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Feature

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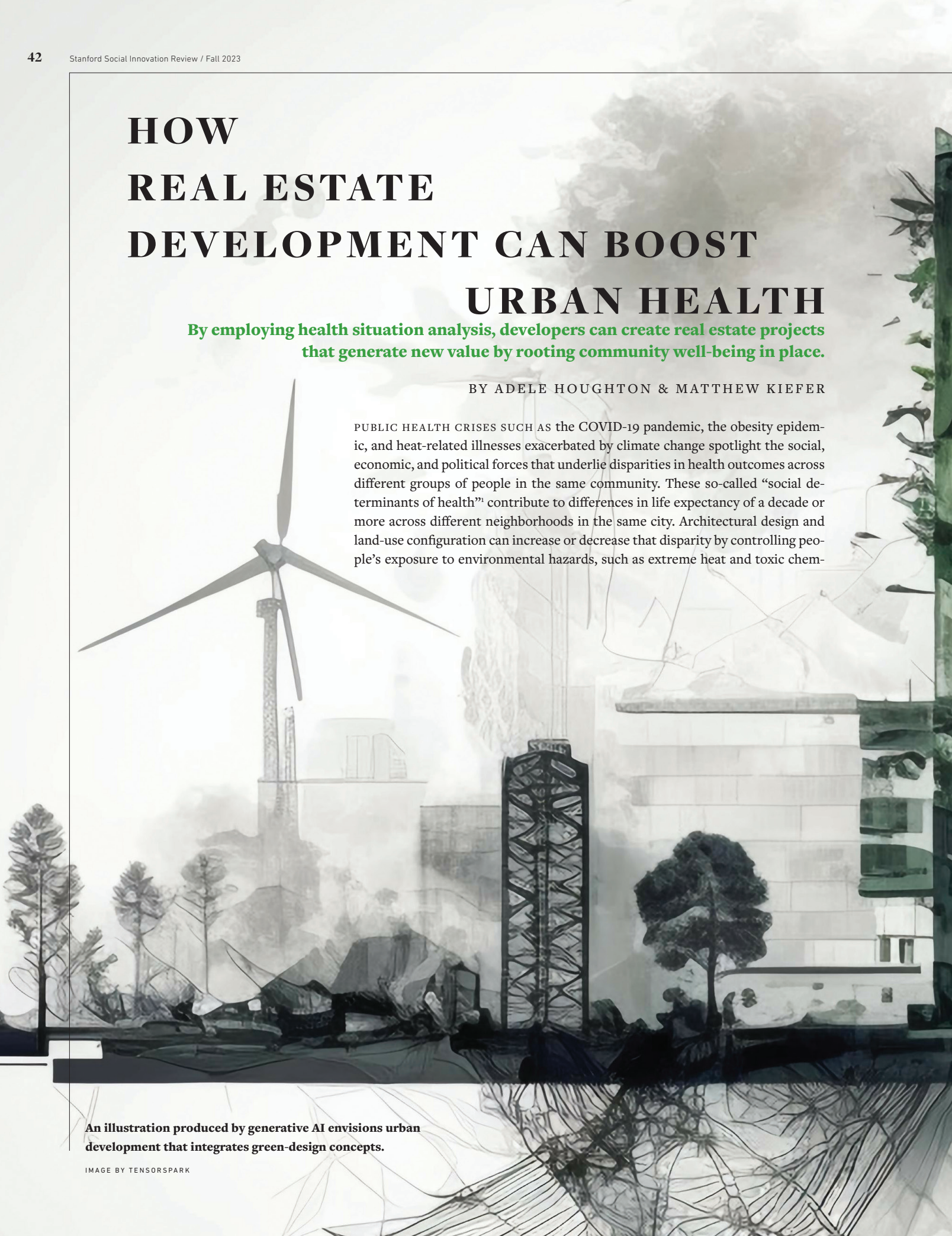
HOW REAL ESTATE DEVELOPMENT CAN BOOST URBAN HEALTH

By employing health situation analysis, developers can create real estate projects that generate new value by rooting community well-being in place.

