NASHVILLE, TENNESSEE

Enhancing Heat Resilience and Equity in the Wedgewood-Houston and Chestnut Hill Neighborhoods

A ULI Virtual Technical Assistance Panel Report

June 8–11, 2021

Urban Land Institute

About the Urban Land Institute

THE URBAN LAND INSTITUTE is a global, member-driven organization comprising more than 45,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and the Asia Pacific region, with members in 80 countries.

More information is available at uli.org. Follow ULI on Twitter, Facebook, LinkedIn, and Instagram.

About the ULI Urban Resilience Program

ULI's Urban Resilience program is focused on how buildings, cities, and communities can be more resilient to the impacts of climate change and other environmental vulnerabilities. The program works with ULI members to provide technical assistance, advance knowledge through research, and catalyze the adoption of transformative practices for real estate and land use policy.

About the Resilient Land Use Cohort

This virtual technical assistance panel is part of a larger series of resilience technical assistance and learning opportunities called the Resilient Land Use Cohort (RLUC). The RLUC is a network of ULI district councils, member experts, and community partners in eight cities working together to identify strategies to be more resilient in the face of climate change and other vulnerabilities, including floods, extreme storms, drought, wildfire, and extreme heat, as well as the related social, environmental, and economic impacts.

RLUC provides on-the-ground technical assistance through ULI's flagship technical assistance models—Advisory Services panels and technical assistance panels. These panels leverage ULI member expertise to advise on complex real estate and land use challenges related to climate resilience, addressing planning, zoning, land use, development strategy, housing, and infrastructure. ULI's Urban Resilience program convenes the cohort regularly to learn from national best practices and discuss peer cities' next steps advancing resilience through land use policies and development strategies. Funding for this engagement and the cohort is provided by the ULI Foundation with support from JPMorgan Chase.

COVER PHOTO: Nashville at sunset.

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CONTENTS

Acknowledgments

On behalf of the Urban Land Institute, the panel would like to thank the Office of the Mayor of Nashville-Davidson County, the Greater Nashville Regional Council, and Core Development, which sponsored this effort. Special appreciation goes to Mary Beth Ikard, former transportation and sustainability manager for Nashville; Shelly Hazle, senior policy adviser, Greater Nashville Regional Council; and Mark Deutschmann, founder and president of Core Development, for their leadership, support, and cooperation leading up to and during the panel.

The panel would also like to express its appreciation to the ULI Nashville member advisers Jennifer Horne, founding partner, Urban Campus and Core, and Katy Sheesley, director of construction services, Gobbell Hays Partners Inc., who worked with the sponsor team to scope the panel and will assist in the implementation of recommendations going forward.

Finally, the panel extends its thanks and appreciation to the 30 city staff members, nonprofit partners, community leaders, and experts who shared their perspectives, experiences, and insights with the panel as stakeholder interviewees.

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A walkway open to the elements allows air circulation and natural light in the spaces between buildings, nourishing the trees and plants and helping to cool the space.

Executive Summary

Due to anthropogenic climate change, the Nashville and Davidson County region will likely be confronted by an increased number of intense storms, tornadoes, more frequent flooding, and extreme heat days per year between 2025 and 2035, according to the 2021 "Sustainability Advisory Committee Report on Metropolitan Government of Nashville and Davidson County's Climate Change Mitigation Action Plan."

To address these climate risks, the Metropolitan Government of Nashville and Davidson County (Metro) has begun building significant public policy goals related to sustainability and climate resilience. Developed under the leadership of Mayor John Cooper, the committee's report on the climate action plan details the goals, objectives, and strategies Metro will pursue to advance its climate goals and protect its current and future residents.

Through this effort, a coalition of Nashville's public and private sector leaders, including the Metropolitan Government of Nashville and Davidson County, the Greater Nashville Regional Planning Council (GNRPC), and ULI Nashville, collaborated to better understand the steps that can be taken to improve the heat mitigation and resilience of the region's built environment.

In turn, ULI convened a virtual technical assistance panel (vTAP) composed of local and national experts in development, design, health, resilience, finance, and public planning to address questions posed by the sponsorship team relating to heat resilience strategies, building retrofits, programs to promote resilience and energy efficiency, financing mechanisms, and other public policies to mitigate extreme heat.

Following in-depth briefings and interviews with Metro staff and local stakeholders, review of data sources such as the CDC Social Vulnerability Index and the Trust for Public Land's Climate-Smart Cities Tool (including tree canopy, surface temperatures, and health outcomes), and deliberations among panelists regarding the opportunities for mitigating heat in the region's buildings and public spaces, the panel arrived at a series of recommendations.

Building Recommendations

The panel recommends that Metro government consider the following to encourage the implementation of heat mitigation strategies at the building-level:

- **Incentivize heat mitigation strategies:** While some developers are embracing resilience measures, it is time to take a more active public policy approach and incentivize heat mitigation measures in new construction and existing buildings. Expanding those measures beyond commercial buildings and multifamily structures to include single-family homes and duplexes will help ensure a greater impact on neighborhood cooling.

- **Align city priorities with building technology improvements:** Through an alignment of Metro's heat mitigation priorities with the building and technology opportunities available to the development community to reduce a building's impact on heat, there is great potential to turn the tide on Nashville's rising temperatures.
- **New construction:** New construction projects present a myriad of opportunities to use new building materials and technology to mitigate heat. From passive construction methods and alternative roofing materials to improved energy-efficient building systems, developers can make selections today that will help keep the people in the building cool well into the future and prevent the building from exacerbating the urban heat island effect. In many instances, these energy-efficient and resilient selections are no more expensive than traditional materials or construction methods.
- **Existing buildings:** Within the region's existing building stock are many opportunities to improve a building's energy efficiency and heat resilience. Installing reflective material on roof surfaces, improving the airtightness of the building envelope, and upgrading heating and cooling systems to newer, more energy-efficient options will assist in reducing a building's impact on the surrounding environment.

Site Considerations

In addition to the considerations for improving the resilience of buildings, the site on which a building sits also presents opportunities for heat mitigation and resilience. Different site considerations recommended by the panel include the following:

- **Pavement and parking:** Efforts should be taken to keep impervious surfaces to a minimum, whether by reducing available on-site surface parking or using pervious materials on surface lots. Pavements may also be treated with light-reflective coatings that reflect sunlight and prevent heat absorption into the ground.
- **Green infrastructure:** Adding green infrastructure requirements to parking lot standards will expand the presence of vegetation on the site and provide more opportunities for the plants to absorb heat and cool the surroundings. The additional plant material will also assist with stormwater management as the plants take up water and reduce the amount of runoff entering the Metro stormwater systems.

Neighborhood Recommendations

At the neighborhood level, Metro can use the following pilot programs and incentives to demonstrate the efficacy and value of resilience strategies:

- **Roads and parking:** Although Nashville residents primarily rely on personal automobiles to move around the Metro, alternative transportation modes (walking, biking, and using scooters) are becoming more common; as a result, fewer cars are on the road, helping to advance resilience. Metro streets should be evaluated for traffic volume, and space should be reallocated for these alternative transportation modes. In instances where streets are infrequently used, the roadway and easements could be converted into a public park, providing the surrounding neighborhood with access to green space, shade, and amenities such as water features for additional cooling.
- **Green corridors:** The location of city parks and passive green spaces presents an interesting opportunity. When mapped and promoted together, this patchwork of open space could form green corridors across the metro area, connecting residents to a wide variety and geography of cool spaces, recreation, and nature. The City Central Greenway system and the 2017 "Plan to Play: The Nashville Parks and Greenways Master Plan" are good examples of work in this category.
- **Tree canopy:** Root Nashville has become a signature program for Nashville and a model program that other cities seek to emulate. However, additional measures can be taken to more fully leverage the cooling effect of trees. Requiring larger trees for new developments, increasing the payments for those pursuing a variance, and requiring that single-family housing and duplex developers abide by the same tree requirements as multifamily housing developers will promote additional tree planting and expand the reach and impact of Metro tree canopy.

City and Regional Recommendations

An opportunity exists to encourage energy efficiency through Metro's building codes, metering, and reporting systems. Tightening enforcement and expanding requirements to include single-family residences and duplexes may improve energy consumption citywide and reduce the impact on the energy grid. Establishing an energy benchmarking system for Metro's commercial buildings would set a baseline against which to measure future improvements and encourage

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A green roof can become a property amenity as it works to cool the building and the surrounding environment.

building improvements that promote energy efficiency. Third-party enforcement or review teams could supplement Metro's staffing resources as these programs are established and rolled out.

