WHERE DESPARATION PLANNING MEETS REPARATIONS PLANNING
Transit as an Agent of Equity in the Shaping of Detroit’s Future

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ABSTRACT

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Black America has been made subject to hatred-fueled mistreatment of near incomparable magnitude and duration for over four centuries of this nation's history. From the shackles of slavery to the systematic disenfranchisement that came with ghettoization and redlining practices by all levels of government, to hair politics, and beyond, Black America is characterized by a people systemically stunted by the country's power majority. These centuries of disenfranchisement are very much felt in the present in Detroit—the country's blackest city by population proportion—as disparities in suffering between blacks and non-blacks in the categories of mortality and unemployment, educational attainment, instances of crime, and property foreclosures are shockingly large.

But what role does the planner have in mitigating these injustices and advancing the societal standing of a people structurally wronged? Here it is argued that what is required is a redefining of equity, and the adoption of the professional ideology of Reparations Planning—a set of principles defined in Chapter 1. These ideals are then operationalized and applied to the practice of transit network design. The result of this application is two distinct models, both envisioned for the city of Detroit, whose specific objectives are the provision of increased access to economic opportunity for Black America. These models are then analyzed against the existing condition of mobility in the city as well as against one another. Finally, both networks are visualized in consumer-friendly transit maps and discussed alongside several other fantasy rapid transit proposals for Motor City.

This work seeks to recruit planners as soldiers for a battle that must not be waged passively; in Detroit or elsewhere. One that must not be diluted or conflated with the plight of the poor or that of other marginalized groups. Whatever the future of the Black Lives Matter movement may be, it has brought back into mainstream media and dinner table conversation the disparate reality lived by members of the black race in a nation that never welcomed them, has struggled to accept them, and has done all in its power to limit their capacity for greatness. What lies in the following pages is a call to planners to not let the wave that this movement has swelled pass by without mechanizing its potential for forward change.

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0. INTRODUCTION

Detroit is cited within many fields as a unique example of urban living in the United States. Whether an economic case study of the downward spiral toward bankruptcy, a sociological example of stark segregation, a historical journey into the once thriving—now largely failed—industrial machine that helped secure the country’s position as a mega world power, or the setting of a post-apocalyptic science fiction film in which nature has reclaimed urbanity and left the city in ruin, Detroit is generally cast in a dark shadow. Perhaps such casting is to be expected of an environment with an unemployment rate double the national average (US Census Bureau), burnt and blighted structures accounting for one third of the housing stock (Data Driven Detroit), murder rates 10 times the national average and 39 percent of the population living below the poverty line (Bouffard 2015), in a city that just 60 years ago hosted double the population and was ranked the single wealthiest urban area in the country per capita.

However, in the last five years or so, as population has remained stable, job loss has plateaued, and government-initiated projects aimed at housing stock improvement have gained traction, excitement about Detroit’s trajectory has come into fashion; particularly in the fields of urban planning and design.

The future of the Motor City, more and more so, is being discussed with respect to the physical and economic mobility of its residents. “The highest priority for city-wide change is transportation. Detroit is heavily car-dependent—over 87% of trips are taken by car—and while the Motor City legacy may persist for several decades to come, the call for real change is present now. Rising fuel prices and environmental issues are starting to bite. Widely dispersed job centers limit access and choice of employment for working and low-income families without cars. This means that diversifying transportation options is fundamental to the future prosperity of the city (Detroit Future City).” However, most of this discussion has been halted at the thought-piece level. The questions of just how improvements to mobility in Detroit shall be brought about, who exactly shall they be designed to serve, and what physical form they will take remain largely unanswered. This piece responds to these questions, and in doing so takes the matter of mobility within Detroit a step beyond discussion-point toward operationalization and modeling.

The exploration begins by addressing just who the target beneficiaries of mobility improvements ought to be. The stance argued for here is void of grey area: Black America must singularly prioritized in the design and implementation of any and all transit infrastructure investment. The reason for this, expressed briefly, is two-fold. The first contributing element is a century old argument that holds just as true today as it did when made: “…for the problem of the Twentieth Century is the problem of the color line (Du Bois 1903).” To claim that the problem of the twenty-first century remains the problem of the color line would not be without merit. Improvement in American race relations has been forward moving since Du Bois’s day on the surface, but appallingly stagnant at its core.
The second element contributing to the explicit identification of Black America as the group that transit planners should be working on behalf of is far more specific to Detroit. It is shed light upon by Efe Bess, a community organizer and professional drummer in the city. He argues that, "The question of Detroit’s future is really a question of the Black man’s future. Until America gives a damn about black life, how can we expect it to give a damn about its blackest city”—83% of Detroit’s population is black (US Census Bureau). This line of thought is used as the basis for the creation of Reparations Planning, a planning ideology defined here and operationalized toward the goal of reformation in the practice for transit network design.

