

Online/On-site: Networked Urbanisms

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Abstract

This visual essay reimagines how Detroit might look if collectively owned internet and digital equity were top priorities of urban design. Detroit has one of the lowest rates of internet connectivity in the United States because its residents have to rely on high-cost, individually owned broadband service; and alternatives like municipally funded access are unavailable because the city is fiscally challenged. More importantly, thousands of people (specifically school-aged youths) are left without the same opportunities for learning, working, or socializing as those with the ability to get online. This speculative project mapped detailed geographies of digital access and exclusion across Detroit using a combination of publicly available spatial data and insights gathered from interviews with high school students. Three urban design scenarios were developed, each one adopting protocols of existing community-driven mesh networks in order to reorganize public life around the internet as a shared infrastructure.

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Fig. 1 - A series of maps showing various data points — including amenities, demographics, and broadband service provision — were created to understand how Detroit's

Representing inequity

According to the National Digital Inclusion Alliance, *digital equity* is defined as “a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy”. As people conduct more of their lives online, and as corporations and governments push for fully integrated digital infrastructure in homes and on streets, civic engagement is



increasingly difficult without affordable internet, computers, or mobile devices.

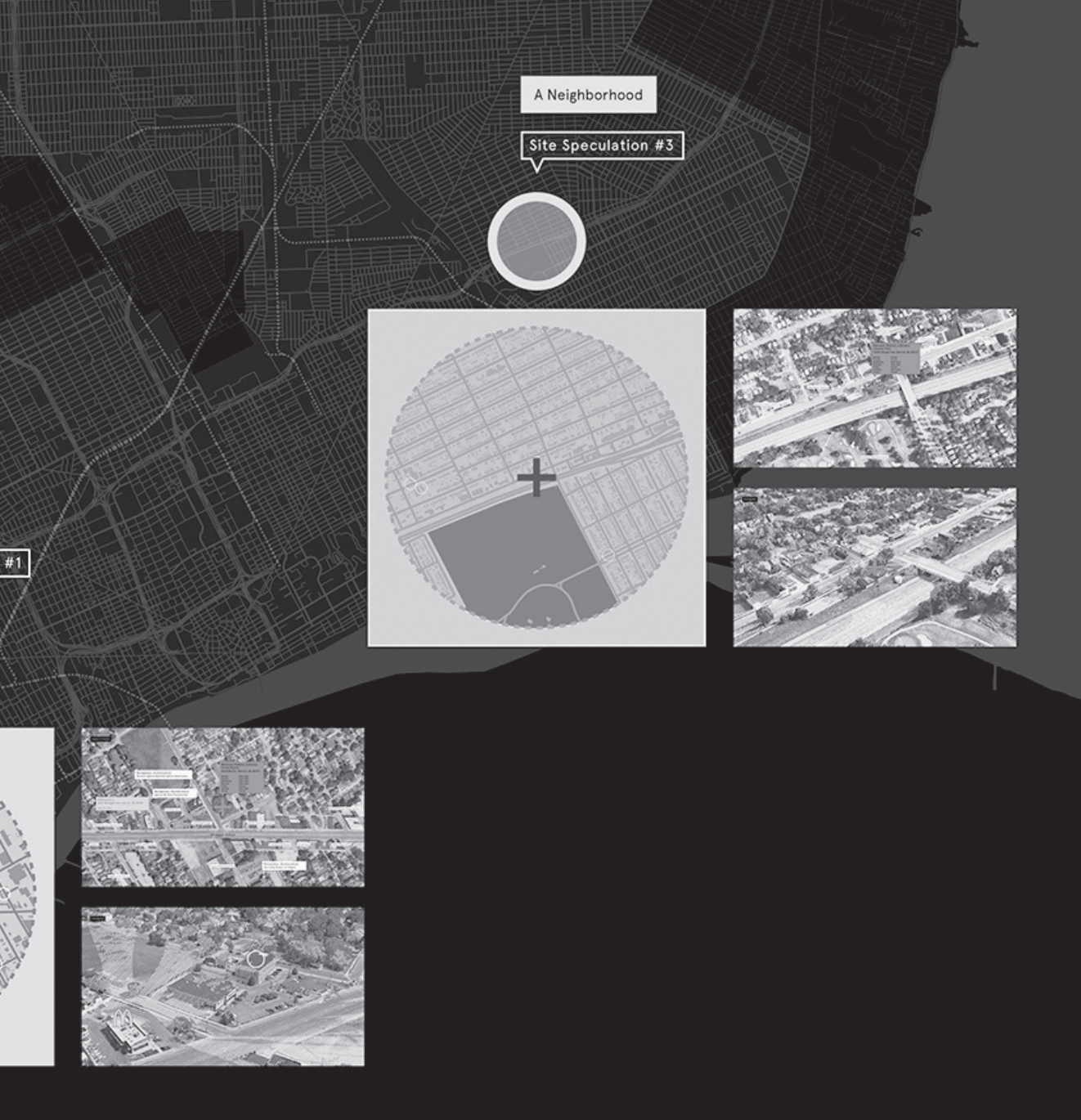
To understand Detroit's digital ecosystem from multiple vantage points, the project began by simultaneously creating maps and conducting interviews. The maps show amenities, demographic information, and broadband service provision, among other data points. These representations sought to re-present the presumed emptiness of de-industrialized sites as

