as community rooms.

Accommodate Group Recreation:

The multipurpose room at the Queens Community House in Forest Hills can be adapted to fit multiple recreational needs such as ping pong, yoga and basketball, and is used to serve lunch to 300 seniors on weekdays.

<< page 106

Design Spaces to Reduce Social Isolation:

In Washington Square Park, playing dogs encourage owners to socialize. A playground and chess tables are nearby, bringing activities that tend to attract both older and younger people into close proximity.

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Consider the Unique Needs of Populations:

Tactile City, a prototype project made in partnership with DDC's STEAM program and the Cooper Union, devised designs that make sidewalks and construction sheds easier to navigate for those with visual impairments.

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Introduce Humor and Playfulness:

Shakespeare Machine, in the lobby of the Public Theater, is a New York City Percent for Art project that takes the form of a chandelier. The kaleidoscope of Shakespearean language organizes text fragments according to a variety of linguistic attributes, and choreographs them into new juxtapositions as it moves. The work provokes response and engagement of its viewers.

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Design for Opportunities to Interact:

The interior design of the New York Public Library Stapleton Branch, which includes long tables with community seating as well as a separate study and community room, promotes casual conversation and group learning.

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Healthy Living:

Reduce Environmental Nuisances

Mitigate neighborhood pollution. Emissions—even those that meet regulatory thresholds—can have serious health consequences, especially after long-term exposure or if in close proximity to vulnerable populations. Inventive, thoughtful design and use of a site can reduce or eliminate these impacts.

Enhance air treatment and ventilation. Consider air quality improvements where use or conditions merit. Indoor and outdoor air quality is an important factor in the transmission of airborne pathogens. For example, the health and productivity of building occupants is linked to safe and secure access to fresh air.

Eliminate exposure to toxins and allergens. Exposure to nuisances can be thought of as a fact of life in cities, but special care can be taken on a building's interior finishings and furniture to ensure they do not emit unnecessary toxins, odors or allergens. VOCs in paint or flame retardant materials in furniture, for example, can have severe adverse health effects.

Minimize noise pollution. As the city grows and noise becomes ubiquitous, consider sound levels from ambient sources and manage transmissions within buildings.

Diminish light pollution. Outdoor lighting has the ability to augment safety as well as add allure to outdoor spaces. However, poorly designed lighting can impede safety by obscuring shadows and adversely affecting human circadian clocks, which is linked to negative mental health effects.

Mitigate Neighborhood Pollution:

The Department of Sanitation has sited facilities to reduce driving distances of trucks, which cuts pollution and road noise. The design of the Manhattan Districts 1/2/5 Garage reduces the clamor of maintenance activities while acting as a barrier to West Street vehicular sound, both of which reduce impact on the neighboring residential community.

<< page 110

Minimize Noise Pollution:

In the restoration of Columbus Circle, a busy traffic hub, planted berms absorb traffic noise while water sprays disguise sounds.

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Eliminate Exposure to Toxins and Allergens:

Projects involving vulnerable populations, like children, can benefit from special care taken to ensure a safe learning environment.

