

## 0.0 TITLE

# Infrastructure for Humans: Repairing Urban Fabrics with A Flexible Dual-Purpose Architecture

## 1.0 ABSTRACT

The United States interstate highway system is an incredible feat of urban planning, engineering, and common direction of movement within the federal government. By the 1960s this highway system spanned the entire continental United States, implemented using an awesome amount of resources and labor. This same highway system was also a vehicle for the continuation of 20th century segregation practices, veiled as beneficial United States infrastructure. These highways were utilized as a means of physical segregation, ripping through urban neighborhoods, facilitating “white flight”, and creating impassable physical barriers within urban centers. An act of redlining under the guise of federally sponsored infrastructure. Today, the spaces adjacent to these highways are still reeling from the effects of their installation in the late 1950s and 60s. To this day urban fabrics remain torn and noise polluted neighborhoods slowly retreat from highway edges, leaving only vacant lots and disinvestment behind.

Due to the massive spatial investment required by these highways, there exists countless miles of byproduct land in the form of easements, embankments, walls, and berms flanking nearly every single mile of American highways. In urban applications, these throwaway lots can be reclaimed and used to repair the fabrics once disrupted by the highways. By utilizing the leftover space created from the installation of urban highways, a flexible architecture-as-infrastructure can be installed to create bespoke edge conditions and begin to repair social, urban, and economic fabrics of negatively affected highway-adjacent spaces. Current legislation provides a catalyst to begin truly examining the effects of the urban highway and how it can be harmful to both human and urban health. A humanist architecture built to manage the highway conditions should also be able to more meaningfully benefit its opposite constituencies, providing a universal tactic for beneficial change that is mountable wherever highways run.

## 2.0 URBAN HIGHWAY RENEWAL

### 2.1 The First Highways

Detroit, Motor City, an alias well-earned for a city that has been deeply impacted by the automotive industry. It exists as the headquarters of United States' Big Three automotive manufacturers as well as the birthplace of the first paved roadway, Woodward Avenue. Detroit's history has been endlessly pushed and pulled to accommodate the automobile. As the first cars exploded in popularity and quickly spread across the entire nation, so followed the subsequent popularity of the paved road and quickly after, the first transcontinental highways were being laid out from coast-to-coast. The federal government would eventually pass the National Highway Act of 1956, subsidizing up to nearly \$425 billion or 90% of the construction of a national highway network across the entirety of the continental United States. (Weingroff 1996). Leading up to the installation of this highway network into the greater Detroit area the routing of various interstates and freeways required land to be made vacant before construction could begin. This led to the separation of many predominantly Black districts within the city, one of the more notable being the destruction of Black Bottom, a bustling neighborhood located in modern day Lafayette Park.

### 2.2 Urban Renewal

With this investment into national infrastructure, cities became directly accessible to far away visitors and new residents as well as allowing for those living within the cities to congregate in newly forming suburbs which surrounded most major urban centers. To accompany, what seemed to be, a host of positive outcomes for the average city dweller, the planning of such a vast network had more insidious undertones. Striving for maximum efficiency in transportation, the highways were planned to be brought directly through to the urban cores of existing cities irrespective of how they may be disrupting existing urban fabrics. The routing of these proposed highways was laid with a majority of influence from automotive industry executives and highway engineers in a 1955 Department of commerce document, often referred to as the “yellow book” (Stromberg 2016). The catch is that the federal government would only contribute 90% of funding for each roadway if local governments did not oppose the planned routing of the highways. This meant that the currently laid plans hosted in the “yellow book” held immense power in dictating the effect that these highways would have on the various fabrics of each individual city. However, the intentions of the engineers, automotive executives, and all else who built this national strategy were not dedicated to preserving city fabrics and would, more often than not, look to intentionally destroy it (Archer 2020).

It was around this time that “Urban Renewal” rose to popularity. When “courts around the country were striking down traditional tools of racial segregation,” the installation of a national highway network was used as a means of continuing the practice of redlining under the guise of positive urban renovation (Archer 2021). This allowed for the highway planners to meticulously route their network of roadways through what was seen as the most efficient locations to both transport drivers to and from suburbs as well as physically segregate low-income minority districts from the urban cores of each city. These roads would oftentimes run along edges of formally defined black and brown districts of cities and sometimes route through them directly, potentially at the request of local city officials. Citizen resistance to these roadways were largely unsuccessful, save for a few instances rallying under the phrase “no white men’s roads through Black men’s homes” (Archer 2021). By constructing these physical barriers between two distinct districts of a flourishing city, it could be ensured that an “encroaching” minority district would not expand into an area which the city might consider to be “too close.” These highways would promote other common urban trends like “white flight” and “suburbanization” wherein populations of white residents utilize the new routes provided by the highways to migrate away from cities and into newly forming adjacent suburbs (Archer 2020). As these highways could promote new means of public transportation and opportunities for under-served minority residents, the majority of impact would come from the impositional physical and qualitative aspects of the highways.