BY ADELE HOUGHTON & MATTHEW KIEFER

PUBLIC HEALTH CRISES SUCH AS the COVID-19 pandemic, the obesity epidemic, and heat-related illnesses exacerbated by climate change spotlight the social, economic, and political forces that underlie disparities in health outcomes across different groups of people in the same community. These so-called "social determinants of health"[1] contribute to differences in life expectancy of a decade or more across different neighborhoods in the same city. Architectural design and land-use configuration can increase or decrease that disparity by controlling people's exposure to environmental hazards, such as extreme heat and toxic chem-



An illustration produced by generative AI envisions urban development that integrates green-design concepts.

IMAGE BY TENSORSPARK

icals, and access to health-promoting behaviors like physical activity and healthy eating.[2]

In light of these concerns, policy makers and public health advocates are focusing on how large-scale private real estate developments can help address health disparities. Social determinants of health play an increasing role in the approval process for such projects. Community groups and permit-granting boards expect developers to demonstrate how a proposed project would benefit the surrounding neighborhood. Often, these conversations focus on social benefits: job creation; housing access; and improvements like parks, walking paths, and better public transit. Separately, ever stricter land-use and environmental-permitting programs require developers to address greenhouse-gas emissions, climate resilience, and other environmental impacts.

At the same time, recent moves by the US Securities and Exchange Commission to standardize reporting of climate risks have prompted publicly traded or regulated investors, such as commercial banks and real estate investment trusts, to include screening questions about greenhouse-gas emissions and climate-change risk in their evaluations of real estate development projects. Developers have long been adept at evaluating how market factors outside their direct control will affect their projected return on investment. But they are now under increasing pressure to assess the effects of their projects, positive and negative, on society and the environment as well. So-called environmental, social, and governance (ESG) frameworks have become the predominant way for impact-oriented investors to evaluate investments.[3]

But ESG screening is not well suited to evaluating the positive social and environmental effects of an individual real estate development project. ESG generally opts for universal measures even though real estate values are rooted in the contours of place. And even when ESG screening uses building or site-specific measures such as LEED ratings, it does not address the ways in which a development parcel affects and is affected by its surroundings. Finally, the ESG framework addresses each of its three factors separately, when in fact they are interrelated and often synergistic in real estate projects.

The real estate industry needs a better approach for evaluating the impacts of development. In what follows, we propose applying the principles of a public health method called health situation analysis. This superior path brings a systematic approach to defining, measuring, and addressing public health challenges in a context-sensitive way. When applied to commercial real estate development, it can reengineer the public approval process by anchoring social impact in neighborhood health and well-being in ways evident to residents and community members.

The approach can also fundamentally reorient value creation in real estate from inside the property lines to a project's ripple effects on the surrounding neighborhood. Deployed at a larger scale, health situation analysis can redefine value in real estate so that the most profitable project becomes the one that provides the greatest benefits to population and planetary health.

ROOTED IN PLACE

THE VALUE OF A REAL ESTATE development project, both to its sponsors and to others it affects, is inescapably rooted in place. Given its effects on the environment, economy, and quality of life in the surrounding neighborhood, real estate development is heavily regulated through zoning and environmental reviews. The way a parcel relates to its surroundings is reciprocal: Context influences a property's value to its sponsors and users, and the project also influences the value and utility of neighboring properties and communities. Tailoring the design of a new building or adaptive reuse of an existing building to maximize that reciprocal relationship can generate value for the development team, the community, and local government.

Best-practice guides, green-building codes, and, more recently, ESG screening methods have ignored this fundamental truth, opting for universal measures that mostly neglect context-dependent issues such as air pollution caused by local traffic or flood risk based on elevation, surface permeability, and water flow. This oversight can lead to missed opportunities to tailor project features to neighborhood needs, build community trust, and increase real estate value. A better way is available.