low internet connectivity intersects with other factors.



Fig. 2 - Three locations were selected and studied in more detail. Each site is anchored by a public library at the center, and a half-mile radius from the library was used to define

data-rich environments saturated with complex systems, relationships, and possibilities. In parallel, high school students from different Detroit neighborhoods shared how the Internet influences their identities and daily routines. These discussions were re-presented in an animation as messaging threads framed by various apps and websites that were mentioned by the participants. As the project developed, members of other government and community organizations throughout the city provided



additional insights. The data from the maps and interviews does not correspond to building form; rather, this information was used to identify opportunities for reimagining Detroit's institutions and infrastructures in ways that could support community needs and desires.

the site's limits. Google Earth was used to conduct viewshed analyses for proper signal transmission.



to building heights, proximities, and materials in order for the network to operate smoothly; and factors as simple as sight lines are used to determine clear pathways for signal transmission. This project observed community meshes from all over the world, including NYC Mesh, Berlin Freifunk, and Detroit's Equitable Internet Initiative. Many of these mesh programs explain how to set up independent networks through downloadable how-to guides and toolkits.

on what terms like *community* mean today.

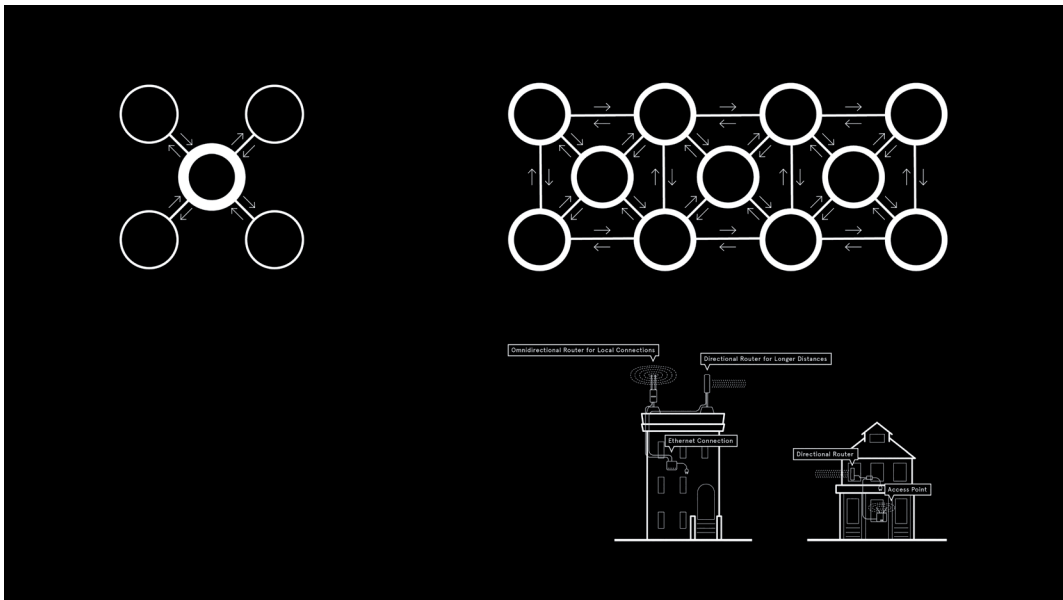


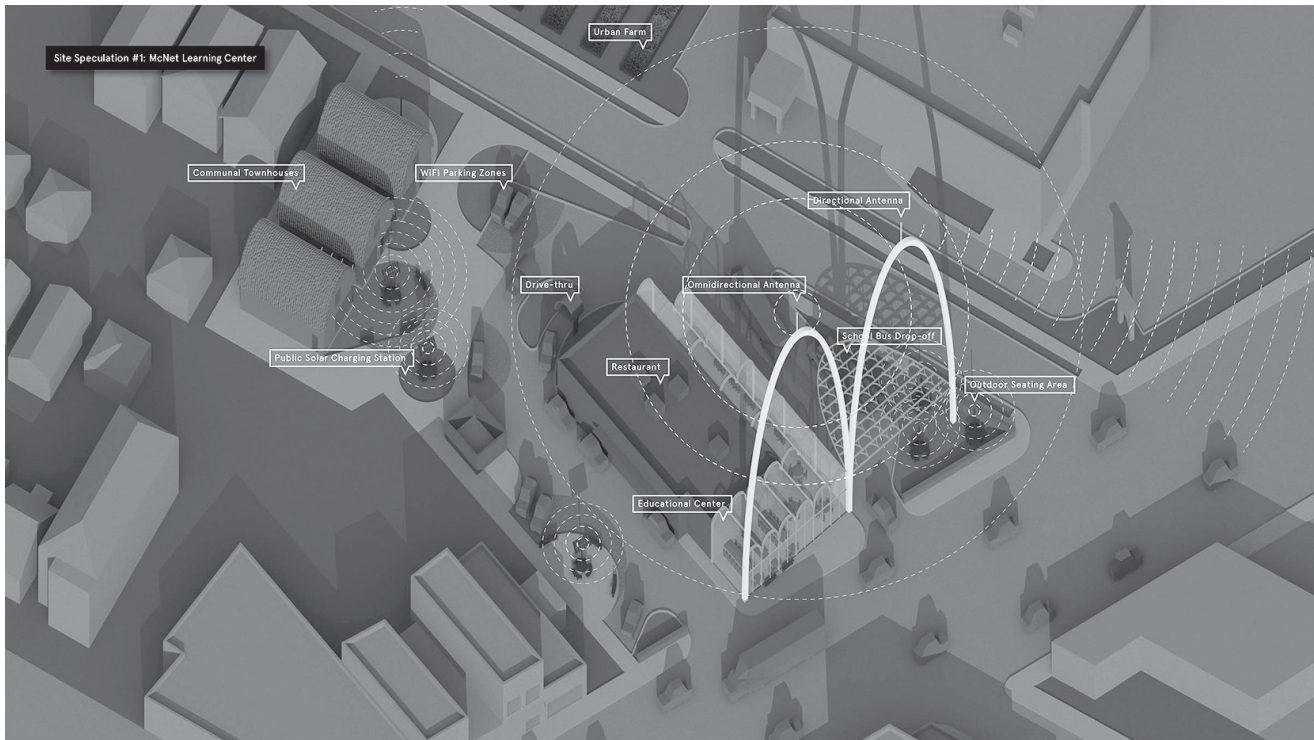
Fig. 4 - On the left is a diagram of a hub-and-spoke network, a hierarchical model that centers the internet service provider relative to other access points. On the right is a diagram of a mesh network, a non-hierarchical model that is constructed atop neighborhood buildings and less dependent on a single provider.