## 2.3 Legislation

It would be twenty years after the installation that the noise pollution caused by the highways would be recognized as a detriment to human health. The effects would be exposed by the quickening pace of urbanization, exponentially growing populations and traffic volumes within major urban centers. Legislation like the “Noise Control Act of 1972” have since cemented the management of roadway noise as a human health issue, spreading secondary infrastructures like sound walls and highway covers to be installed overtop of and against highways running adjacent to residential districts all over the country (Wagner 2016). This is an example of an expensive infrastructure being installed to remedy profoundly negative effects retroactively caused by another instance of expensive infrastructure, though the latter was funded almost exclusively by the federal government half a century ago. The goal then is to create a zero-sum condition, canceling out negative highway effects while spending massive amounts of resources on remedial infrastructures. During the first year of the 2020 Biden presidential administration, two colossal infrastructure bills were drafted to allocate trillions of dollars towards the repairing, renovation, and upgrading of United States infrastructures. One bill, H.R.3684, also known as the “Infrastructure Investment and Jobs Act,” is dedicated to repairing and reinvesting in physical infrastructure like roads, bridges, and creating a wealth of jobs to facilitate the work needed to be done (2021). The other, H.R.5376 or the “Build Back Better Act,” focuses on bolstering the social infrastructure of the United States including: expanding affordable healthcare, investing in children and caregiving, addressing climate change, and alleviating the costs on the middle class (H.R.5376 2021). As of publishing, only the former bill has been signed into law, following a legacy of the federal government being habitually more likely to invest in physical infrastructures than into social infrastructures.

An interesting item to note that is included in the Infrastructure Investment and Jobs Act is the “Reconnecting Communities Pilot Program.” This program allocates \$500 million to aid communities that have been negatively impacted by highways, conduct both studies and construction projects to remedy the negative effects. The eligible candidates for this pilot program are described in the bill text as the following:

*A highway or other transportation facility that creates a barrier to community connectivity, including barriers to mobility, access, or economic development, due to high speeds, grade separations, or other design factors* (H.R.3684 2021).

The program offers communities grants of up to \$2 million to subsidize 80% of urban planning and developmental research as well as grants of up to \$5 million to subsidize 50% of construction projects intended to remedy the negative effects of the highways or “any other principal arterial facility” (H.R.3684 2021). This is a first step in beginning to address the social concerns brought by the highway systems while using a fundable physical solution.

## 2.4 Social Disruption

This pertinent legislation comes at a time where many of the social and physical infrastructural needs in the United States are flaring up due to the economic volatility and general instability caused by the pandemic and the consequent social lockdowns. An example of one pandemic-irritated social infrastructure is that of United States homelessness. When looking at evidence provided by more socialist-leaning capitalist governments like Canada or Finland, there is great success to be found in a federal approach to ending homelessness. Canada has experimented with models of Housing First programs and found great staying power for such a system after a research trial conducted in the late 2000s across five of its very diverse cities (Goering 2014). Finland too has spent a great deal of federal capital in installing an integrated housing system, wherein shelters are renovated to private dwellings and made available with a very low barrier of entry. The Y-Foundation has been the non-profit organization at the head of these efforts, working closely with the Finnish government to ensure the creation of a holistic system which will continue to prosper just as the successes of its past (A Home 2017). The United States, on the other hand, would be

hard-pressed to devote such a sum of energy and investment in a social service which would require lasting and extensive financial support. Even the rhetoric used around homelessness and housing first contributes to this perspective division. Geoffrey Nelson, professor of psychology at Wilfrid Laurier University, offers that when homelessness is discussed and considered as a result of “individual psychopathology, [...] or moral failing[s],” then the solution most likely invoked is one of charitable care or treatment first (2021). This also tracks in the United States as the rhetoric used by opponents of housing first seeks to provide a generalized and distorted view of the metrics used to measure success, projecting diminishing results against an implementation requiring massive amounts of funding and resources (Pleace 2021).

Because of this impassable rhetorical debate, the current method employed by the United States to address homelessness rests much of the duties of the programs on decentralized, local-scale organizations (H.R.1319 2021). Due to shifting administrations paired with a dominant two-party system, there is not enough of a consensus on how homelessness in the United States should be addressed so as to warrant a holistic, integrated federal strategy, similar to Finland's. Because of such great divides in how to address these social infrastructural issues and the long-running pattern of funding physical infrastructures, the subversion of the typical legislative process is needed to address social infrastructures with long-term solutions.

## 2.5 Contemporary Urban Highways

In a context where varieties of urban, social, and economic fabrics have been torn apart by federally subsidized infrastructure projects, it is ironic that additional federally subsidized attendant infrastructure is used as the direct solution to these consequences. However, this same landscape is also driven by capitalist urges toward economic growth, meaning that physical infrastructures seem to be the main vehicle to enact change. Highways are engineered to fit into this system as a universal infrastructure typology. They are designed to be standardized and implemented with typical solutions into any location or condition. A requirement of these prototypical highway components and design strategies is a large spatial investment. This means that routing a highway with a design speed of seventy miles per hour through a dense 1950's neighborhood will require a comically large footprint. Cross-sections of recessed urban highways can stretch as far as 300 feet wide from outer-edge to outer-edge. When 300 feet is multiplied by many miles in length, the scale of the spatial requirement in its entirety, quickly becomes unimaginably large.

Highways do have an interesting quality in that they require some amount of flanking technology to ensure that a run-off vehicle can safely come to a stop. When dealing with highways in urban cores, they can be built elevated with thick shoulder walls or fully recessed, sometimes many layers deep, with stark vertical retaining walls. As highways travel away from congested city centers, they begin to flatten, and to save funds on construction, will often depress below grade with large sloped embankments capped off by service drives. These embankments, usually understood as unbuildable, noisy, throwaway land belonging to the state department of transportation, provides an interesting opportunity for engagement. Recent legislation like the “Infrastructure Investment and Jobs Act” is both lending legitimacy to and providing a catalyst fund to begin to build on sites just like these, constructing massive sound walls to quell the noise polluting adjacent neighborhoods. Why should these sites be used only to remedy only the maladies caused by the highways? Instead, these sites can be infilled to begin addressing what's on the other side of the wall as well. Through the guise of building out physical infrastructure, urban highways can be reclaimed by the populations that were disrupted. Humanist infill construction along urban highways can repair the damage done to social, urban, and economic fabrics.