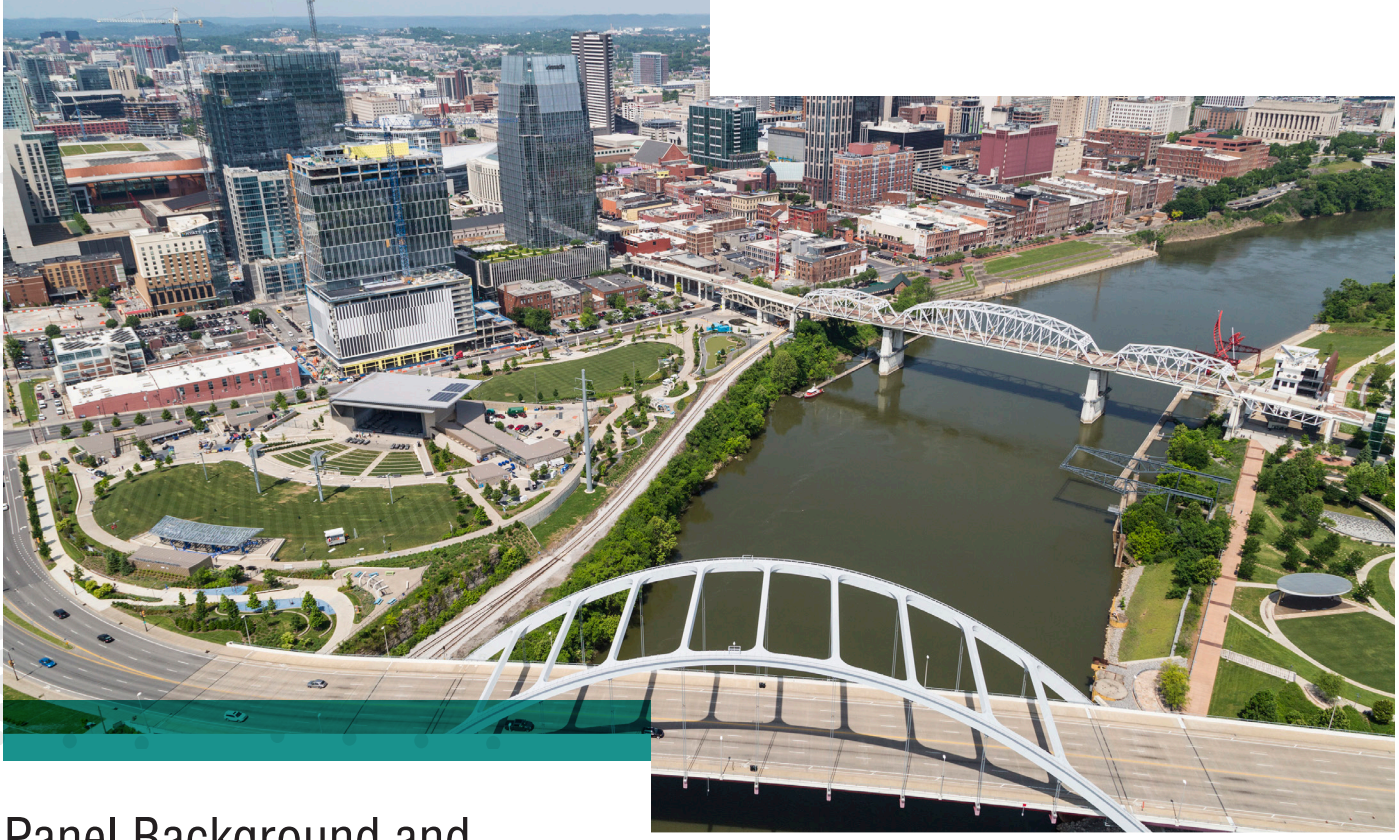
Health and Equity Recommendations

The interwoven nature of heat and health and the disproportional impacts that previous planning efforts have had on historically redlined communities led the panel to center equity in all its recommendations as follows:

- **Citizen science:** Educational campaigns and citizen science would work well in supporting residents' understanding of the impacts of heat and engage them in decisions that are being made in their neighborhood to mitigate heat.
- **Development rubrics:** Neighborhood associations should leverage development rubrics to evaluate development proposals for their neighborhood and advocate for the inclusion of resilience and sustainability measures in new development.
- **Resilience hubs:** Resilience hubs and volunteer resilience programs can bring help and support to communities before, during, and after a crisis.
- **Misting stations:** Misting stations in public spaces can help ensure that cooling options are available where residents with high health risks spend their time.
- **Displacement prevention:** Displacement prevention should remain a focus throughout any of the steps previously listed and measures should be taken to help low-income residents make energy-related improvements to their homes. Likewise, it is important to help income-qualified legacy residents address property-tax increases as their neighborhoods gain in popularity.

Financing Mechanisms

From corporate partnerships to structured funding programs, there are a host of opportunities to leverage funding to support resilience measures. Given the range and complexity of funding opportunities, the panel recommends the establishment of a financing resource hub for those wishing to better understand the variety of funding sources available and to receive technical assistance with specific funding questions.



AERIAL INNOVATIONS SOUTHEAST

Riverfront Park in downtown Nashville is perched along the bank of the Cumberland River and offers residents a cool destination for recreation.

Panel Background and Assignment: Mitigate Heat Impacts

The Nashville region is in the midst of a significant building boom. It is a metropolitan area on the rise in popularity as a place to live and as a place to do business. It is also a city that is acutely aware of its responsibility to be resilient and sustainable during its growth and to ensure that its approach to growth is equitable to all of Nashville's residents.

A Focus on Heat Mitigation and Social Equity in the Built Environment

According to the NashvilleNext plan (2015), average evening temperatures have risen 1.8°F since 1950 and they are expected to increase another 5°F to 9°F by 2100.

Extreme heat is a complex issue that has significant impacts on human health and is exacerbated by urban development patterns and climate change. Fortunately, the built environment can offer opportunities for heat mitigation through strategies related to building design, building materials, green infrastructure, land use planning, and public space design.

In the United States, urban areas are the locations most at risk from extreme heat—to the point of becoming a public health risk for residents—due to the urban heat island effect, which is the difference in temperature between urbanized areas and surrounding outlying areas. The urban heat island effect is exacerbated by the abundance of impervious surfaces and paved areas in urban centers; by the lack of shade, vegetation, and open spaces; and by waste heat emissions generated by building and transportation operations.

Extreme heat also could have long-term impacts on local economies and consumer market preferences. In the private sector, individual developers in and around Nashville are already embracing resilience and heat mitigation measures to ensure that they are not contributing to Metro's urban heat island effect and are keeping their residents and tenants comfortable and safe.

The current temperature trajectory is dangerous and will not be thwarted without intentional effort. According to the CDC report "Climate Change and Extreme Heat Events," extreme heat kills more people annually than any other natural disaster.

As temperatures rise, widespread public health risks may result, often affecting the most vulnerable populations first—but ultimately affecting all. Extreme heat is a pressing public health risk, particularly for low-income and elderly communities.

Given the dangerous effects of urban heat islands, higher average temperatures, and extended heat waves, it is wise to consider how the existing built environment can be modified to reduce heat impacts and to identify ways in which the development industry can leverage new building technologies to lessen the impact of extreme heat.

Building on the important work by the Mayor's office and knowing that temperatures are expected to increase, Metro, the Greater Nashville Regional Council, and Core Development turned to ULI to convene a virtual technical assistance panel (vTAP) to explore and identify ways in which Metro can address heat resilience in the built environment.

Panel Scope

The vTAP was charged with answering the following questions:

1. What are the building and site-scale landscape design heat resilience strategies that, if implemented more widely, have the potential to help the region achieve its extreme heat/cold resilience goals? What best practices for extreme temperature mitigation from other cities can be implemented in Nashville?
2. Given the health impacts of urban heat islands and extended heat waves, how can the Nashville region ensure that building retrofits and land use heat mitigation actions are done in an equitable manner?
3. What are the opportunities and challenges for new programs (such as the voluntary energy benchmarking, as cited in the resilience strategy) to demonstrate short-term feasibility to help Nashville achieve its longer-term heat mitigation and energy efficiency goals?
4. What relevant/current regulations and potential financing mechanisms programs can be leveraged to support extreme temperature mitigation retrofits and create a market for resilient buildings in the region?
5. How could future city policy encourage local property owners and developers to mitigate extreme heat/cold at their projects and open spaces?

To answer these questions, and using two neighborhoods in southeast Nashville as sample study areas, ULI Nashville convened a small group of members—real estate professionals with expertise relevant to the questions at hand—to study the issue, interview city and private sector stakeholders, and ultimately deliver a set of recommendations and actionable strategies that Metro can put in place to help it equitably achieve its extreme heat/cold resilience goals and prepare people and the built environment for the increased heat and heat events to come.

Stakeholder Insights

As the panel considered the scope posed by the sponsors, it conducted stakeholder interviews, hearing directly from more than 30 people representing the public and private sectors, developers and residents, nonprofit and community leaders, and real estate and business owners. The following input was collected from the stakeholder interviews:

- The existing building stock needs upgrades to be more energy efficient.
- Current solutions are neither aimed toward the long-term nor aimed toward lowering the impact on the grid.
- Larger commercial buildings need to be subject to energy consumption measuring and monitoring.
- State priorities and funded priorities are not aligned.
- Encourage Tennessee Valley Authority and Nashville Electric Service incentives.
- New construction energy codes need to be regularly upgraded on a three-year cycle.
- Currently, single-family homes and duplexes are exempt from most of Metro's stated building energy requirements.
- Parking requirements need to be revised and updated to reflect the needs of a population that is more mobile and focused on alternative-transportation methods.
- Infrastructure improvements have lagged behind growth.
- Only 18 percent of city streets have sidewalks.
- Who determines which buildings or places are worth preserving?
- A need exists to broadly communicate the impacts of individual actions on neighbors or others in the chain of beings.
- A pilot project could be launched to apply reflective roofing on existing roofs in a neighborhood.
- Solutions related to flood mitigation need to be viewed through an equity lens because previous mitigation efforts have led to the destruction of black neighborhoods.
- Change is occurring quickly, and action cannot wait because plans and developments are already underway for significant development across the Metro.