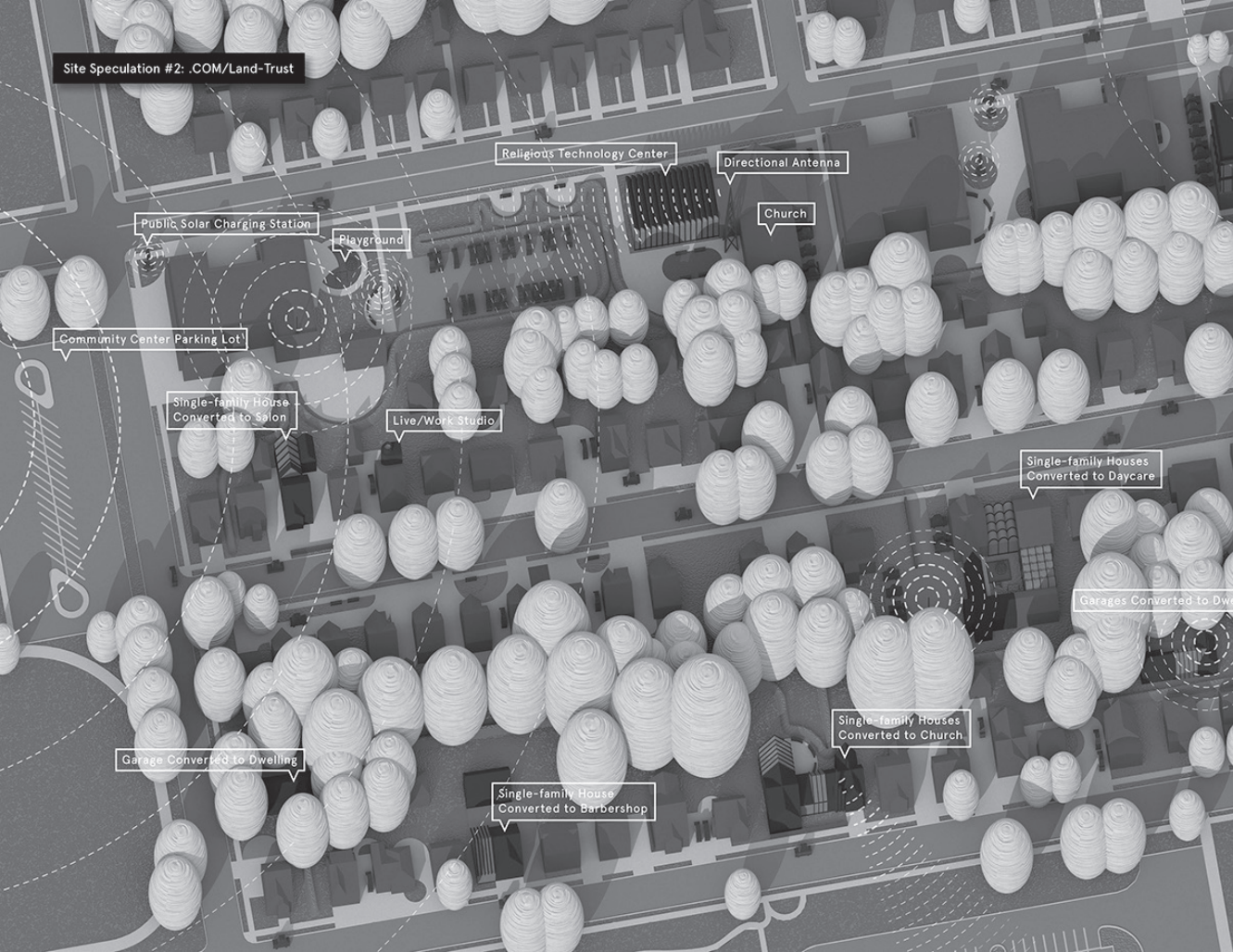
Fig. 5 - Aerial view of the McNet Learning Center, a proposed addition to an existing McDonald's restaurant in Southwest Detroit. This building-scaled scenario presents the possibility for public-private partnerships in collectively owned internet.