## 3.0 INVESTIGATION

### 3.1 Description

If the embankments created as a byproduct from recessed urban highways can be utilized as buildable land then an infill infrastructure with architectural elements can be installed to remedy negative effects of the highway as well as benefit adjacent contexts. These small thirty foot wide lots have the ability to mend disrupted districts by creating a novel, beneficial edge condition against the transportation infrastructures that have carved canyons through once whole urban fabrics. By investing in and engaging with these newly available urban lots, there exists a multitude of possible strategies to be employed to best extract benefit from the installed infrastructure, to best serve the adjacent communities, and to best serve the forward-looking master planning for any given city.

### 3.2 Requirements

This work is catered towards, but not limited to, any areas where the installations of urban highways have severed communities, disrupted neighborhoods, replaced boulevards, or otherwise negatively impacted an existing community. These criteria mirror that which the “Reconnecting Communities Pilot Program” targets in the

“Infrastructure Investment and Jobs Act” (H.R.3684 2021). In reality, this work can be installed anywhere that a highway creates strips of flanking land as a byproduct of construction. This work will assume that a certain amount of investment is being put toward these highways in order to construct attendant infrastructures that will address the negative effects of the highways. To provide a constrictive domain within which the architectural intervention can be explored, this attendant infrastructure will take the shape of the sound wall. The primary variable is then constricted to how best any given architectural intervention can interact alongside, within, against, or respective of, sound wall infrastructures as well as the adjacent constituencies opposite the highways.

To further resolve the scope of this work, a number of assumptions must be made. For instance, current sound wall practices will be adopted as a starting point for the attendant infrastructure being installed. The performance of such installations will be addressed by the work only when explicitly dictated by programmatic decisions. Otherwise it is assumed that the performance of the sound walls is of standard quality and of negligible interest to the strategies employed around them. Secondly, intensive architectural interventions shall be contained within the footprint of the lots created from reclaimed highway land. There is the possibility for this work to begin engaging with adjacent vacant lots as close highway-proximity could lead to patterns of blight. However, the architecture provided in this work should not encroach into these vacancies but instead support the future development or rehabilitation of such lots by providing catalyst programs to best promote future investments.

### 3.3 Architectural Context

When investigating current and historical examples of architecture-as-infrastructure surrounding different transportation infrastructures like highways. Urban-fabric-repairing architecture is not a novel concept and there are successful precedents to learn from. Interestingly, a common trend that emerged between more tangentially-related projects was the idea of imposition and how humans interact with and impose their ideas onto different infrastructures. When pairing this concept with transportation infrastructures specifically, there are many projects that push the limit on the depth of benefit that can be extracted from large-scale infrastructures. For instance, a parasitic studio built by Fernando Abellanas in Valencia, Spain infills the space suspended between massive structural members at the underside of a bridge overpass. This is an intensively architectural imposition onto a highway infrastructure, utilizing leftover space as buildable volume, but construction is not necessarily required to retrieve benefit from these spaces.

Claiborne Avenue in New Orleans, Louisiana once hosted a bustling neighborhood and large boulevard lined with live oaks which was celebrated by the local Black residents (See Image 07). This green scape was consequently torn out and the new Claiborne Expressway, a highly trafficked, elevated roadway, was built overtop of the former park and filled in the ground condition with parking lots, alleyways, and other hardscapes (See Image 08). This was a devastating blow to the minority district which so heavily utilized the space, and brought with it all of the regular ill-effects produced from close highway proximity. In recent years, the generational residents of this same neighborhood have begun to reclaim the space, filling in the hardscapes with community-based programming and even painting the structure of the expressway with vibrant murals. Whereas the secret studio in Valencia was a primarily spatial imposition of architecture onto transportation infrastructure, these reclamation efforts prove to be more of a place-making effort but nonetheless showcase the imposition of the resident's ideals and the benefit that is derived from the covered boulevard. The Spark, a project by the firm Snøhetta, speculates on a future where benefit is drawn from hot air. A world dominated by data will need a prominent typological data center in every city. Hot air from the exhaust of the server machines is collected and piped to a nearby city instead of venting into the atmosphere. In this world, even an infrastructural byproduct like exhaust is made to have some amount of beneficial value to the surrounding communities.

Another work which has proven to be incredibly inspiring when researching this work is the Dutch, A4 Sportpark. Not only is this work a fabric-repairing piece of architecture-as-infrastructure, but the highway that once separated two neighborhoods is metaphorically and literally bridged overtop of. Then, the program installed overtop of such “bridging” efforts is a sportpark that could quite literally bring these two communities together over top of the transportation infrastructure which once divided them. The work assumes some amount of poetry in just how deftly the rhetoric of the work effortlessly supports the tenets of community. The scope of the park does quickly outweigh the installation of the highway cover in the budget of the installation, making the community aspect the primary reason for the work to exist. In a flipped scenario, the Bascule Bridge and Bridgemaster's House showcase how benefit can be derived from an attendant infrastructure which is not directly related to the main operation of the work. The Bridgemaster's House acts as a secondary piece of architecture compared to the monolithic investment of resources required by the Bascule Bridge, yet this house exists as an elegant and high-cost work of architecture that pales in comparison to the budget of the bridge.