Focus Area: Chestnut Hill and Wedgewood-Houston Neighborhoods

Further leveraging the CDC's Social Vulnerability Index and the Trust for Public Land's Climate-Smart Cities Tool, the vTAP sponsors identified two neighborhoods in South Nashville as microcosms of the challenges and opportunities that the larger metro area faces relating to heat, development pressures, natural resources, and more.

The Chestnut Hill and Wedgewood-Houston neighborhoods are home to many low-income residents, yet the area is surrounded by high-profile land uses including downtown Nashville, Trevecca Nazarene University, The Fairgrounds Nashville, and a new Major League Soccer stadium. The Fairgrounds area has been home to horse racing and car racing, uses which largely ignored their impact on the nearby Brown's Creek. Today, however, environmental work has commenced, remediation is occurring, and wildlife is returning to the area around the waterway.

Other activity within the study area includes the construction of new multifamily housing and an expo site, the redevelopment of May Hosiery, The Finery building, and the development of Azafrán Park. These developments are bringing added attention to the neighborhoods and driving escalating and inflated property costs beyond the grasp of the typical legacy neighborhood resident.

Given their location and proximity to other new development planned in this part of Nashville, the neighborhoods are experiencing intense development interest and pressure to make way for building renovations, retrofits, and new construction. This outside pressure provides an opportunity to position these neighborhoods as examples for the incorporation of resilient building and design practices going forward.

Resident leadership within the neighborhoods has been relatively strong. The Wedgewood-Houston neighborhood has a development rubric in place to help guide new development along paths outlined by the community, and Chestnut Hill's Community Association has programming in place to bring neighbors together and to provide a space for community conversations.

The two neighborhoods are also some of the most likely to experience challenges related to extreme heat and cold. The homes in these neighborhoods are older and require upgrades to become more energy efficient and heat resilient. Many are single-family or duplex homes and therefore are not subject to a number of important city regulations regarding tree preservation and energy performance. Finally, there is a significant amount of impervious surface throughout the study area. These factors contribute to an environment that is warmer than the environments of the surrounding neighborhoods.

Given the development interest in Nashville, Metro needs to be intentional with planning, protection, and land use. Residents will be affected by the development pressures, the upward trend in property values and associated property tax increases, and the financial strain to maintain a cool home as the temperatures continue to rise—resident displacement may result. To help prevent displacement and assist with heat mitigation, the panel recommends Metro consider the following strategies for these neighborhoods.

ULI/ GOOGLE MAPS

The study area, which includes the Chestnut Hill and Wedgewood-Houston neighborhoods of Nashville.

Land trust: A land trust might be a helpful tool in the preservation of land for community use as well as in the preservation of affordable housing in both neighborhoods.

Neighborhood capacity building: Although both neighborhoods have community/resident leadership associations in place, there may be a need for additional capacity building for these resident leaders. Supporting increased understanding of development, sustainability, and resilience will support resident leaders during discussions with developers seeking to enter their neighborhood.

Connectivity: The neighborhoods are marked by a lack of sidewalks, yet many residents are frequent users of public transportation. Reopening the pedestrian bridge connections across Brown's Creek would help residents more easily access public transportation assets, and a reallocation of road space for bike and pedestrian infrastructure via the planned Complete Streets project will help. It is also worth noting that the addition of the City Central Greenway through the study area will open additional recreation opportunities for neighborhood residents and provide additional transportation infrastructure.

Multiuse infrastructure: Any improvements made in the neighborhood should be prioritized and leveraged to provide multiple benefits. The potential for a 62-acre park in the middle of the neighborhood, as considered in the Fort Negley RFP issued by Metro, will provide recreation opportunities and help mitigate heat. By limiting new development around Brown's Creek, Metro can address flood risk in the area—and at the same time, the green space can provide opportunities for recreation and relaxation. Splash or spay pads spaces in parks could be used to entertain children in the summer months, and older residents might also benefit from the cooling created by the misted environment around the water features. Bioswales can assist with stormwater mitigation on site and provide a welcome landscaping amenity that is pleasing to be around. Every investment must provide multiple benefits.

GEOFF LYON

Ample shade makes Houston's Levy Park comfortable and usable in all seasons.

Development and Land Use Strategies

> The panel strongly recommends the adoption of the mayor's sustainability plan and incoming adaptation plan.

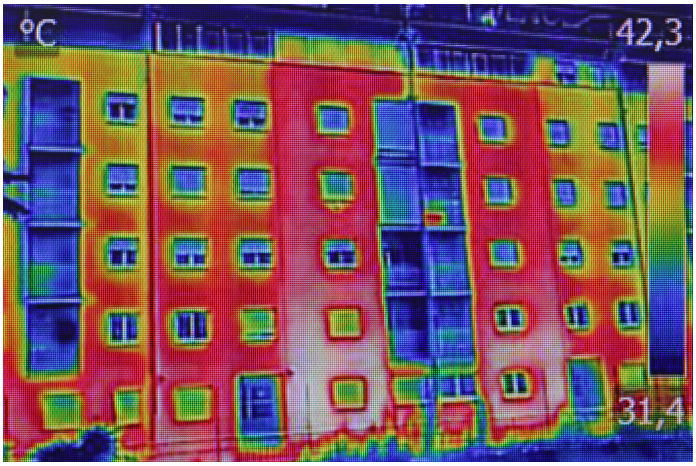
Mayor Cooper's administration has already been hard at work, convening an advisory committee to identify strategies to address climate change in the metro area. Before detailing the recommendations specific to this ULI vTAP engagement, the panel strongly recommends the adoption of the mayor's sustainability plan and incoming adaptation plan. From setting targets for greenhouse gas emissions reduction to reducing flood risks, particularly in vulnerable populations, the report is full of strategies that will positively affect the sustainability and resilience of the Metropolitan Government of Nashville and Davidson County.

While some developers are already pursuing resilience goals and measures in new projects, there are opportunities to encourage adoption of heat mitigation strategies by developers who may not yet be familiar with the practices.

A need exists for broader education on the topic of heat mitigation and resilience in the development community. Making the business case for resilience will be key in these conversations as is identifying areas for potential cost savings in material selection or at least areas where resilient options do not cost more. It is also critical to stress the importance of resilience and energy efficiency to today's buyers and tenants.

Homeowners and building tenants increasingly understand the roles they can play in their space as it relates to heat mitigation, climate resilience, and the heat island effect—and

Light-colored coatings can be applied to roofing material to cool a building.



Thermal scans of buildings can help identify areas of focus for improving the airtightness of a structure.

they are looking for homes and buildings that meet their personal and/or business goals. In addition, many view green roofs, bioswales, and rain gardens as property amenities, and they are willing to support the installation and maintenance of such. Case studies that support these measures and demonstrate the value proposition for their use should prove helpful in persuading reluctant developers to take on resilience practices.

To help encourage new or reluctant developers, Metro could consider entitlements and/or density bonuses to incentivize cool roofs, green roofs, tree canopy, cool coatings, and other resilience improvements to the building envelope. These incentives could be drafted and managed in a manner similar to the bonus height potentials currently included in Metro's Downtown Code.

> Every action is a climate action—either reducing risk or increasing risk, inadvertently or deliberately.
>
> —TAP panelist

Given the predominance of single-family homes in Nashville, and the fact that these properties are currently exempt from regulations relating to cool roofs and tree canopy, Metro is encouraged to revisit the code exemptions for single-family homes to more actively engage in heat mitigation and resilience efforts citywide, particularly in these areas where people live, invest their personal time/income, and raise their families.

It may also be possible to fund greater/broader community resilience with the help of the development community. If developers were encouraged to contribute to a community amenity fund supporting resilience improvements, Metro could tap into those funds to assist in the implementation of some of the resilience recommendations contained in this report.

Specific to the impacts of the built environment on Metro's heat island effect, the panel identified a variety of solutions for consideration and framed each recommendation based on the scale of the solution—building-level (new construction and existing buildings), site-level, and neighborhood. Equity should be a consideration throughout, regardless of the scale of the building or solution.

The following sections provide detail for each recommendation, but put simply, the Metro needs more greenery and shade, pavement and rooftops should be lighter in color, and more water features should be added across the Metro, providing people with opportunities to cool off.

Building Recommendations

The built environment is a significant contributor to the urban heat island effect. At the same time, new technologies and simple construction or renovation approaches can effectively reduce the heat impacts of buildings.

New Construction

In many instances, heat mitigation solutions can be implemented just as easily and cost-effectively as traditional building materials and construction practices. By using Metro's building code process and incentive programs, Metro

highlights the benefits of heat mitigation measures and signals the importance of the adoption of such measures across all city neighborhoods.

Metro is encouraged to require the installation of reflective materials, cool roofs, or green roofs in new developments to cool neighborhoods and protect residents. Cities across North America are embracing policies of this nature—Chicago, Los Angeles, New York City, Louisville, and Vancouver have policies in place that either require cool roofs or incentivize their installation.

Additional new building codes or incentives could focus on construction methods, materials, systems, and even landscaping provisions. In the construction of the building, passive methods such as using improved insulation, reflective walls, and less glass in the building envelope each impact the amount of heat generated by or trapped within a building. The building's energy systems also provide prime opportunities for energy efficiencies and heat mitigation. By incentivizing the use of efficient heating and cooling systems such as heat pumps, energy consumption is reduced and the building owner can enjoy the benefits of reduced energy costs. Around the exterior of the building, property owners should also be encouraged to use shading elements to protect people entering and leaving the building.