Design scenarios

This combination of maps and interviews, along with information from news articles and mesh toolkits, established the foundation for three urban propositions organized around shared internet. Located in areas with a medium-to-high youth population and a range of amenities, each scenario interweaves social programming, public space, and digital infrastructure at different scales. The design studies also leverage opportunities for *offline* interaction that are outcomes of the consequent spatiality from prioritizing the mesh; and alignments with complimentary ideas about collective ownership are explored as well.

The first study is at the scale of a *building*. An existing McDonald's in the Claytown neighborhood – already equipped with 24-hour WiFi access – is reconceived as a community anchor that could provide computers, tutoring services, and workstations to students outside of school. Here, the internet connection of a private business is apportioned as a public resource. In between the drive-thru lane and communal townhouses on the north end of the site are outdoor spaces with solar charging stations around which pedestrians *and* motorists could gather and surf the web. A community garden – another technology for collective life – is introduced on a nearby lot so the surrounding neighborhood and the McDonald's could have access to fresh produce. This proposition questions the role of a corporation in collaborative internet infrastructure where multiple stakeholder interests converge.





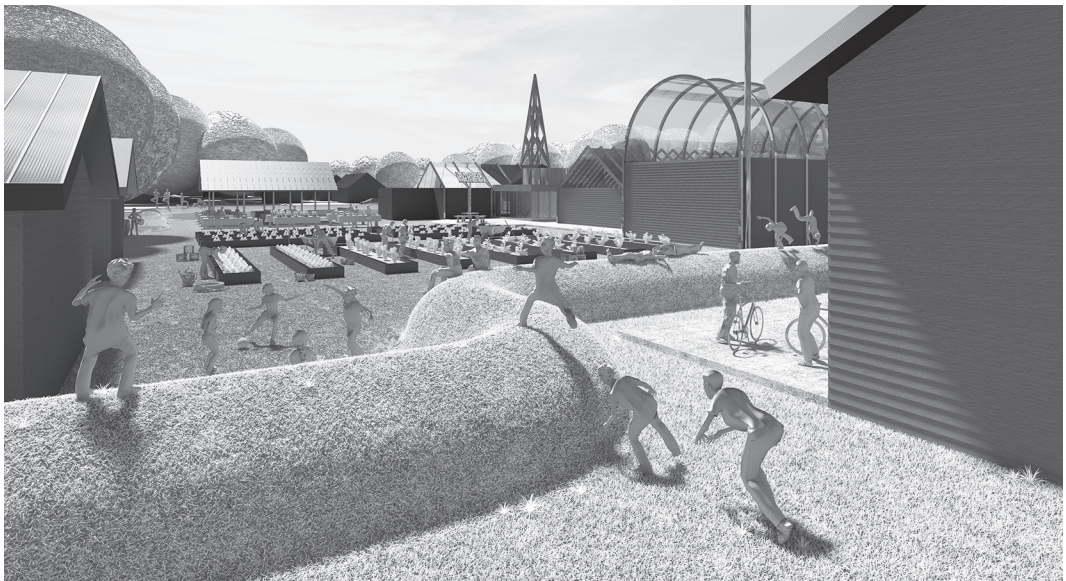
The second study is at the scale of a *block*. Located in the Miller Grove neighborhood, this scenario envisions a community land trust that models collective stewardship of property *and* internet. Houses are transformed into computer-equipped daycares, greenhouses, and barbershops owned and managed by residents living in the area. The wing of an existing church becomes a technology hub where seniors and youth can get online. A nearby community center and closed school sitting atop dark fiber can supply broadband to the blocks. Cords and cables are consolidated into fiber-optic berms that cut through the site, further dissolving property lines. In doing so, the materiality of public utilities is redirected toward creating spaces for public assembly.