### 3.4 Site

In order to begin exploring the specific conditions of the architectural intervention being proposed in this work,

#### 4.0 DESIGN RESULTS AND CONCLUSIONS

*To be completed at a later date.*

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IMAGE 01: [Placeholder] Overlay of Modern Highways onto 1950 View of Detroit (B. Cox, 2022)



IMAGE 02: An aerial of the end of freeways construction of the R. L. Thornton and Stemmons expressways, Dallas, Texas (Squire Haskins Photography, Inc., 1959)





IMAGE 03: Aerial View of Atlanta Highway Interchange Splitting the Urban Fabric (Huzma Deas, 2019)



IMAGE 04: "Yellow Book" Overall Map of the 1956 Highway Network (United State Bureau of Public Roads, 1955)

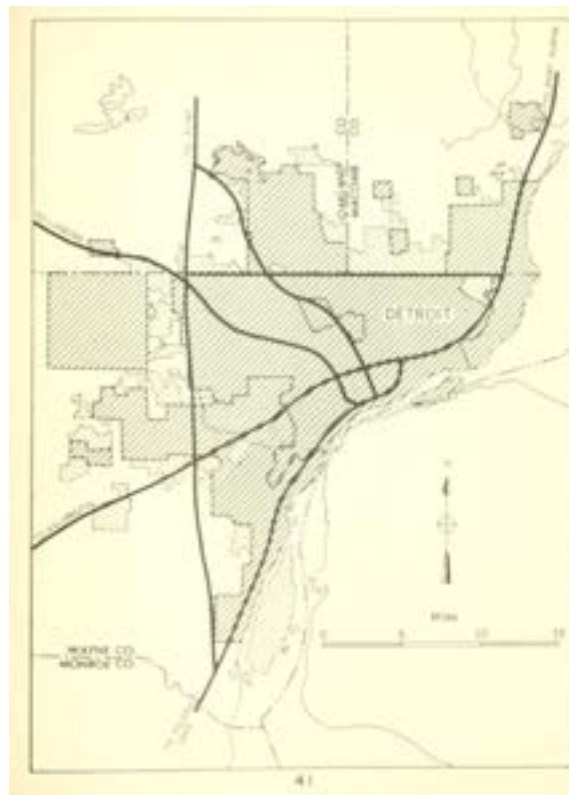


IMAGE 05: "Yellow Book" Map of Planned Detroit Highways (United State Bureau of Public Roads, 1955)





IMAGE 06: Aerial View of the Central Expressway Over Dallas, Texas (Squire Haskins Photography, Inc., 1951)



IMAGE 07: Old Claiborne Avenue Before the Construction of Interstate 10, New Orleans, Louisiana (Louisiana Division/City Archives, N.D.)



IMAGE 08: Claiborne Expressway, New Orleans, on May 29, 2014 (NewUrbanism, 2014)

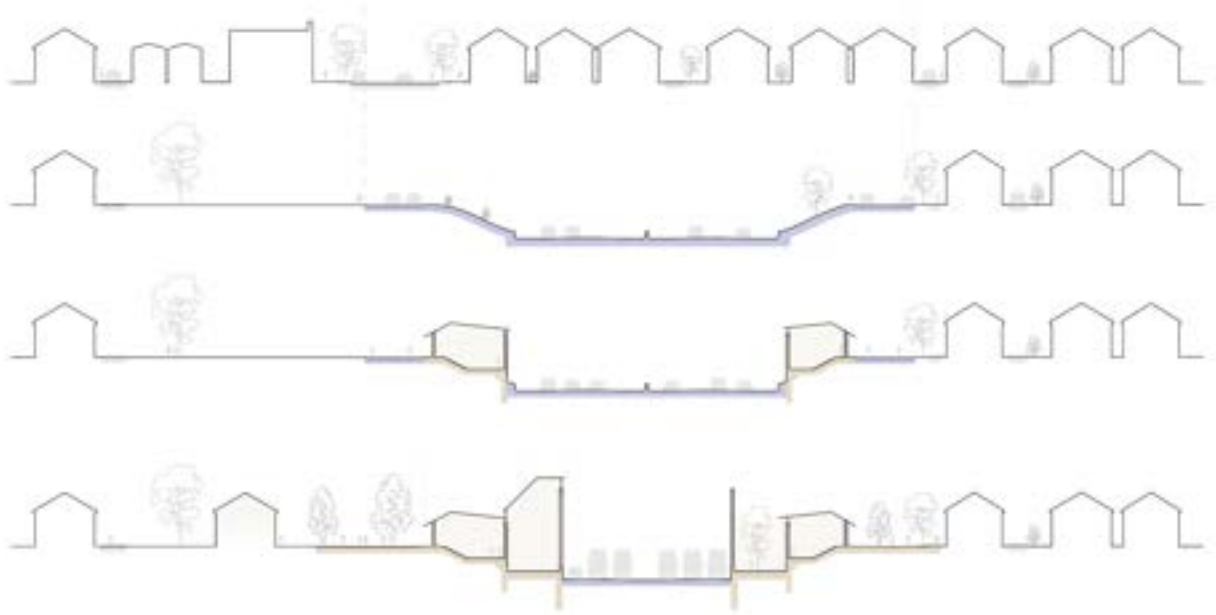


IMAGE 09: Project Phasing Diagram Over Periods of Urban Fabric Damage and Repair (B. Cox, 2021)