Existing Buildings

Similar to policy recommendations for new construction, Metro is encouraged to address the energy efficiency and heat resilience of Nashville's vast inventory of existing buildings—both commercial and residential (multifamily, duplex, and single family).

Building codes and incentive programs could be used to encourage the installation of cool roof measures. For existing buildings that may not be able to withstand the additional load of a green roof, given the weight of the additional materials required to sustain vegetation, reflective roof coatings can be installed. These coatings can be used on small residential structures as well as on large commercial buildings. The coatings help cool the building, reduce the energy consumption in each instance, lower utility bills, and contribute to heat mitigation in the surrounding area with a reduction in the release of heat from the structure at night.

Aging homes and buildings were often constructed at a time when less insulation was needed. To address today's climate conditions, however, owners of these aging structures could benefit from and be encouraged by incentives to increase the airtightness, insulation, and weatherization of the building envelope. Similarly, upgrading a building or home's heating and cooling systems to energy-efficient systems would benefit both the building owner via lower utility bills and the surrounding neighborhood via reduced waste heat emissions.

These improvements would also increase the building's passive survivability—the length of time a person can safely stay in a building during a critical weather event with power outages. A well-insulated and airtight home or building is going to stay cooler for longer periods of time, thereby increasing the likelihood of survivability in time of crisis and lowering energy bills over time. These measures also reduce the amount of energy needed from the larger energy grid and help improve the resilience of the entire system, from individual home to commercial building to the larger power grid.

Site Recommendations

At the broader property or site level, a number of measures can be put in place to help reduce the impacts of climate change on the Metro.

One measure other cities are embracing is the requirement that new developments of a certain scale address stormwater management on site. Implemented via a metro stormwater permit process and zoning design standards, Metro benefits from the reduction in flood risk, and the building owner and tenants enjoy the added greenery and planting amenities typically employed in bioswales and rain gardens. The additional vegetation and water retention/management on site also help contribute to a cooler environment around the building and site.

Traditional hardscape features can also present opportunities for improvement or conversion to amenities that will help reduce the heat island effect. Metro could encourage the increase in permeable area on a site and, where that may be challenging or problematic, allow roof gardens to contribute as permeable surface in the overall ratio of permeable to impermeable surface on a site. Parking lots are also ripe for mitigation efforts. From reducing parking minimums to require fewer square feet of hardscape at the start, to resurfacing lots with a cool pavement, Metro has plenty of policy decisions it can consider to reduce the heat impacts of parking infrastructure. Going a step further, parking lot design standards could be upgraded to include green infrastructure features, which lessen the visual impact of the pavement expanse and, of course, contribute to the cooling of the surrounding area.

STREETSLA

STREETSLA

Light-colored coatings can be applied to paved spaces and streets to increase the reflectivity of the space and reduce heat absorption.

Finally, as it relates to site landscaping, Metro is encouraged to consider performance-based landscape standards that take into consideration the type of plant and irrigation requirements, working to reduce turf and encourage native species that are more heat and drought tolerant.

Neighborhood Recommendations

Although it is critical to address heat mitigation measures at the building and site level, it is also just as important to understand and consider how the decisions made at the site level affect neighboring properties and downstream water conveyance. By employing a holistic approach to site selection and design, not only will on-site mitigation measures work to reduce heat impacts and cool the site, but the measures also will have positive ripple effects out into the surrounding community. Once again, incentive programs or a municipal pilot program may be needed to demonstrate the installation and benefits of neighborhood-scale measures.

Finding spaces within neighborhoods for the addition of green infrastructure and cooling mechanisms might provide Metro with an interesting opportunity to begin to connect such spaces, creating a green corridor for residents and visitors. Along the way, spray pads, misters, and other water-based cooling devices could be installed for light cooling (misters) as well as play (spray/splash pads). There may also be opportunities to leverage green spaces and cool areas within Metro's existing public assets. Through an inventory of existing schools, libraries, etc., new green and cool spaces may be discovered, cataloged, and made available to the general public for use when extreme heat takes hold.

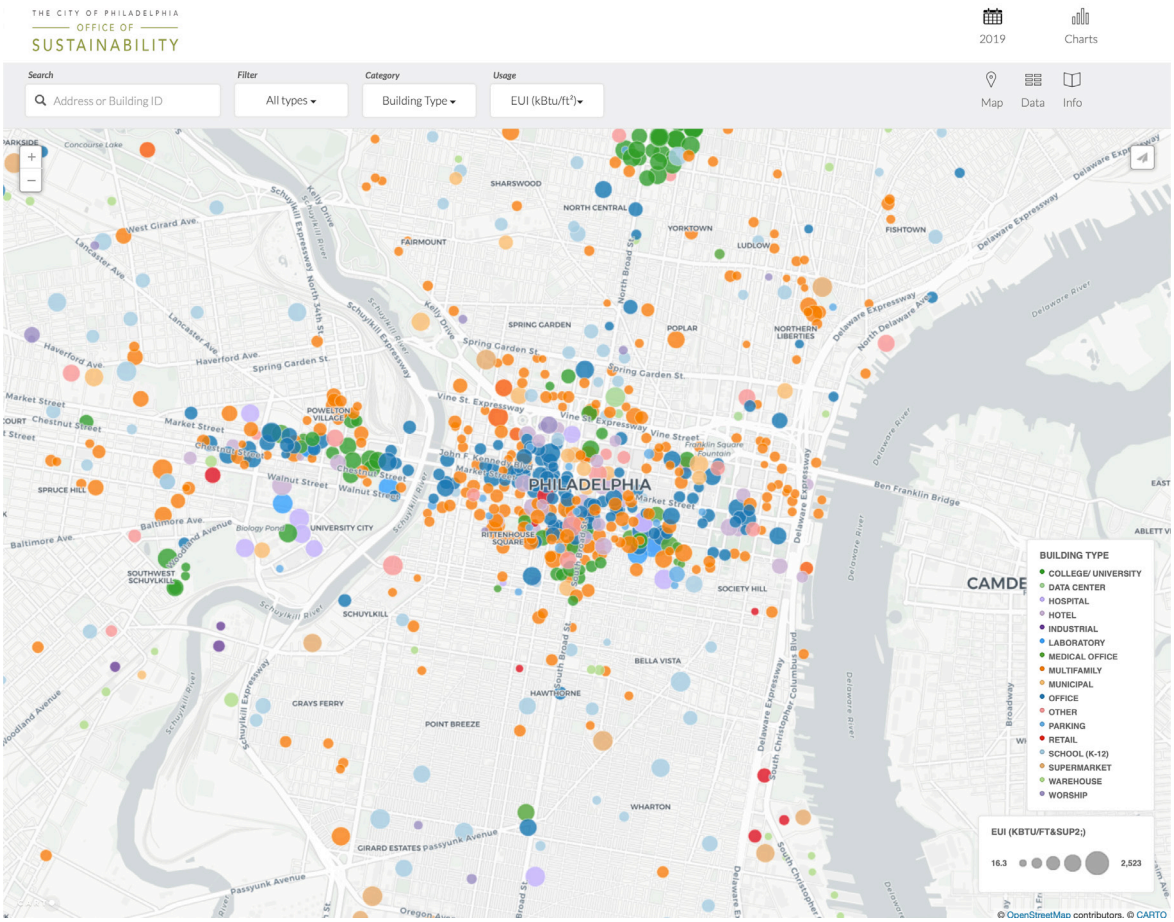
Streets and parking areas play a critical role in raising the temperature in cities. By reallocating road space to support alternative transportation and open space (e.g., converting streets to parks), Metro may begin to realize the benefits of decommissioning underused roadways and shifting the focus on such from the personal auto to more sustainable transportation and recreation opportunities. In instances when it might not be practical to convert an entire street to green space, there may yet be underused or excess space that could be de-paved and converted to green infrastructure. Similarly, underused parking lots should be targeted for de-paving and green infrastructure installation. New York City has converted more than 2,000 such spaces into green durable landscape.

In each instance, the approach to any improvement works best when the improvement serves multiple functions—for example, reducing the size of a parking lot and using the excess area for a bed for native vegetation reduces the amount of runoff from the impervious surfaces, absorbs stormwater on site, and helps mitigate the heat island effect of the parking lot.

Tree Canopy

Nashville is in some ways ahead of the game when it comes to its tree canopy. The recent Root Nashville campaign to plant over 500,000 trees by 2050 will have a significant impact once it is fully funded, however, there is a good deal of work yet to do.

Although Metro does have tree planting requirements in place, enhancements to those requirements could address additional factors such as caliper, size of canopy, and tree removal. New developments could be encouraged or incentivized to plant larger trees that will have increased impacts on heat mitigation earlier in the development's life cycle. Increasing the tree canopy requirements in all project approvals could have a similar effect. The current tree



The city of Philadelphia hosts an online resource that maps the location of various commercial buildings currently participating in the municipal energy benchmarking program.

ordinance should be expanded to also include requirements for trees and trees of size in new single-family home and duplex developments. Finally, all tree planting above the required size, regardless of the development type or scale, should be incentivized.