The superior method we propose, health situation analysis, pays careful attention to the lived circumstances of residents in a community and the features of their neighborhood that may affect their well-being. In a conventional project, a development team might emphasize environmental sustainability efforts like net-zero design goals (e.g., reducing energy demand to the amount that can be produced on-site using renewable power) in community meetings. But if the development is located in a neighborhood whose residents report high asthma rates, they are unlikely to connect the universal goal of reducing greenhouse-gas emissions with improvements to their day-to-day lives.

By contrast, health situation analysis would link high asthma rates in the neighborhood with specific climate-change-related exposures that can trigger or exacerbate asthma attacks, such as ozone action days and extreme heat events. Making that connection would naturally lead to a public conversation about project

Health situation analysis is inherently community-based, relying on neighborhood-specific environmental health data and community input.

design recommendations that would reduce exposure to asthma triggers, such as measures to reduce traffic congestion.

Strategically planting trees and bushes to screen the site from sources of air pollution (for example, a freeway or a busy intersection) can further protect occupants from traffic-related air pollution. Maximizing the amount of plantings and shade can cool the air around the building, and passive cooling techniques, such as insulation, light-colored surfaces, and operable windows, reduce the risk that indoor temperatures will reach dangerously warm levels during power outages. All of these strategies also happen to reduce the project's contribution to greenhouse-gas emissions (i.e., its carbon footprint). But developers and government officials can cite this point to the community as valuable collateral or as a cobenefit of a design whose central goal is to support neighborhood health and well-being.

For investors and regulators, health situation analysis can ground ESG goals and help measure success. It makes ESG metrics and their interconnections visible by using environmental, demographic, and health data from sources such as the US Centers for Disease Control and Prevention, the Federal Emergency Management Agency, and the US Environmental Protection Agency to map baseline climate, health, and equity conditions in the neighborhood surrounding a development.

By using readily available, open-source datasets and a systematic method that generates neighborhood-specific recommendations, health situation analysis increases transparency and equity in the public evaluation of proposed real estate projects and reflects each neighborhood's unique social, environmental, and health characteristics. When data are used as a framework for conversations with the community about the project, the community engagement process can be transformed from a rote exercise into an opportunity to shape the project to reflect community aspirations and ground it in community well-being.

A recent study that coauthor Adele Houghton conducted in three communities in the United States (Albany, New York; Buffalo, New York; and Waterford, Virginia) found that using health situation analysis as a framework for conducting community engagement on a proposed real estate development balanced all stakeholder groups' priorities more effectively than the typical public approval process. When asked if they felt as if their voices were heard during the community engagement process and their views were reflected in the final project vision, participants returned an average score of 4.65 out of 5. One community member remarked, "I felt the blend of all voices heard."[4]

Health situation analysis also better realizes ESG goals than typical ESG methods. The green-building design and operations recommendations coming out of community-informed health situation analysis (the "E" in "ESG") are motivated by social and health needs in the surrounding neighborhood (the "S" in "ESG"). This method also prompts real estate development teams to reorient their approach to governance (the "G" in "ESG") by centering the community in the design through a more intentional community engagement process. The method thus combines all three elements of ESG by using the analysis of neighborhood environmental exposures and existing health needs to amplify the community's voice in shaping the final project.

Finally, health situation analysis is scalable. It uses freely available, neighborhood-specific big data from reputable sources to prioritize evidence-based design and operations strategies that reduce exposure to unhealthy conditions and promote positive health outcomes. The indicators used in the analysis can apply existing tracking and rating systems to be more effective at measuring and achieving positive outcomes around climate change, population health, and social equity. The indicators are also intertranslatable with existing ESG screens; local policies; best-practice guides, such as LEED, WELL, and Fitwel; and global frameworks like the UN Sustainable Development Goals. As a result, they lend themselves to scaling up from an individual development to compiling an ESG score at the level of the neighborhood, the community, and even the global real estate portfolio.