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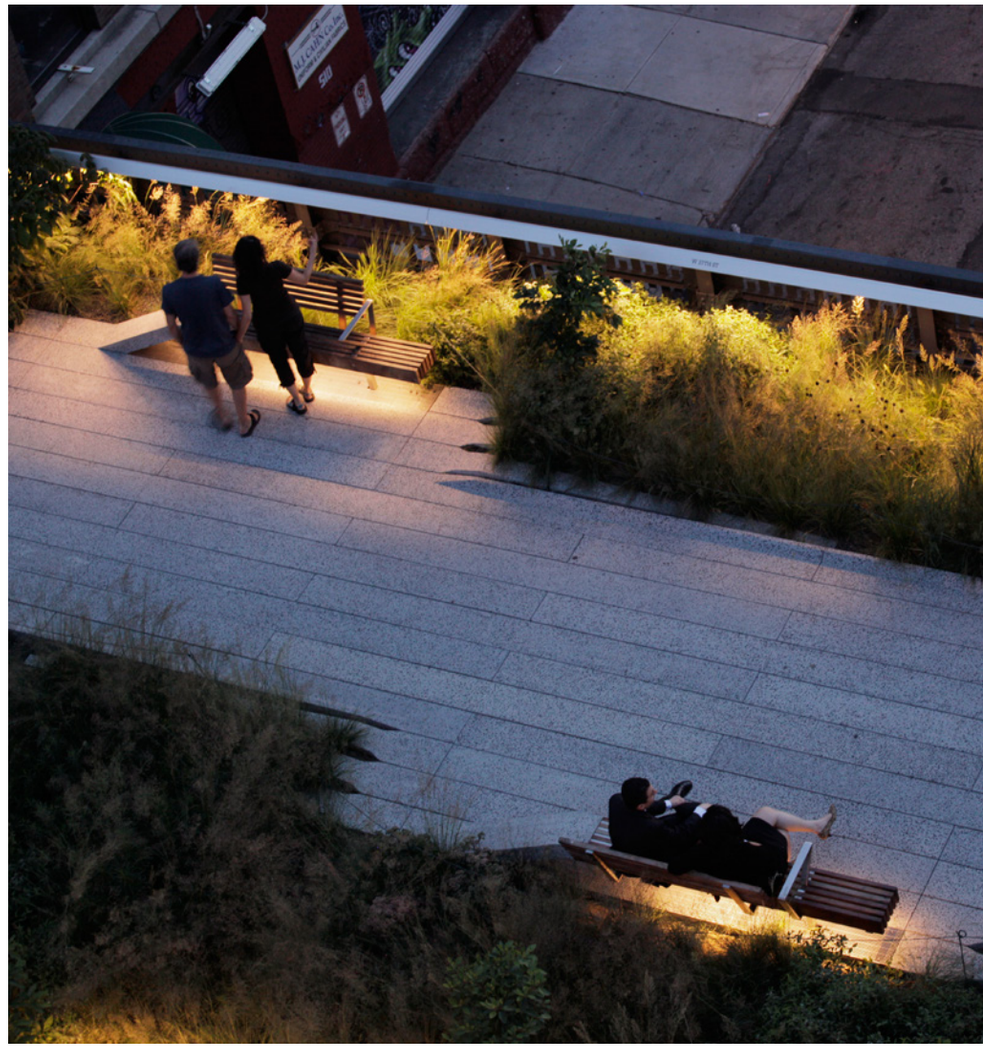

Diminish Light Pollution:

On the High Line, the lighting design includes no sources installed higher than waist level. The concept lights the pathway for safety but keeps glare from spilling into adjacent buildings. The visibility of the night sky and the vistas all around are not impeded.

^

Enhance Air Treatment and Ventilation:

Plants in the Active Modular Phytoremediation System filters air through the wall system, providing clean, fresh air. This prototype in the Public Safety Answering Center II, may be especially useful in stressful workplaces where their presence is calming. The plant armatures induce air movement without mechanical assistance.

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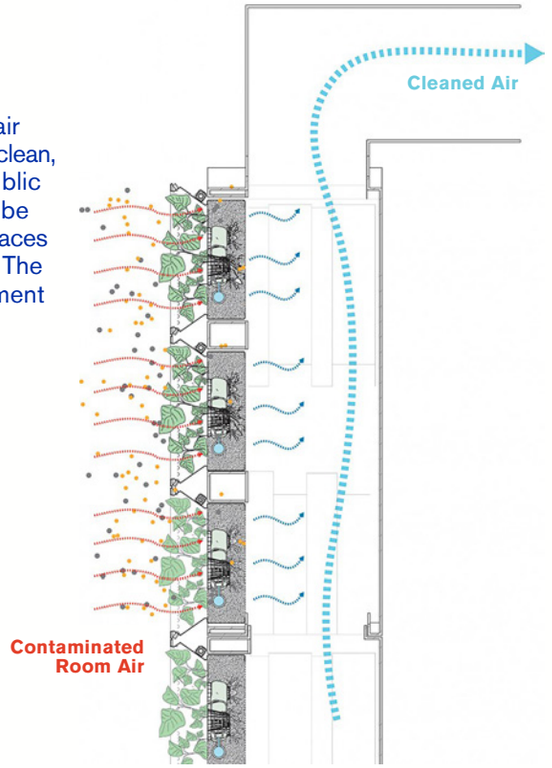

Up Close:
The Effects of Noise on Health

Reduce Environmental Nuisances: Mitigate Neighborhood Pollution, Minimize Noise Pollution

Traffic, elevated rail lines, construction sites and air traffic are only a few daily noise nuisances in the city. High decibel levels and frequency of noise can have significant physical health effects including hearing impairment and sleep disturbance, but can also have severe psychological and mental health effects. In outdoor environments, planter strips and berms are among tactics that can be used to mitigate noise. Splashing or running water can disguise the traffic roar. In indoor environments, special consideration for insulation, windows and strategic placement of rooms more sensitive to noise can improve sound quality. Brooklyn Bridge Park installed a large berm to protect waterfront visitors from the roar of the adjacent highway traffic.