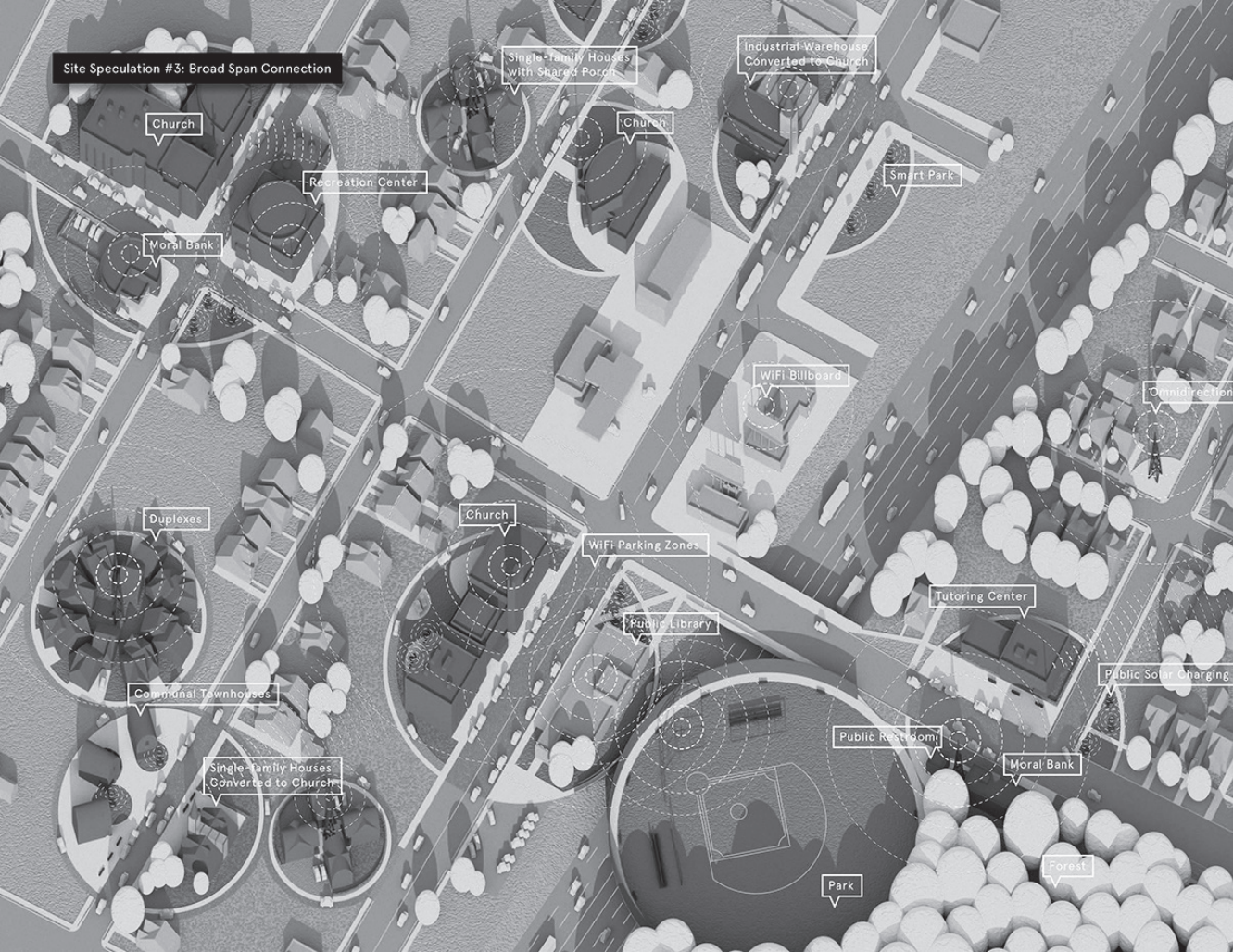


Fig. 6 - Perspective view from inside the addition showing worktables in the foreground and a school bus drop-off in the background.

Fig. 7 - Aerial view of the .COM/Land-Trust, a proposed community land trust in Northwest Detroit. This block-scaled scenario considers collective stewardship of both property and internet and offers new ways to assemble publics around broadband's physical infrastructure.

Fig. 8 - Perspective view of fiber optic berms that subdivide lawns, heighten awareness of shared infrastructure, and suggest new spaces for civic engagement.