COMMUNITY-BASED DEVELOPMENT

Environmental regulations and active community groups increasingly compel individual real estate developments to demonstrate how they benefit the community. Climate, health, and equity goals are being incorporated into neighborhood advocacy and into formal district plans, zoning codes, and other local government initiatives. Separately, real estate debt and equity funders are increasingly scrutinizing potential investments for how they support the investors' ESG profile or regulatory requirements. Such ESG pressures can increase the rancor and the length of the public approval process, ballooning soft costs and reputational risk to the developer during the predevelopment phase, and stress among all participants. They may also result in long-term project commitments that are not evidence-based but nevertheless raise the capital or operating cost of the project.

Health situation analysis counteracts these forces by helping real estate development teams prioritize the environmental health factors where their project can have the greatest impact. The metrics they use to track progress are scalable to the community level because many local climate, health, and equity policies rely on the same metrics—just at a larger scale. In this way, the development team can demonstrate how its project contributes to key performance indicators in the district plan, as well as municipal plans around climate action and health conditions like obesity and asthma.

Health situation analysis is inherently community-based, relying on neighborhood-specific environmental health data and community input, instead of imposing an abstract ESG rubric. This approach can build trust and a common currency among the development team, community groups, and local government to align around a shared vision for the project. Such a dynamic increases the likelihood that a streamlined public approval process will create new value for all three stakeholder groups. The development team gains financially when a streamlined process reduces the length of its carrying cost. Its reputation is also boosted if it can point to a project that has received strong community support. Local residents and businesses arguably gain the most from the process over the long term, because their quality of life is more likely to improve if the final design reflects their needs and preferences. Finally, community leaders and local

government officials benefit from being seen as effective in balancing responsiveness to constituents with green-lighting projects that will help grow the local tax base and economy.

BOSTON CASE STUDY

To illustrate more concretely how health situation analysis can benefit all three stakeholder groups in practice, we offer the case of Parcel P3, a 7.6-acre parcel of land in the Roxbury neighborhood of Boston, Massachusetts. Roxbury is a mostly low-income, majority-minority, and historically disinvested neighborhood about three miles from downtown. The neighborhood is less than a mile from the Longwood Medical and Academic Area, where a group of health-affiliated institutions including Harvard Medical School form a major employment center. Roxbury is also adjacent to Ruggles Station, a bus, subway, and commuter-rail hub.

The site is symbolically important as the largest parcel of land remaining under public ownership from Boston's troubled urban renewal period of the 1950s and '60s, when public authorities used eminent domain to redevelop large tracts of land, displacing low-income and marginalized residents from their neighborhoods in order to build massive infrastructure projects, civic buildings, and higher-income housing. The P3 tract is also important because it is large enough to act as a catalyst for economic opportunity and social benefit in the neighborhood.

In October 2021, the Boston Planning & Development Agency (BPDA) issued a request for proposal (RFP) that asked developers to pitch a market-oriented development and to demonstrate how their design would produce meaningful community benefits along with expected financial returns. Two leading developers each proposed approximately one million square feet of life-science and mixed-income residential uses in several buildings. The BPDA chose a developer in January 2023.

Reflecting increasing pressure exerted by public officials and community groups to demonstrate how a proposed real estate development would benefit existing neighborhood residents and businesses, the RFP acknowledged that sparking economic development could lead to neighborhood displacement. So it asked developers to orient the project to benefit current residents of Roxbury, rather than focusing only on attracting new businesses and residents to the neighborhood. As part of a course on developing real estate for social impact, coauthor Matthew Kiefer challenged students at the Harvard University Graduate School of Design to consider, with coauthor Adele Houghton's support, how health situation analysis might offer a more systematic approach to achieving that goal on the P3 site than current practice, which is often ad hoc.

A health situation analysis begins by mapping out the location, severity, and causes of baseline environmental exposures on and around the proposed building site. The analysis then addresses whether those exposures will disproportionately harm existing residents or the development's future occupants.

In the case of P3, census data reveal the surrounding neighborhood (approximated by zip code 02119) to be significantly more diverse than both Boston as a whole and the United States in general: 25.2 percent Asian, 20.4 percent non-Hispanic Black, 16.1 percent Hispanic/Latino, and 35.3 percent non-Hispanic White.