Healthy Living:

Encourage Physical Activity as Part of Everyday Use

Invite movement. Consider site and building design elements that offer alluring options for physical activity. High levels of daily activity can improve physical health and mental well-being.

Design visually appealing streets and public spaces. Think about ways to create vibrant places with design such as active street frontages, intriguing paving and curiosity inspiring art. Enticing sidewalks and streetscapes can encourage increased walking and physical activity as part of everyday life.

Connect projects to green space. Seek opportunities to develop safe and convenient access to adjacent or nearby parks, playgrounds and pedestrian paths with generous entry plazas, widened sidewalks and cycling accommodations.

Link to multiple travel modes. When projects enhance convenient access to a variety of transit modes—walking, biking, bus routes—people are encouraged to choose active travel options. Access and proximity to buses is especially helpful for those with mobility impairments.

Enhance pedestrian safety. Design that is focused on the needs of pedestrians, especially in areas with high pedestrian and vehicular conflicts, aids safety and can promote increased walking and biking.

Link to Multiple Travel Modes:

Protected bike lanes, safe pedestrian routes, buses and subway stations can all be found in Queens Plaza. Improved access to multiple transit options allows commuters to easily travel to their desired destination.

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Design Visually Appealing Streets and Public Spaces:

The inviting and magnetic design of the Westchester Square Branch of the New York Public Library enlivens the local street frontages to make an enjoyable pedestrian experience.

^

Invite Movement:

In the renovation of the New York Hall of Science, the sculptural stairway, placed as the centerpiece in an open foyer, invites use and makes physical activity pleasurable.

<

Enhance Pedestrian Safety:

On Tillary Street, safety is improved through traffic calming tactics, wider medians in which pedestrians can pause and neckdown sidewalk extensions that reduce crosswalk distances. The project improves access to the Brooklyn Bridge walkway at a high traffic intersection.

^^

Connect Projects to Green Space:

A protected bikeway augments the Hudson River Park, not only making it more accessible, but more attractive because of pedestrian improvements to streets leading to the waterfront. The bike path also links several parks, encouraging people to access almost the entire Manhattan river frontage.

^

Healthy Living:

Promote Healthy Choices

Accommodate healthy programming. Create spaces which accommodate opportunities for exercise classes and healthy eating options. Space could flex, for example, to allow health-improving activities when not in use for core programming.

Prompt healthy decisions. Architectural cues, such as an alluring, centrally placed stairway, can prompt more physically active choices. Signage and other visual aids can encourage healthy behavior and gently discourage unhealthy habits.

Promote access to outdoors. Look for opportunities to program underused spaces for outdoor recreation. Such locations are especially helpful for families with children, but they can be valuable in a wide variety of settings for example, clinical spaces could share a healing garden on a roof setback.

Encourage access to healthy food. Facilities may be able to address local food deserts with programmable public space for food kiosks or green markets. Creating places to sit, rest and gather in comfort can also encourage the eating of healthy meals.

Ease and invite access to drinking water. Appealing and well-maintained water fountains and bottle refilling stations encourage healthier dietary choices and reduce the incentive to buy sugary drinks. Water sources could be prominently placed as artistic presences in foyers and other high-use spaces.

Accommodate Healthy Programming:

New Yorkers can access training in food preparation in the Riverside Health Center's commercial-style, demonstration kitchen. Kitchen facilities such as these can serve a variety of people who seek to improve cooking skills and nutritional knowledge.

<< page 120

Encourage Access to Healthy Food:

The widening of Humboldt Street Plaza in Williamsburg allows space for a green market, plantings and multiple seating arrangements for people to sit, pause and enjoy a healthy meal.

v

Prompt Healthy Decisions:

Signage gently invites use of the stairs rather than the elevator. Stair prompts and other signs can be designed to be inviting rather than a utilitarian necessity.

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Ease and Invite Access to Drinking Water:

The Source acts as both an art piece and a water bottle refilling station in La Plaza de las Americas in Washington Heights. The distinctive patterns of the pylon draw attention to the faucets, while celebrating the plurality and richness of neighborhood culture.