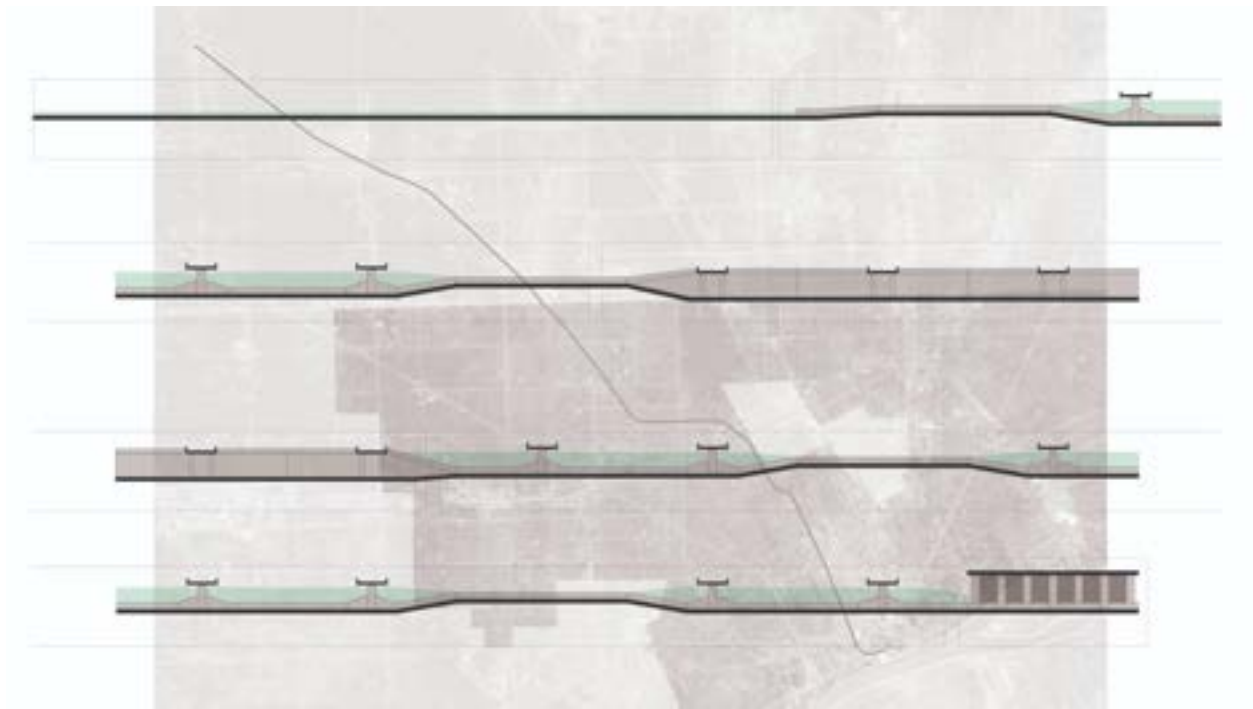


IMAGE 10: Cataloging Vertical Relationships of Edge Conditions Along M-10 (B. Cox, 2022)