When tree removal occurs illegally, Metro is encouraged to increase the penalties, and for those who wish to make a payment in lieu of meeting the requirements, it is recommended that they should face a higher payment to the tree mitigation bank.

Given the real estate demand in Nashville and the excellent health of the local economy, Metro is in a strong position, and it can ask more of the development community. Many national developers are being asked to meet these demands in other cities, and this should be the case in Nashville as well.

Although legislation relating to tree plantings for single-family homes and duplexes was removed in the last legislative session, it may be time to go back to the homeowners and share information about the business case for tree preservation on private lots.

City and Region Recommendations

At the municipal and regional level, efforts such as strengthened building codes and measuring and reporting energy use can encourage more active resilience measures from building developers and owners.

Building Code Revisions

Although some of these recommendations may already be woven into the current building code, changes occur rapidly, code reviewers have an increasing scope to monitor, and developers may be circumnavigating the requirements via variances. Regardless of how some are skirting the requirements, Metro is encouraged to strengthen its building codes and increase enforcement. In some instances, there may be an issue with capacity within the building department. If that is the case, there are third-party permit reviewers who can be hired on a contract basis by Metro to ease the strain on the current city staff. This additional assistance could also support city staff in the review and oversight of larger development projects in which significant opportunities for heat mitigation may lie.

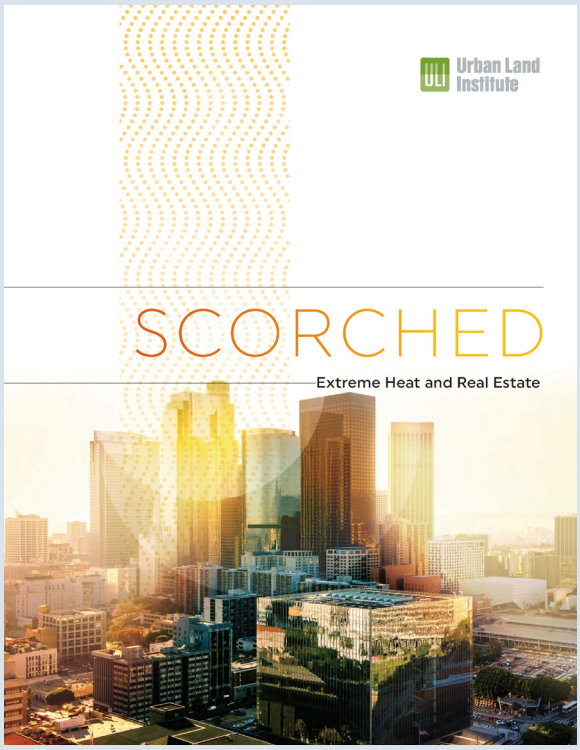
Energy metering and reporting is a tool that has gained traction with other U.S. cities as a way to encourage energy efficiency and best practices in building management. By establishing a baseline and setting targeted goals, building owners, the public sector, and even Metro's residents can have a clearer understanding of how buildings are using energy and where improvements and efficiencies are being achieved. By leading with a voluntary program, Metro could work with building owners who value sustainability. Together they could then encourage other building owners and developers to participate before moving on to a mandatory system. Philadelphia has recently launched a similar program that could be leveraged for data and developer insights to help lay the foundation for a metering and reporting conversation with the Nashville building and business community.

Scorched

In 2019, ULI's Urban Resilience program published *Scorched: Extreme Heat and Real Estate* to outline how extreme heat will affect the real estate and land use sectors and to highlight the leadership and the potential positive impact of the real estate sector in implementing "heat-resilient" building designs and land uses. The report provides an overview of extreme heat's connections to the built environment and an in-depth discussion of heat mitigation and adaptation strategies related to building design, building materials, green infrastructure, and public space design.

Overall, ULI found that extreme heat is an issue with increasing relevance to the real estate and land use sectors because of the intensifying impacts of climate change and the urban heat island effect, changes in amenity expectations and market demands in some regions, and regulators' growing interest. In response, some developers, designers, and other land use professionals are addressing temperature-related risks through the life cycle of a building or development—from investment to construction to operations and maintenance.

Investing in heat-mitigation technology and approaches can lead to a host of benefits, such as improved tenant experience, reduced operating costs, improved likelihood of business continuity, enhanced branding, and additional foot traffic in pedestrian and retail environments.



A splash pad fountain outside PPG Place in downtown Pittsburgh provides the public with easy and enjoyable access to cooling water features.

Health and Equity

The intersection of equity and heat mitigation relates to the increased vulnerability of certain populations to health, economic, and safety impacts resulting from increased heat. Extreme heat impacts are more detrimental in historically under-resourced communities, resulting in disproportional negative health impacts for older adults, people living in poverty, and BIPOC (Black, indigenous, and people of color) communities. Seniors, people with low incomes, and Black and brown populations are much more likely to experience the negative impacts of heat and to suffer in their health or personal economics, or to have their safety threatened. These communities were of particular focus as the panel evaluated the TAP challenge and formed its recommendations.

Community Empowerment

The panel recommends considering the following strategies to encourage and support the community in decision-making for mitigating heat in neighborhoods:

- **Educational campaigns:** Community-wide education is needed to alert all to the health and safety hazards of extreme heat. To meet this demand, Metro is encouraged to develop educational campaigns to inform developers, nonprofits, and community members about urban heat issues and solutions. During the TAP stakeholder interviews, developers noted that they would likely pursue heat-resilient options during the development process if those options and associated benefits were clearly communicated to them. ULI Nashville is uniquely positioned to play a leading role in this education process. In addition, other nonprofit organizations and foundations could serve as important conduits of heat mitigation and resilience solutions to the communities and constituents they serve.
- **Citizen science:** Residents in Nashville neighborhoods could be engaged to serve as representatives in their neighborhoods' pursuit of heat mitigation strategies. This citizen science approach can also be used as a teaching tool for community members so everyone can learn about heat impact, design and building scenarios that may be contributing to increased heat in their neighborhoods, and the various solutions that they can advocate for either with Metro or with developers working in their neighborhoods.

Wedgewood Houston Proposed Development Rubric Scoring proposed projects in relation to Wedgewood Houston's community needs and wishes. Projects that meet at least the minimum score of 80 are considered for Wedgewood Houston community/SNAP support (letters, etc.).			
	Strong *20 Points*	**Sufficient** *10 Points*	**Lacking** *0 Points*
Community Character	Design is respectful of community character. Proposed buildings symbolize a reimagining of historical neighborhood structures.	Proposed development includes more units that are vastly different from the character of the neighborhood (i.e.-"tall and skinny"), size of proposed units doesn't fit the scale of the need in community (i.e. micro units in a family-centered neighborhood)	Buildings standout from community character. No focus on maintaining historical character or meeting the community's ideal needs.
Housing Diversity	At least 30% of proposed housing/unit options are diverse housing (i.e.-workforce, mixed use, mixed income, 0-80% AMI affordable, family focused).	Only one type of diverse housing/unit is included in plan, BUT still represents at least 10% of the prosed units within the project.	Less than 10% affordable housing/units, included in the proposed project.
Transportation Consideration	Obvious design for ease of access to, and safety around, public transportation, and neighborhood walkability. Includes crosswalks and/or sidewalks. Pedestrian safety (bus stop lights, bike lanes, school zones, etc.)	Proposed plan minimally addresses pedestrian safety around busy streets, near schools, etc. Vague language surrounding developer's commitment to community/pedestrian/biking/bus rider safety.	No focus on pedestrian needs or public transportation safety, etc.
Sustainability	Includes sustainable design metrics. Focus on mitigating urban runoff. Plan for **EITHER** 10% increase in trees, unique use(s) of green space. Inclusive, welcoming public spaces (focused on needs of legacy and new neighbors). Multiple LEED concepts firmly established.	Meets more than the minimum required open space, storm water, and landscape requirements, as defined in the Metro Nashville Zoning Ordinance. Lacks creativity and plan for inclusive and welcoming public open space. Some LEED concepts established.	Meets **ONLY** the minimum required open space, storm water, and landscape requirements, as defined in the Metro Nashville Zoning Ordinance. Lacks creativity and plan for inclusive and welcoming public open space. No LEED concepts established.
Artist/Industrial	Proposed project focuses on inclusion of affordable maker space(s), entrepreneurial education, STEM, industrial space, art spaces, that are inclusive in design and meant to welcome all neighbors. Includes potential outreach plan, to recruit diverse array of local artists, for onsite installations.	Singular focus on one type of artistic/industrial space. Lacks obvious plan to ensure diversity in either types of projects or artists represented. No recruitment plan to ensure inclusive diversity.	No focus on artistic/industrial space

Note: This rubric is a *living document* and may change to fit the changing needs of the Wedgewood Houston Community.

This development review rubric crafted by the Wedgewood-Houston community might be a good model for similar neighborhood associations.

WEDGEWOOD-HOUSTON COMMUNITY

Double-glazed windows and solar panels are improvements a homeowner can undertake to improve energy efficiency. And these improvements may be prime opportunities for funding support via state or federal funding or special utility promotions/programs.

- **Development rubric:** The Wedgewood-Houston neighborhood association employs a rubric against which it scores and measures development proposals in its geography. By using this rubric as a model and perhaps incorporating additional heat resilience factors, other city residents can begin to take a more active role in shaping the development coming into their neighborhood and push for resilience strategies that will benefit everyone well into the future.