City neighborhood-level data on environmental exposures show high vulnerability to urban-heat-island effects and flooding, because much of the neighborhood is covered with impervious surfaces such as streets, parking lots, and buildings. Boston's climate resilience plan, Climate Ready Boston, further places the site at high risk for flooding. About half of the P3 site is currently pervious (e.g., covered in vegetation), so a new development that increases impervious surfaces could inadvertently increase neighborhood vulnerability to extreme heat and flooding.

Furthermore, Tremont Street, a major Roxbury thoroughfare, borders P3. From 2015 to 2022, the city documented 20 traffic-related bicycle and pedestrian injuries along that section of the street—many in the middle of the P3 block, offering an opportunity for the new project to introduce a safer way for pedestrians to access Ruggles Station across Tremont Street.

Census tract data on the community health characteristics of the immediate neighborhood show a high prevalence of adult asthma, poor mental health among adults, and a very high poverty rate (48 percent). On the other hand, general physical health is good, which may reflect the underrepresentation of demographic groups such as children and the elderly, who, for both physiological and behavioral reasons, are at higher risk of negative health outcomes when exposed to environmental hazards like poor air quality, flooding, extreme heat, and dangerous intersections.

Thus, an assessment of environmental exposures and social determinants of health in the P3 neighborhood would suggest prioritizing four community health conditions in the project's design: heat-related injury and death, flood-related injury and death, traffic-related injury and death from air pollution and bike/pedestrian crashes, and mental health. These health factors, in turn, suggest several evidence-based strategies for site and building design and operations that could reduce harmful exposures and promote physical and mental health.

Building Design | Designing net-zero-carbon, all-electric buildings and reducing their cooling and heating loads would respond to two environmental health priorities coming out of the health situation analysis—extreme heat and air pollution—while simultaneously lowering greenhouse-gas emissions. Additional design strategies for reducing exposure to extreme heat include installing a white or garden (i.e., vegetated) roof; enhanced wall and roof insulation; increased wall-to-window ratios; and appropriate building size, shape, orientation, and external shading devices (e.g., awnings).

Operable windows would support two priorities from the health situation analysis—protection from extreme heat and supporting mental health—by lengthening the amount of time the building could be used during a power outage[5] and amplifying the restorative effects of sunlight and views of nature.

Outdoor rooms (i.e., outdoor spaces, sometimes covered, that are designed to be used to conduct activities that also occur inside) welcoming neighborhood residents could increase usable area on the property without increasing the building footprint. This would increase rentable areas, help the project achieve net-zero

energy use, and also support the mental health and well-being of building occupants and neighborhood residents by increasing access to nature, thus extending the physical and mental-health benefits of the project beyond the project boundaries.

Given the neighborhood median income level and age of its housing stock, the project should include a space that would convert into a neighborhood resilience hub or cooling center during power outages and natural disasters. In fact, this strategy could represent one of the most significant community benefits of the project.

Site Planning | Given P3's strategic location across the street from the Ruggles Station transit center, the way buildings are placed on the property could respond to all four environmental health priorities coming out of the health situation analysis. For example, the site could reduce the risk of injury for cyclists and pedestrians by linking walking and bike trails crossing over to the local greenway network. Such an approach, coupled with organizing the buildings around generous publicly accessible green space, would support mental health by increasing access to nature in a safe location away from traffic. The planted areas could further be designed to reduce temperature during heat waves and to reduce the risk of flooding on-site and in the surrounding neighborhood.

Increased pervious green space would mitigate the health and environmental risks of flooding[6] and the urban-heat-island effect[7] while simultaneously supporting mental health among building occupants and neighborhood residents.[8] Increased tree cover would further reduce exposure to extreme heat events, affording building occupants and the surrounding neighborhood the physical and mental benefits of spending time in nature.

Linking to the nearby greenway and reducing the number of available parking spaces would lower the risk of traffic-related injuries and community exposure to traffic-related air pollution on Tremont Street by encouraging site occupants to travel by bike, foot, or public transit.[9]

Community Renewable Energy Microgrid | Health situation analysis would also support the inclusion of a community renewable-energy microgrid—a site that is owned cooperatively and has renewable-energy production facilities (e.g., solar panels, wind turbines, geothermal energy installations) and a set of electrical transmission lines, transformers, and energy-storage units that can be isolated from the central electrical grid and function independently for a period of time in a broad power outage.