>

Promote Access to Outdoors:

A canopy makes productive use of a rooftop at the Brooklyn Children's Museum in Crown Heights, inviting people to step outdoors.

v

Case Study:
Riverside Health Center

Promote Healthy Choices: Accommodate Healthy Programming, Prompt Healthy Decisions

The design of the Riverside Health Center in Manhattan encourages users to engage with a multitude of healthy choices, each promoting physical and mental health. Stairway wayfinding, artwork and signage prompt stair use, increasing physical activity. The teaching kitchen and recreation room allow the programming of healthy activities. On-site lockers, showers and bicycle racks support employee fitness and active commuting options. Though it is a relatively small building at 42,000 square feet, it occupies a shared site with a neighborhood library, promoting the possibility of a co-location of services and programming. Most of the building has access to natural daylight and views to nature and greenery, with a basement light well, views to the planted entrance courtyard and a green roof along the side of the building. Such spaces of respite enhance mental well-being. The center achieved LEED Gold, including an Innovation Credit for Design for Active Occupants.

How the Guiding Principles Work Together

Queens Museum

The Guiding Principles invite architects and construction professionals to think about excellence from several perspectives that for some will be new. DDC's Guiding Principles should not be thought of as a checklist of design add-ons, but an opportunity to embed solutions to some of the chief challenges of our time into the DNA of a given project.

Though the principles have been framed within four lens categories (equity, sustainability, resiliency and healthy living), some aims apply across categories and address more than one challenge.

Sustainability tactics can aid the quest for equity by diminishing threats from global warming (flooding, for example), and helping communities adapt to climate change effects. Equitable communities, in turn, prove to be essential to successful resilience efforts, since disasters and other extreme events harm the most vulnerable. Nor can preparedness—whether for severe storms or long-term sea-level rise—succeed without strong communities that can work together. Healthy living aims to build more active, involved communities, which nurtures equity. The talents of DDC's design consultants can do much to advance such virtuous connections.

Consider individual aims in terms of other aims—across principles and lenses. In this way, each design decision becomes a means to build multiple benefits and to address multiple issues that span categories.

Bringing ample daylight inside buildings, for example, is known to improve well-being. When daylight can replace electric lighting, energy use diminishes. Daylight becomes

essential should power fail. That is a very hard-working tactic, involving all four lenses.

The Guiding Principles abound with possibilities for a tactic or a larger strategy to build multiple benefits. Yet what works cannot readily be codified. Instead the most effective ideas seem tied to the unique aspects of individual projects. That's why DDC urges design teams to look at those aspects for opportunities to deliver the greatest benefits and highest performance.

Streetscapes are proving fertile ground for addressing numerous seemingly separate issues. Pedestrian upgrades improve safety and encourage people to walk instead of drive. Tree planting cools streets. A variety of green infrastructure tactics, such as bioswales and stormwater-retaining landscapes, can bring beauty to neighborhoods while treating runoff.

The City has pledged to expand the use of these landscapes, in this way avoiding the construction of water treatment plants costing billions. Green infrastructure also can delight the beholder. With its intimate scale, attractive plantings, and benches, the plaza outside the Glen Oaks Library invites passersby to pause and meet each other. Invisibly, it diverts runoff from an overburdened storm sewer system.

The Case Studies highlight projects that use design to efficiently develop many benefits. With a skylight, natural ventilation, a green roof, solar hot water, and geothermal heating and cooling, FDNY Rescue Company 2, in Brownsville, will be a highly energy efficient building. The

design's connection to daylight and greenery are also beneficial to the health of firefighters.

The new NYPD 40th Police Precinct Station House prioritizes equitable design with a high-visibility meeting room that provides an open, safe space for community engagement. The FDNY Zerega Avenue EMS Station engages the lenses of equity and sustainability by diverting water collected by its green roof to irrigate a community garden next door.

These are just a few ways the Guiding Principles can work together to reveal solutions to a wide range of needs—many not anticipated at inception—enhancing projects without compromising the original needs set out by the client agency.

Viewed through the lenses of equity, sustainability, resilience and healthy living, the meaning of Design and Construction Excellence 2.0 deepens, explicitly including human experience and addressing some of the chief challenges of our time. It is a new way of defining the highest aspirations of design, aspirations that serve the New York of today, yet will endure whatever tomorrow's challenges may be.

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Acknowledgments

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Introduction

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Resiliency

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Conclusion

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Acknowledgments

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