Neighborhood Response

The best way to foster and support lasting impacts in heat mitigation and adaptation is to bring the issue as close to home as possible. By investing at the neighborhood level specifically, the following efforts will have a greater chance to advance equity and quality of life for Nashville's residents:

- **Neighborhood resilience hubs:** Establish neighborhood resilience hubs at existing community centers, schools, and/or libraries. By incorporating opportunities for residents to cool off, warm up, and access essential services and resources, particularly during natural disasters, these hubs enhance existing public assets and improve the quality of life in the surrounding neighborhoods. Hubs can also include medical and mental health services, food, water, and emergency medical supplies. Given the greater needs in neighborhoods at high risk, establishing hubs in high health risk neighborhoods should be a priority.

- **Volunteer resilience program:** Residents on the ground in the neighborhoods can also become key resources in the deployment and support of health-related strategies. A community-focused volunteer resilience program could create opportunities to engage residents in resilience work by asking them to pair up with and check on neighbors who may be at a high health risk during adverse weather days. This volunteer engagement increases Metro's resilience work and capacity cost-effectively and encourages residents to share their knowledge with fellow neighbors. New York City has a program in place called "Be a Buddy" that follows this volunteer resilience model.

Resilience Hubs

Communities around the country are leveraging the power of their public assets by turning them into multifunctional resilience hubs. These resilience hubs serve residents before a crisis (via their core functions as libraries, schools, etc.), during a crisis by providing safe space and resources, and after a crisis by providing follow-on programming or resources to help the community stabilize.

> Resilience hubs are community-serving facilities augmented to support residents, coordinate communication, distribute resources, and reduce carbon pollution while enhancing quality of life.
>
> —resilience-hub.org

Typically, resilience hubs are placed in buildings that are proximate to neighborhoods, they feature large spaces for gathering, and they are already a trusted part of the community's social and physical fabric. Many cities are finding the perfect solution in existing community assets like libraries, recreation centers, and schools because these spaces are easily accessible, open to the public, and, with certain modifications, can be trusted to remain open in times of crisis.

Ideally, a resilience hub features a sustainable and climate-responsive design in its building structures and systems. Features such as resilient energy systems and communications systems are critical to serve the community before, during, and after a crisis. The facility must also be equipped with the materials and resources (e.g., food and medical supplies) that may need to be distributed in times of crisis. Additional enhancements might include an expansion of the building's programming to provide year-round health and social services as well as training to support the surrounding neighborhood's emergency preparedness and adaptive capacity to climate change.

Learn more at http://resilience-hub.org.

CITY OF TALLAHASSEE

- **Misting stations:** By adding simple misting stations in parks or other public spaces where residents with high health risks spend time, Metro can introduce a reprieve and cooling in the Metro's neighborhoods. Priority again should be placed on the neighborhoods with the most vulnerable populations.

Displacement Prevention

In the midst of the improvements and investments in the community and to ensure that equity is centered in this work, care needs to be taken to ensure that current residents are not displaced during or because of Metro's resilience efforts. The following are strategies and investments Metro can use to prevent displacement:

- **Energy efficiency upgrades:** In addition to the commercial building upgrades outlined previously, upgrades to residential buildings will help advance Metro's resilience goals. Paying for these upgrades, however, may be challenging for existing homeowners, particularly seniors. Metro can help by funding energy efficiency upgrades in individual homes to lower energy bills and help ensure residents can afford to stay in their

homes. The upgrades could be funded through utility grants or loans subsidized by utility companies for air conditioning and other energy efficiency investments.

- **Financial assistance:** As investments in homes and neighborhoods are made, property values will increase. Metro is encouraged to provide financial assistance to income-qualified homeowners to meet the financial demands of their increased property values and allow them to stay in their home. In Atlanta, the Westside Future Fund was established to provide this critical funding to residents facing higher taxes related to increases in their property values. Similarly, in Philadelphia, the Housing Trust Fund works to preserve existing housing and provides some financial assistance related to home repair projects and energy upgrades.
- **Acquire land strategically:** The public sector is encouraged to acquire property strategically across the metro area to help ensure that open and green space remains in place to help continue to cool the metro area, address ongoing flood risks, and provide recreation space to all residents, thereby also addressing gaps in park access. Metro's Plan to Play: Countywide Parks and Greenways Master Plan provides a compelling blueprint for providing parks and greenways in the urban core and across the metro area

The planning, design, and infrastructure put in place in these disinvested communities exacerbate the heat island effects caused by the abundance of pavement and impervious surfaces and the lack of trees and vegetation.

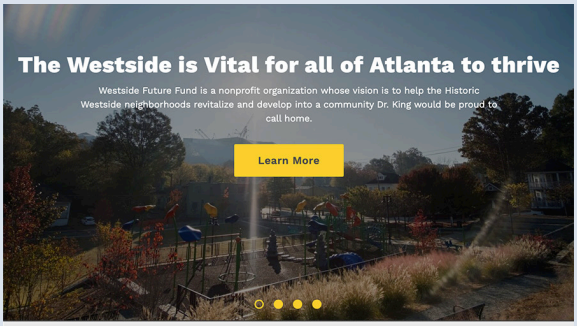
Pointing back to the wisdom shared by the Sustainability Advisory Council in Mayor Cooper's recent report, the panel emphasized the importance of considering procedural equity and bringing community members along throughout the decision-making process. Doing so helps ensure distributional equity: Metro knows where resources are coming from and where they are being deployed so no one is left behind.

Westside Future Fund

Established in Atlanta as a philanthropic antidisplacement tax fund, the Westside Future Fund will pay the increase in the property tax for income-qualified legacy homeowners who are experiencing a tax increase due to the improvements in the neighborhood around them. This funding allows legacy homeowners to stay in their home and enjoy the quality-of-life improvements around them as others begin to recognize the value of these historic neighborhoods.

Most funds of this nature require some form of public/private partnership to help expand the scope and breadth of what government can accomplish on its own.

Learn more at www.westsidefuturefund.org.



FEATURED NEWS

Westside Future Fund Announces New Round of Affordable Housing Development to Benefit Legacy Residents on Atlanta's Historic Westside

ATLANTA – John Ahmann, President and CEO of the Westside Future Fund (WFF), announced today that the nonprofit would soon start more affordable housing development activity, thanks to its public-pri...

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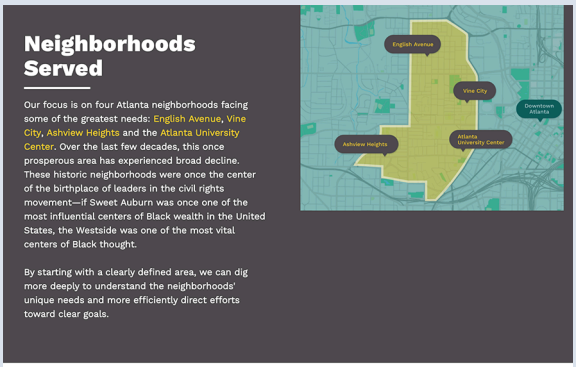
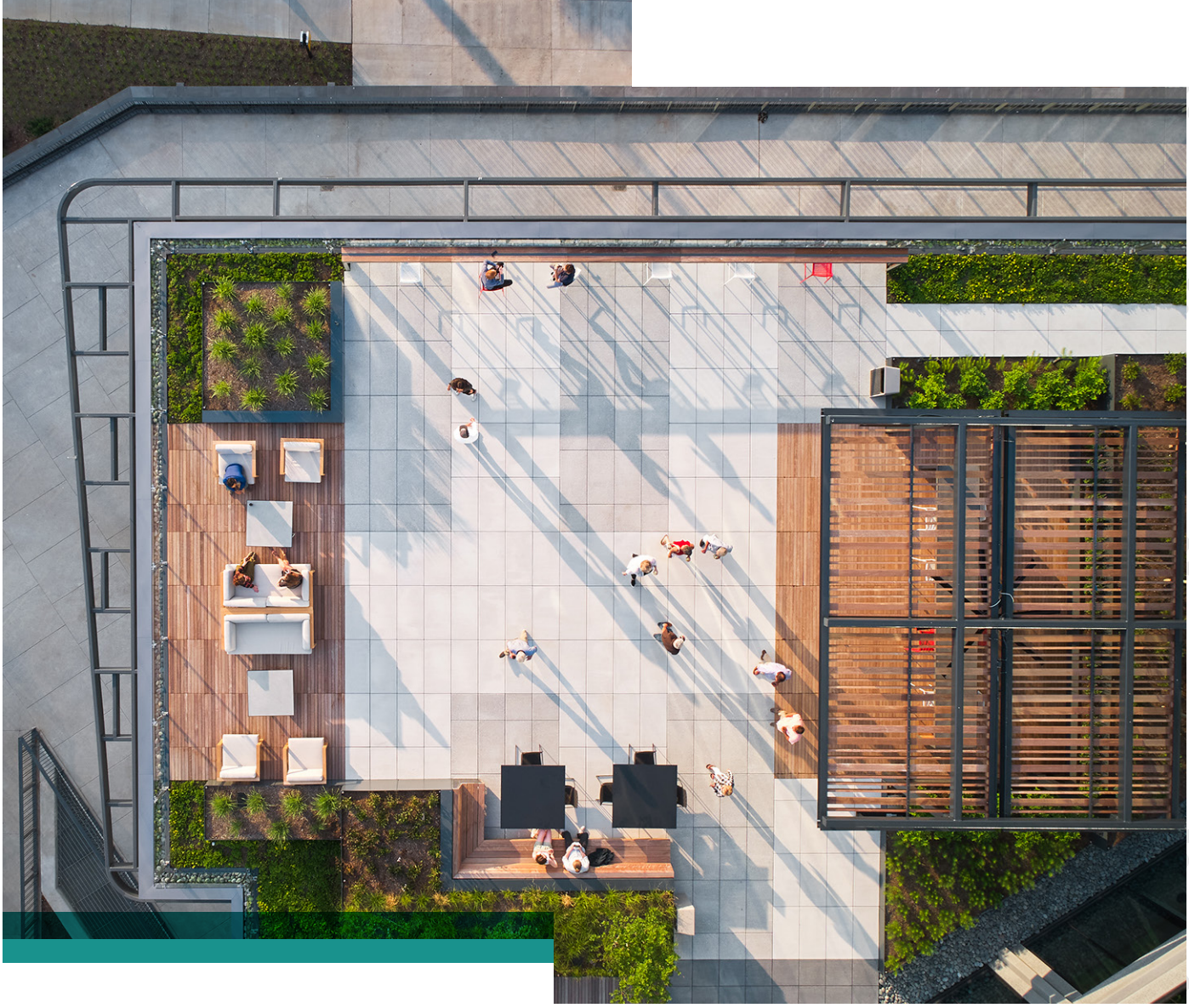