Given P3's size, power needs, and urban location, anchoring a community renewable-energy microgrid could advance multiple goals. It would reduce exposure to power outages caused by heat or flooding events and to air pollution from fossil-fuel combustion. It would also ensure power for the neighborhood resilience hub during weather-related power outages and could make participating buildings energy islands, where residents could continue to run air-conditioning during heat-related power outages.

The community microgrid could also reduce the financial pressures on low-income residents by lowering their monthly electricity bill. In fact, the project could represent a neighborhood-

Roxbury is less than a mile from the Longwood Medical Area (right), where a group of health-affiliated institutions including Harvard Medical School form a major employment center.

PHOTO BY BOSTON GLOBE VIA GETTY IMAGES

led economic-development project that could build wealth among current Roxbury residents. The community could partner with the Boston Office of Emergency Management or nearby projects like the community microgrid anchored at Wentworth Institute of Technology to structure the funding, development, and operation of the project. The microgrid would also benefit the developer by creating a new income stream for the property while reducing the development's greenhouse-gas emissions.

The nearby city of Chelsea, Massachusetts, broke ground in 2020 on a solar- and biofuel-powered community microgrid with battery storage for exactly these reasons. Participating buildings are connected to a central controller that manages load and aggregates production from multiple sites into a virtual power plant, using a cloud-based platform. The project was spearheaded by a partnership between the city and a coalition of local environmental justice nonprofits called Resilient Urban Neighborhoods + Green Justice Coalition that secured nontraditional funding sources, such as a $200,000 grant from the Massachusetts Green Communities program.

Cost-Benefit Analysis | Health situation analysis can also help a project pass muster under cost-benefit analysis. The approach generates many design options for a real estate development to help address priority environmental health concerns in the surrounding neighborhood that, if resolved, produce immense, quantifiable value. An item-by-item accounting of how much each evidence-based strategy would likely cost compared with a generic, code-minimum baseline can be paired with a similar accounting of the multifaceted cobenefits of these strategies from the perspectives of the real estate developer, community groups, and local government. Notably, it is possible to measure most of the benefits flowing to local government as improving key performance indicators in the local climate action plan, climate resilience plan, community health improvement plan, and existing municipal programs.

As with all cost-benefit analyses, benefits cannot always be converted precisely to monetary terms, but they can be estimated based on accepted modeling techniques to guide decision-making. While costs are likely borne by the developer, benefits flow to other parties as well. This approach helps the developer make the case to other stakeholders to contribute to the success of ideas that might at first glance be considered too costly on their own. It also lets developers propose measures that address documented neighborhood needs, rather than reacting to myriad requests from stakeholders and permit-granting agencies. Stakeholder groups are more apt to support projects when they see how proposed strategies address their needs and priorities. Such strategies can reduce project risk, improve financial performance, and be directly imported into ESG portfolios as discrete quantities with validated metrics.

ALIGNING STAKEHOLDERS

In theory, health situation analysis can help bring together the major stakeholder groups of a development project—the community, the development team, and local government. In practice, however, conflicts and mistrust can divide. Consequently, health situation analysis, no matter how well grounded by data and evidence, must be paired with a forthright community engagement process using participatory methods[10] to ensure that every stakeholder group—especially community members impacted by the development—perceives that its voice has been heard and its views acknowledged in the final project design.

Our Harvard students received insightful reactions from community representatives, developers, and local officials in response to their final presentations for the P3 project. Stakeholders were particularly interested in how the project could integrate lab space (which would likely draw most of its occupants from outside Roxbury) with affordable housing to welcome users from a range of incomes and backgrounds. They supported student ideas that eased public transit, increased access to nature and outdoor activities, and provided a safer route to Ruggles Station across Tremont Street.