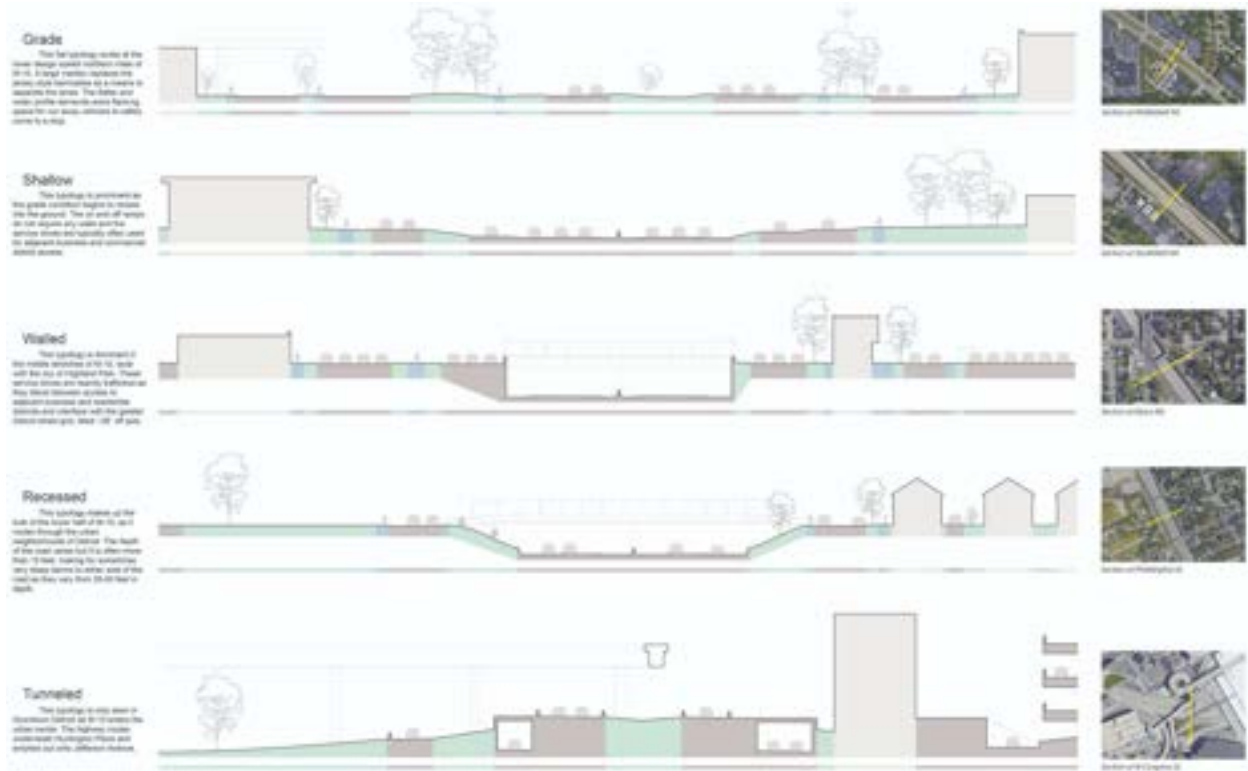


IMAGE 11: Cross-Sectional Studies at Various Points Along M-10 (B. Cox, 2022)



IMAGE 12: Analyzing the Urban Density and Blight Recognition to the North and South of Calvert Ave. (B. Cox, 2022)





IMAGE 13: Site Plan at Intersection of Glynn Ct. and M-10 (B. Cox, 2022)



IMAGE 14: Proposed Site Plan at Intersection of Glynn Ct. and M-10 Incorporating Strategies (B. Cox, 2022)

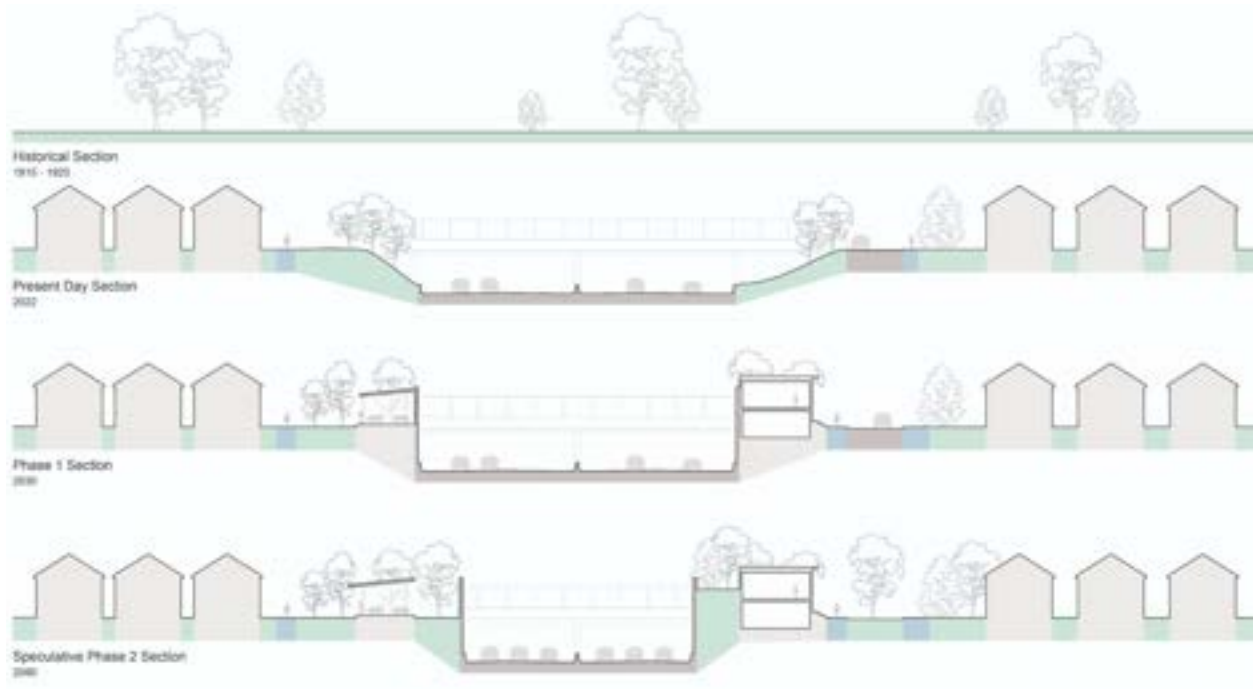
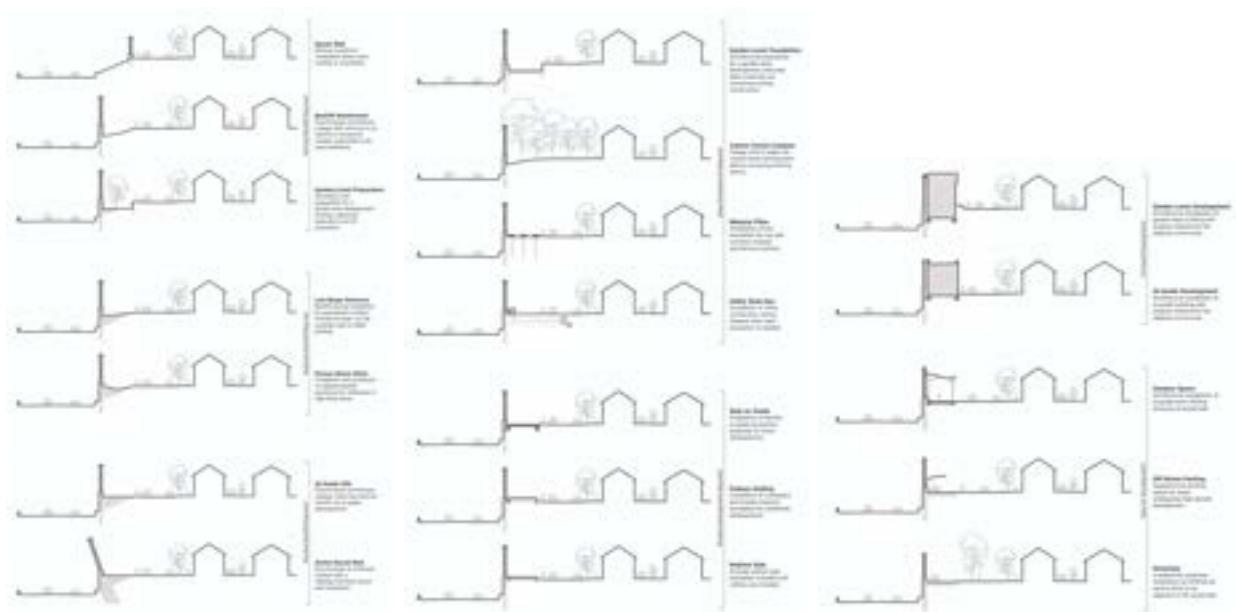