Impact Areas

Communities are proven to thrive when they excel at making people feel safe and secure, when people from all walks of life can afford to live together, when residents are educated and trained to be productive citizens, and when they have access to resources that improve their health and well-being. We're focused on getting those four things right.



KENDALL MCCAUGHERTY © HALL + MERRICK PHOTOGRAPHERS/COURTESY OF HASTINGS ARCHITECTURE LLC

The low roof terrace, green roof, light-colored paving materials, and shade structure at Peabody Plaza in Nashville.

Financing Mechanisms

There are a variety of resources available to Metro and the broader community that can be tapped to help implement the recommendations detailed by the panel. From leveraging corporate sponsorships, to property assessed clean energy (PACE) funding, to other federal sources, cities are able to find the necessary funding to make great strides in climate adaptation and resilience.

Corporate Leadership

Nashville is home to a growing base of corporate citizens with growing employee populations. Many of these corporations are also embracing sustainability and resilience in their business operations—expanding those efforts to also include corporate facilities and buildings would be a worthwhile addition to their sustainability practices. Likewise, these corporate citizens could encourage their employee populations to adopt energy improvements and heat mitigation techniques in their personal residences. Thought should be given to the idea of developing corporate leadership and funding via sponsored initiatives. Companies like Amazon, Alliance Bernstein, Facebook, Oracle, and Nissan would be excellent partners and could likewise benefit from jointly sponsoring programs that focus on capacity building for affordable housing, open space, and climate issues.

Commercial Property Assessed Clean Energy Program

The funding opportunities available to businesses and property owners via a commercial property assessed clean energy (C-PACE) program would open the door to significant resilience and energy improvement investments across Nashville. Recently adopted in Tennessee via legislation at the state level, the cities and counties in the region are encouraged to adopt C-PACE locally to provide the funding vehicle for the improvements and investments recommended by the panel. In the event there are concerns about Metro's capacity to manage a C-PACE program, there are third-party managers who can contract with Metro to take on the program management and administration.

Financing Resource Hub

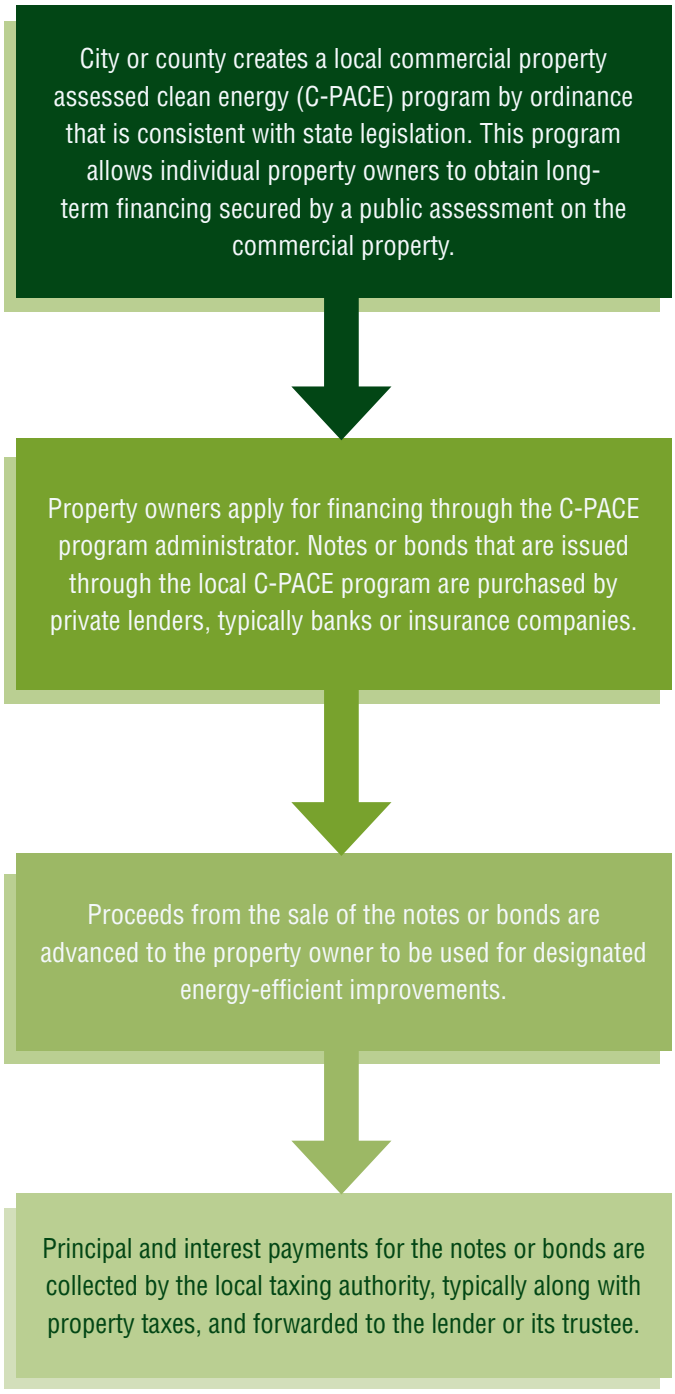
The number and variety of financing resources available to developers and municipalities for economic development and energy efficiency incentives are staggering and complex. These resources include the Housing and Urban Development (HUD) Section 108 Loan Guarantee Program, the HUD Community Development Block Grant Program/HOME Investment Partnerships Program, the Low-Income Housing Energy Assistance Program, Historic Tax Credits, New Markets Tax Credits, and Tax Increment Financing, to name just a few, and the information about and guidance on each of these programs are scattered and challenging to navigate. To make the most of these federal funding programs, Metro is encouraged to create a financing resource hub—a one-stop shop for information about and technical assistance with the federal financing programs for specific projects.

Public Buildings and Federal Funding

Public buildings are important public assets in communities, yet these buildings are not typically eligible for the same types of development and improvement incentives as private buildings. Today, however, cities are at a unique time when there are federal funds that have been allocated via the Cares Act and the American Rescue Plan to fund resilience programs for public buildings.

It is worth noting that there is an added benefit of the financing mechanisms detailed previously: they do not conflict with each other and could be used together to further leverage the public investment in the community's resilience.

Figure 1. Commercial Property Assessed Clean Energy Program Process



HASTING ARCHITECTURE

This building rooftop features a variety of green roofing materials, cooling the building while also capturing and using rainfall that would otherwise be diverted into stormwater management systems.

Conclusion

Climate change is happening now, at a rapid pace, and city leadership should not wait to implement the heat mitigation and resilience strategies outlined in this report. The Metropolitan Government of Nashville and Davidson County is undergoing significant change with development that has not been seen in generations—now is the time to act on design and development measures to support resilience and heat mitigation. Resilience measures must be put in place today. Left unmitigated, the heat in our cities will soon make them uninhabitable. It is incumbent upon champions of the built environment to do what is needed to mitigate cities' extreme heat.

A number of developers are already employing many of the heat resilience measures highlighted by the panel. Likewise, the public sector has been working hard to identify and support sustainability measures, climate adaptation, and heat mitigation strategies. This TAP represents the nexus of the two—an opportunity to align policy and development to encourage the widespread adoption of heat mitigation and resilience measures in the built environment. From large commercial developments down to a single-family home, every building presents an opportunity to add to or detract from Metro's resilience efforts. Not only do these strategies represent the right thing to do to advance the heat resilience of Nashville, they are also the right thing to do for a development's bottom line. In many instances, there is little difference in cost between traditional building products and processes and ones that take resilience into account.

There is a direct connection between health, inequities, and extreme heat. The inequitable development and investment

practices of yesterday have led to the stark realities of health and wealth gaps between neighborhoods separated by only a few miles. These inequities lead directly to more significant impacts on the health of residents in those disinvested communities. Only intentional investment and direct attention to the resources needed to support the health outcomes of these residents will begin to equalize the historic disparate health and wealth impacts.