The third study is at the scale of a *neighborhood*. Bisected by Interstate 94, this scenario entwines the residential grid with a large-scale mesh network defined by social and cultural programs. Unoccupied houses and industrial buildings are converted into religious institutions that can operate as internet access points and support community organizing efforts. Banks, businesses, and recreation centers are pulled away from commercial corridors and redistributed as clusters within the blocks. New housing types — like duplexes radially organized around omnidirectional antennas — offer shared spaces and WiFi connections. The redistribution of open space in the neighborhood is determined by viewshed requirements for wireless signal propagation. In the end, this project should be understood as a series of open-ended speculations on the future of cities in an ever more connected world. A community-oriented network architecture unlocks alternative models of collectivity, ownership, and resilience that encourage other ways to coexist online and on-site.



Fig. 9 - Aerial view of the Broad Span Connection, a proposed network of commercial and cultural institutions in Northeast Detroit. This neighborhood-scaled scenario reorganizes public programs around mesh network nodes that are more embedded in the residential fabric.

Fig. 10 - Perspective view inside a ring of duplexes designed with shared porches that all face a WiFi signal transmission tower.



References

- Byrum, G. (2019), *Building the People's Internet*, "Urban Omnibus" [Online]. Available at: <https://urbanomnibus.net/2019/10/building-the-peoples-internet/> [Accessed: 10 December 2020].
- Commotion Construction Kit, *Commotion Construction Kit* [Online]. Available at: <https://commotionwireless.net/docs/cck/> [Accessed: 10 May 2019].
- Crang, M., Crosbie, T., Graham, S. (2006), *Variable Geometries in Connection: Urban Digital Divides and the Uses of Information Technology*, "Urban Studies", vol. 43, n. 13, pp. 2551-2570.
- Detroit Community Technology Project (2018), *Equitable Internet Initiative* [Online]. Available at: <https://detroitcommunitytech.org/eii> [Accessed: 10 December 2020].
- Freifunk Berlin, *Freifunk Berlin* [Online]. Available at: https://berlin.freifunk.net/index_en/ [Accessed: 10 December 2020].
- Greig, J. (2018), *Wireless Mesh Networks as Community Hubs: Analysis of Small-Scale Wireless Mesh Networks and Community-Centered Technology Training*, "Journal of Information Policy", vol. 8, pp. 232-266.
- Lenstra, N., Baker, K. (2017), *Intermediation of Community and Infrastructure*, "Library Trends", vol. 65, n. 4, pp. 473-490.
- McCullough, M. (2020), *Downtime on the Microgrid: Architecture, Electricity, and Smart City Islands*, Cambridge (MA), The MIT Press.
- National Digital Inclusion Alliance (2015), *Definitions* [Online]. Available at: <https://www.digitalinclusion.org/definitions/> [Accessed: 27 October 2020].
- National Digital Inclusion Alliance (2017), *Worst Connected Cities 2017* [Online]. Available at: <https://www.digitalinclusion.org/worst-connected-cities-2017/> [Accessed: 10 September 2018].
- NYC Mesh (2015), *NYC Mesh* [Online]. Available at: <https://www.nycmesh.net/> [Accessed: 10 December 2020].
- Motherboard (2017), *Meet the People Building Their Own Internet in Detroit* [Online]. Available at: <https://youtu.be/1B0u6nvcTsI> [Accessed: 10 September 2018].
- Red Hook WiFi (2013), *Red Hook WiFi* [Online]. Available at: <https://redhookwifi.org/> [Accessed: 10 December 2020].
- Urban Omnibus (2013), *Local Connections: The Red Hook WiFi Project*, "Urban Omnibus" [Online]. Available at: <https://urbanomnibus.net/2013/09/red-hook-wifi/> [Accessed: 10 September 2018].
- Wolske, M. et al (2010), *Effective ICT Use for Social Inclusion*, "iConference 2010" [Online]. Available at: https://www.ideals.illinois.edu/bitstream/handle/2142/14952/wolske.pdf?sequence=2&origin=publication_detail [Accessed: 10 September 2018].