IMAGE 15: Proposed Temporal Site Sections at Glynn Ct. and M-10 (B. Cox, 2022)



IMAGES 16, 17, & 18: Potential Strategies Employed In Embankment Reclamation (B. Cox, 2022)



## APPENDIX A: LITERATURE REVIEW

### At Home/Chez Soi Project

The At Home/Chez Soi project was a federally funded research project to study the effects of a housing first model on Canadian homelessness. It was installed in Canada's five largest cities, providing for a range of conditions for not only the urban characteristics of each city, but also a range of demographics and severity of homelessness within each location. Over the four years that the study was conducted, the Mental Health Commission of Canada found that a housing first model was plausibly adaptable within each of the five contexts, at various levels of care (including intensive and high-intervention models). This lends credence to a holistic approach to ending homelessness adopting the housing first model in various urban environments.

*"In 2008, the federal government invested \$110 million for a five-year research demonstration project aimed at generating knowledge about effective approaches for people experiencing serious mental illness and homelessness in Canada."*

*"One of the advantages of stable housing for a group who have high levels of chronic mental and physical illness is the possibility of shifting their care from institutions to the community."*

Goering, Paula, et al. National At Home/Chez Soi Final Report. Mental Health Commission of Canada, 2014. Retrieved from: [mentalhealthcommission.ca](http://mentalhealthcommission.ca)

### A Home of Your Own—Housing First and ending homelessness in Finland, The Y-Foundation

*A Home of Your Own* documents the ongoing work of non-profit, The Y-Foundation, throughout the country of Finland. Their main goal is to renovate public shelter buildings into subsidized permanent housing across the country. These low-barrier to entry units are then used to facilitate a nation-wide housing first program in an attempt to end homelessness across all of Finland. The success of this work is outlined within this handbook including quantitative research on the trends pointing to the true longevity of this program's positive effects on ending homelessness.

*"A dwelling is the foundation on which the rest of life is put back together. When a person has a roof securely over their head it is easier for them to focus on solving their other problems."*

*"The Housing First model in Finland has taken into account the existing social benefits system so that it is utilized as much as possible. Service providers help clients with getting access to assistance and services provided by the state or municipalities."*

A Home of Your Own—Housing First and ending homelessness in Finland. Y-Foundation, 2017.

### Neoreaction and housing First: A Review Essay, Nicholas Pleace

Nicholas Pleace offers his own analysis of two US generated responses to the failures of housing first programs in the United States. Pleace also integrates external precedents of the Finnish Y-Foundation, laying the contextual differences between implementation of housing first programs in the United States, European Union, and United Kingdom. The misrepresentation of the effectiveness of linear treatment when compared to housing first acts as a generalized example of how these two papers distort the weight of evidence to support governmental reductionist ideals in the cost-benefit of housing first spending. This points to the housing first implementation in the United States being stunted by the prohibitive allocation of resources, especially under shifting administrative policy, when a full-scale nation-wide implementation would require extensive and sustained funding and coordination.

*"Finland's version of 'Housing First' is and always was distinctly Finnish, a home-grown ethos and philosophy that has produced a uniquely strong, housing-led, integrated strategy that has greatly reduced long-term and recurrent homelessness."*

*"To be clear, the argument is exactly the same as saying you should not keep spending money on a hospital because building one and funding it did not stop people getting ill, or to employ the criminal justice analogy"*

*used by Eide, it is pointless to spend any more money on a police department, because you already did, and yet crime is still happening."*

Pleace, Nicholas. "Neoreaction and Housing First: A Review Essay." *European Journal of Homelessness*, vol. 15, no. 2, 2021, pp. 269-288.

### How Social Science can Influence Homelessness Policy, Geoffrey Nelson

The three "streams" contributing to the framing of these problems are based on a social framework developed by Robert Kingdon where a Problem stream, Policy stream, and Politics stream all contribute to how policy change is enacted. In the case of homelessness, the Policy stream is important to use research-based information to frame the issue so that effective evidence-based solutions can be developed. Politics are then influenced to allow policy change to effectively pass through with wide-scale implementation. It is the funding of these programs within the United States government that poses the largest hurdle for sweeping legislation to become reality.