The mayor has set the stage for Metro's focus on sustainability and resilience. The private sector is also stepping up in some instances, making decisions that will lead to a better climate for residents in the future. Through this initiative, however, the two paths may begin to align, drafting policy recommendations and strategies to help spur further climate resilience and adaptation measures more broadly and widely into the Nashville community.

While the recommendations (see figure 2) could generally be classified as ongoing, the panel believes that the urgency of the decisions made today and the ability of those decisions to positively affect the future of Nashville's climate are such that they should be addressed in the near term. The temperatures are rising in Nashville, and a pressing need and unique opportunity exist to interrupt that rise and make changes today that will affect the region positively for years to come.

Figure 2. Recommended Heat Mitigation and Resilience Measures for Nashville

Building or site	Remove barriers to green infrastructure by changing the definition of green roofs as permeable.	Update building codes to require reflective roofs in new construction and significant building upgrades.	Conduct a pilot program to retrofit existing roofs with reflective roofing, including schools and affordable housing.
Neighborhood	Identify community buildings within neighborhoods and equip each to serve as resilience hubs during extreme weather.	Use citizen science as a teaching tool for community members about heat impact and solutions.	Create a community-focused volunteer resilience program to check on residents with high health risks on adverse weather days.
City and regional	Address code enforcement to ensure green infrastructure components are built and building energy codes are met or exceeded.	Require third-party reviews of permit sets for energy-code compliance.	Add misting stations in parks or other public spaces where residents with high health risks spend time.
Finance/ development	Tap into private corporate leadership and financial resources to address broad community initiative.	Facilitate the full use of economic development incentives to fund resilient and sustainable real estate development with positive community impact.	Establish regulations and entitlement criteria that direct developer community contributions in line with requirements in other markets.

Though it is not a comprehensive list, this table represents a general overview of the types of actions that can be taken to address heat mitigation and resilience in Nashville.

About the Panel

Dr. John Vick

Panel Chair
Nashville, Tennessee

Vick serves as the evaluation and assessment director for the Office of Primary Prevention at the Tennessee Department of Health. Vick works at the intersection of public health and the built environment, facilitating the development of health-promoting, equitable, and livable communities. He brings an interdisciplinary perspective to the public health field, with a background in applied research, chronic disease epidemiology, urban planning, and community engagement.

In his current role at the Tennessee Department of Health, Vick develops practical data systems, frameworks, and projects to inform the department's primary prevention efforts. His work is interdisciplinary and collaborative, reaching across sectors to develop and leverage partnerships with government agencies, universities, nonprofits, and community groups. Vick holds a PhD in community research and action from Vanderbilt University and a BA in psychology from the University of Tennessee, Knoxville. He is a 2018 Salzburg Global Fellow and a 2019 Tennessee Government Management Institute Fellow.

Kevin Augustyn

Chicago, Illinois

Augustyn is a vice president in the North American CMBS, Global Structured Finance group at DBRS Morningstar, a credit rating agency and investment research firm based in Chicago. Augustyn covers several esoteric finance instruments and leads Morningstar's effort to provide credit ratings for C-PACE (commercial property assessed clean energy) loans on a national basis. He also serves on the firm's environmental, social, and governance (ESG) methodology subcommittee.

Before joining DBRS Morningstar, Augustyn's career has been focused on urban infill development in Chicago, leading teams responsible for the redevelopment of Piper's Alley and the North Pier as well as the development of River East Center and other large projects. He has over 25 years of real estate development and finance experience with several national real estate development firms and financial institutions including Bank of Montreal, Trammell Crow Companies, OPUS, and CIII Capital Partners.

Jillian Burgess

Philadelphia, Pennsylvania

Burgess is the senior building enclosure consultant at RWDI. A skilled project manager, she has contributed to the design and delivery of high-performance building enclosures for buildings around the world. RWDI's clients benefit from the depth of her technical knowledge—especially in building performance modeling—as well as the breadth of her project experience.

Burgess's work has focused in particular on balancing daylight and heat gain in glass facades and on developing a holistic understanding of the life cycles of various building-enclosure assembly types. A Leadership in Energy and Environmental Design (LEED)–accredited consultant, Burgess believes in the power of rigorous energy analysis to drive outstanding building performance.

Adam Freed

New York, New York

Freed is a principal at Bloomberg Associates. Before joining Bloomberg Associates, he was the deputy managing director of the Nature Conservancy's Global Water Program, where he worked to help cities have safe, sustainable, and reliable water supplies.

From 2008 to 2012, Freed was the acting and deputy director of the New York City Mayor's Office of Long-Term Planning and Sustainability, overseeing the implementation of PlaNYC and related sustainability initiatives and developing the city's first climate resilience program. As part of PlaNYC, the city planted almost 1 million trees, created more than 240 new community playgrounds, enacted the nation's most aggressive green buildings legislation, achieved the cleanest air quality in over 50 years, announced the largest expansion of its recycling program in 25 years, launched a $2 billion green infrastructure program, and lowered its greenhouse gas emissions by 14 percent.

In addition to his time with city government, Freed was an assistant comptroller in the Office of the New York State Comptroller, where he led the review of large-scale economic development projects and crafted corporate governance strategies for the $150 billion New York State Common Retirement Fund.

Clay Haynes
Gallatin, Tennessee

Haynes is the founder of Public Square, a sustainable real estate investment and development company that focuses on the adaptive use of historic structures. Public Square is a purpose driven company that develops with intent. The firm has an acre-for-acre commitment—for each acre of property developed, the firm offsets it with an acre in permanent natural space easement. Haynes is also a licensed general contractor and he launched a construction company in 2012 to direct all aspects of the construction process.

Guided by the core belief that to those who are given much, much is expected, Haynes seeks to contribute his time to organizations that equitably strengthen community. He is the board chair for the Nashville Arts and Culture Commission and is a member of the SouthArts board of trustees. He created and currently serves on the advisory board for Startup Gallatin, an organization cultivating the next generation of entrepreneurs in his hometown.

Haynes is passionate about conservation and is an active member of the Next30 committee with the Southern Environmental Law Center. He holds a degree in political science from Washington University in St. Louis and a certificate of French language from the University of Paris Sorbonne.

Sahdu Johnston
City of Vancouver, British Columbia

Johnston was the city manager of Vancouver, British Columbia, from March 2016 until January 2021, responsible for managing the operations of the city, including oversight of a budget of more than $1.6 billion and more than 7,000 staff. As city manager he spearheaded initiatives to address the growing housing and climate change crisis in Vancouver.

He was the chief environmental officer of Chicago and deputy chief of staff to Mayor Richard M. Daley, until he was appointed deputy city manager of Vancouver, British Columbia, in 2009. Johnston previously was the executive director of the Cleveland Green Building Coalition. He is coauthor of *The Guide to Greening Cities*, published by Island Press in 2013.

In 2008, Johnston cofounded the Urban Sustainability Directors Network (USDN) and served as the chair of the executive committee of STAR, a community sustainability rating system. Johnston served on the selection committee for the Partners for Places Fund, a partnership between USDN and the Funders Network for Smart Growth and Livable Communities, and he served on a committee for the Greenest City Fund in partnership with the Vancouver Foundation.

Abena Ojetayo
Tallahassee, Florida

Ojetayo is the director of housing and community resilience for Florida's capital city, Tallahassee. In that capacity, she directs the city's affordable housing, human services, code enforcement, and sustainability programs in a cohesive strategy to build community resilience. She has worked in multiple sectors and in various countries, including working as an energy and infrastructure planner of a town in Greece following a devastating earthquake, and managing an urban design team for the flood-prone Anam New City, Nigeria, a project that was recognized by the Clinton Global Initiative as a promising approach to international sustainable development.

Before moving to Tallahassee, Ojetayo worked on climate action planning at Cornell University and supported the green building and infrastructure design effort for its New York City Tech campus in the aftermath of Superstorm Sandy. She moved to Tallahassee in 2014 to serve as Florida A&M University's first chief sustainability officer and the founding executive director of the university's Sustainability Institute, tasked with building sustainability across all academic and operational aspects of the university.

Ojetayo has an interdisciplinary background, receiving a bachelor's degree in civil engineering and a master's in engineering management, both from Cornell University.

Erica Weeks
Nashville, Tennessee

Weeks is the associate principal and director of sustainability for Hastings Architecture LLC. She came to Tennessee to pursue her Bachelor of Architecture at the University of Tennessee at Knoxville. After living and working in Palo Alto, California, for five years, Weeks returned to Nashville in 2011 and joined Hastings as a Leadership in Energy and Environmental Design (LEED) project coordinator. As director of sustainability, Weeks educates the studio, as well as other architects, owners, and contractors, about sustainability and LEED processes. She's had a major influence on the studio's knowledge of sustainability—saving energy and water, specifying materials—and on the qualities of end products and changing the face of Nashville's built environment.

Weeks is an avid proponent of green building and evidence-based design. She earned her first LEED AP (Accredited Professional) credential in 2006 and was one of the first 100 people in the country to earn EDAC credentials (evidence-based design accreditation and certification), which are earned by those who show an in-depth knowledge of the application of research on design issues. In 2017, Weeks was named one of the *Nashville Business Journal's* Women of Influence, in the category of inspiration/mentoring, for her focus on support of professional education within Hastings Architecture LLC.

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