Similarly, coauthor Adele Houghton's research found that using health situation analysis to frame an in-depth community engagement process increased participants' support for the project. For example, at the outset of the community engagement for one participating real estate project, several community leaders focused exclusively on the need to address air pollution from trucks and nearby trains. But the analysis demonstrated how air pollution was part of a larger framework of environmental exposures, including extreme heat and flooding; community health needs, such as mental health, gun violence, obesity, and asthma; and social determinants of health, such as high poverty rates and the legacy of racism, that exacerbated the risk of negative health outcomes. As a result, the participants forged a consensus that prioritized design strategies to protect building occupants and neighbors from all three climate-change-related exposures (heat, flooding, and air pollution). Community members also emphasized the need for the development team and community groups to work together to recruit community-based nonprofits and city services to occupy the ground floor of a core building in the development.

At the end of the community engagement, in addition to expressing their overall support for the approach, most partic-

The current approach to development is not achieving its maximum potential impact—whether measured using traditional financial-return metrics or ESG.

ipants either agreed or strongly agreed that their stakeholder group's views were reflected in the final project vision (an average score of 4.44 out of 5). Even more striking, the atmosphere shifted markedly during the engagement. Many community members began the process by expressing concerns about gentrification and displacement, and skepticism about developers' intentions. By the end of the engagement, all three stakeholder groups had reached consensus about the project vision. One community leader even asked the developer, "What are the steps that community members can take to assist in advocating on your behalf?"[11]

IMPLEMENTATION CHALLENGES

HEALTH SITUATION ANALYSIS HAS immense promise. To be fair, however, applying it to real estate development may confront challenges that face any new transdisciplinary endeavor. Real estate developers likely do not have the in-house expertise to perform a health situation analysis. True, other aspects of real estate development require specialized expertise, such as energy efficiency or stormwater retention. But the approach addressed in this article has been used on only a handful of projects, so no established cohort of consultants exists to apply it. Similarly, community residents are likely unfamiliar with this method, and municipal staff may lack the public health expertise to evaluate how to incorporate health situation analysis into public reviews.

The good news is that all parties want a superior method. Impact investors, real estate developers, architects, green- and healthy-building consultants, and community-based organizations are increasingly aware that the current approach to development is not achieving its maximum potential impact—whether measured using traditional financial-return metrics or ESG. Coauthor Adele Houghton has interviewed more than 50 real estate developers, architects, and green- and healthy-building consultants in the United States since 2020. They have expressed a desire to tailor building design to meet the demonstrated needs of the surrounding neighborhood.

A second challenge is the quantity and dispersion of secondary datasets. The proliferation over the past decade of openly available, neighborhood-scale datasets sends the health situation analysis practitioner on a scavenger hunt. For example, the P3 case study presented in this article drew on 40 datasets located on 13 websites. Health situation analysis makes it possible to convert that profusion of data into a succinct expression of how a proposed real estate development could leverage its location and intended use to bring the greatest benefit to the development's financial backers, the surrounding neighborhood, and the community.

The recent emergence of artificial intelligence (AI) tools such as ChatGPT raises the possibility of using AI to automate the first step in the health situation analysis process—thereby making the process outlined in this article available to everyone impacted by real estate development, regardless of their educational background. The challenge of how to use big data efficiently and ethically is a question that innovators and early adopters of the method proposed in this article must sort out over time alongside other fields that are grappling with similar questions.

Real estate development may seem an unlikely vehicle for positive social change. Although the connection between the physical environment and social outcomes is increasingly clear, many neighborhood residents and advocates fear that large-scale real estate development will bring unwelcome change to their community. Developers must reconcile the need to make the case for their project's benefits with the inherent risks of real estate development. Projects are capital-intensive, require a longer-term investment horizon, and must promise a high rate of return to attract investment. Conventional wisdom might suggest that adding social-benefit requirements to the mix would be counterproductive.

Our research indicates that this view is mistaken. We look forward to the more widespread use of health situation analysis, along with cost-benefit testing and effective community engagement, to improve real estate development for the benefit of all participants. ◘

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