*"Homelessness is often framed in terms of having either personal or structural determinants, or both. If homelessness is considered to result from individual psychopathology, poor choices, or a moral failing, then a model that emphasizes 'treatment first' or charitable care is often invoked."*

Nelson, Geoffrey, et al. "How Social Science can Influence Homelessness Policy." *European Journal of Homelessness*, vol. 15, no. 1, 2021, pp. 131-158.

### "White Men's Roads through Black Men's Homes": Advancing Racial Equity Through Highway Reconstruction, Deborah Archer

Deborah Archer posits that the aging transportation infrastructure in the United States is on the verge of repair and that there is an opportunity to begin dismantling the systemic racism that is inherent to these roadways. She advocates for a new system in which comprehensive analyses will precede lawmaker decisions that affect racial and ethnic groups, ensuring that the full effect of proposed action is understood before implementation. The impetus lies on the United States lawmakers to thoughtfully implement redevelopment efforts around the national highway system as the roads are still, to this day, laced with the discriminatory practices of the United States' history.

*"America's highways are part of the racial architecture of our country, with barriers both visible and invisible. The question before the country is whether we will truly confront those barriers."*

*"[Racial equity impact studies] also have the potential to help jurisdictions account for the racially disproportionate harm highways have already caused, equitably distribute the benefits and burdens of new highway redevelopment projects and be guided by the values of transportation justice as they move forward."*

Archer, Deborah. "'White Men's Roads Through Black Men's Homes': Advancing Racial Equity Through Highway Reconstruction." *Vanderbilt Law Review*, vol. 73, no. 5, 2020, pp. 1259-1330.

## APPENDIX B: PRECEDENT ANALYSIS

### Claiborne Expressway - New Orleans, Louisiana. Completed 1968. New Orleans Municipal Government

The Claiborne Expressway is an act of middle-late 20th century redlining, installing a massive infrastructural project which cuts through two miles of predominantly and historically black neighborhoods. There now exists a movement to reclaim the space and develop a new urbanism culture throughout the corridor. Removal of the highway opens the corridor to new construction without the best interest of the citizens, and a huge influx of traffic, contingent on a better route through the city. The space created from the highway was left unengaged, and built to facilitate only traffic above and below. It was designed only for the transportation of cars and should have incorporated the benefit of the surrounding community. Reclamation efforts include using the sheltered spaces to gather, and reintroduce the thriving community aspects that once existed. Reclaiming the space allows full community control over the final programming of the space. Studies explore the potential effects of removing the expressway but do so largely irrespective of input from the residents of the affected area.



### Secret Studio - Valencia, Spain, Completed 2017. Fernando Abellanas

The Secret Studio is a project which exists against the underside of an undisclosed bridge in Valencia, Spain. It is an act of a parasitic architecture which contributes nothing of value to the bridge, but benefits from the spatial byproduct created from the bridge structure. It is a work which utilizes unorthodox methods to inhabit unorthodox spaces. The infrastructure in this work is not designed to provide any kind of benefit to the surrounding inhabitants past its role in transportation, yet one of its surrounding inhabitants has found a way to extract some amount of benefit. This spatial byproduct provides an inherently architectural opportunity to engage with while being a completely unintentional aspect of the larger infrastructure.



### The Spark - Not Sited, Designed 2018. Snøhetta

The Spark speculates on a future of a dominant data center typology infesting the built environment. This concept harnesses the potential of this speculative future to provide benefit to existing communities while allowing a necessary infrastructural installation. Instead of venting the heat created from the operation of the data center machinery, it is captured and routed through to the adjacent community to be used as free heating. This is an example of infrastructure byproducts being designed to be utilized as a direct benefit to disparate constituencies. This work is similar to a lighthouse, where the light needs to be maintained and the housing for a dedicated lighthouse keeper is built directly into the infrastructure. Although the byproduct created in The Spark is not inherently spatial, it is still an example of how additional benefit can be derived from infrastructure in various forms.



### A4 Sportpark - Schiedam, Netherlands, Completed 2016. MoederscheimMoonen Architects

The A4 sportpark exists on top of the Dutch A4 highway. The tunnel over the roadway was constructed first as a means of noise mitigation and separation between neighboring residential areas. What this project achieves is the literal and figurative bridging over top of a large piece of infrastructure that actually reconnects the separated populations. Developing the new space to be a community center further accentuates the thematic effect of the work. The use of the overhead space of the tunnel infrastructure benefits the new construction being an open-air field for sport. The cultural mapping done by MoederscheimMoonen Architects highlights the true scale of the green space intervention, all taking place within the footprint of the existing highway infrastructure. This project showcases a prime example of a dual-purpose installation acting as both attendant infrastructure and architecture at the same time, greatly benefiting the adjacent communities.



## Bascule Bridge + Bridgmaster's House - Purmerend, Netherlands, Completed 1996. UN Studio

The Bridgmaster's House is a beautiful example of using the existing structure leftover from a massive infrastructural project. The house exists as an elegant work of architecture standing alongside the greater bridge installation. Compared to the entire project, the Bridgmaster's House costs only a fraction of the budget and utilizes many of the resources dedicated primarily to the operation of the bridge. The house benefits from being an attendant structure to the larger infrastructural project, constructed at a premium while the necessary equipment was already on-site and in use for the larger scope construction. This work is similar to a lighthouse in that the necessary attendant infrastructure is built alongside the primary at the same time.