The result of this reformation is two different network models; both of which crafted with the objective of economic opportunity provision specifically for black Detroit residents. In a sense, the resulting models are an answer to the following call to action posed by experts within the planning field: “Doubtless the city (Detroit) suffered from economic and related problems that outfaced those of any other place in the United States after 1970. Yet these very real and extensive problem should not forbid our reconsideration of the city's condition and the proposition of alternative physical futures (Ryan 2012, p126-127).” The exploration concludes with the posing of a similar motion for non-traditional thinking and practices within the field such that equity be allowed to climb the ladder of professional objectives from the bottom to top rung.

In short, planners and policy makers must answer for themselves the question of where transportation falls in the “calculus of justice (Martens and Golub 2012).” What follows in these pages is my personal answer; one which I encourage my fellow planner to adopt.
1. BLACK AMERICA

Introduction

"It may be impossible to overstate the significance of race in defining the basic structure of American society."
-Michelle Alexander

Much of the grandeur that is found in American cities, the wealth enjoyed by their residents, has come into being at a cost. A cost disproportionately paid by members of the Black race: “We were people turned to fuel for the American machine (Coates 2015, p70).” This fuel has burned for over 400 years and continues to do so as Black America is, time and time again, pushed down so that others may reach new heights. No field is without guilt of this practice.

This chapter begins by looking at the statistics that speak to the continued disenfranchisement and lesser quality of life experienced by blacks in the US. The numbers are then supplements by statements by black individuals of how they perceive their own blackness on a daily basis. From there, the call for reparations for slavery, for a post-emancipation system of oppression, and for mistreatment specifically within the field of transportation are explored. Finally, the chapter closes as the school of thought of Reparations Planning is given definition.

It is important that two points are made clear before this chapter is dove into. The first is that “to be Black is a precious thing (Nina Simone 1958).” Blackness is a complex state of being rich in culture, empowering in its resilience, and unparalleled in its ability to create beauty out of such darkness. While the focus of this piece—the improvement on the current standing within society brought about by structural mistreatment of an entire people since beyond the nation’s inception—requires the painting of a bleak picture, I wish not to mislead one to believe that Blackness and the people that comprise it are not exceptionally grand.

The second vital point to stress is that in the isolation of wrong doing afflicted onto the black community I do not erase the wrong doing done to others; other racial groups, other religious groups, the LGBTQ community, immigrants, and the many other minority factions that mainstream America has mistreated. The hurting of these peoples is very much important. That said, there is power in explicitness and Black America has a unique history that requires unique attention. The call for Reparations Planning, and its potential implementation within the practice of transit network design in Detroit, is certainly not a segue into the raising of an All Lives Matter flag. And while identity—much like urban planning—is cross-cutting and allows one to wear many hats at once, this chapter is unapologetically dedicated to the specific history of black bodies, such that present practices regarding black lives are changed, so that the future of Black America may become bright and allowed to flourish.
1a. Quality of Life

The differences in quality of life experienced across races in the US is astounding. Now, one might say, 'How can you measure quality of life such that it can be compared from one person to the next let alone across groups of people?' A fair question, no doubt. An attempt to compare apples to apples and oranges, similarly, to their own kind has lead academics and policy makers to close examinations of the numbers; statistics allow for an extensive set of controls to be in place such that race can be singled out as the independent variable of interest affecting noticeable disparities in sectors such as health, education, employment, property ownership, and the increasing jarring field of mass incarceration.

Acknowledging that the numbers are powerful and illustrative of the injustices I aim to mitigate in the chapters to follow, I follow the trail masterfully blazed and open this section with a look at the numbers. This is proceeded by discussion of an aspect of quality of life not often enough explored in academia or within the black community at large: the state of the Black psyche. In an effort to shed light on how the numbers are internalized by Black America and made to shape self-perception, I close this section with a description of what it means to black people to be black.

I cannot stress enough that this is a discussion of Black America, not an attempt at definition. Black America is diverse, dynamic, and is uniquely defined by every black individual. Efforts to categorize and define are dangerous; they are othering and are more often than not used to limit and divide the black community rather than to empower and uplift it. While blackness is anything but homogenous, exceptionalism is the enemy of structural progress. And so, in this section, while the 'black community' refers to all self-identifying black individuals living in the US and all statistics presented apply on average, no claims are made here that suggest accounting for comprehensive blackness; such would be a fools errand.

The Numbers

Have you ever received a response that resembles the following to the question 'How are you?': 'I've seen better days, but at least I have my health.' A look at the difference in health-related statistics between blacks and whites will make you rethink what a response like that really means depending on the skin color of the person giving it.

From the second they leave the womb, black lives are in greater danger than their white counterparts. Black infants die at a rate of 11 per 1000 live births, while white infants mortality rates are at 5 per 1000 live births (Center for Disease Control and Prevention). For those that survive their infancy, the early years of life see no improvement in their disproportionate likelihood for poor health. Black children are 73 percent more likely than white children to be obese. Physical segregation, disparities in access to healthy food, weak public school programs focused on healthy lifestyle habits, and socioeconomic disadvantage are just a few of the race-related contributors to this statistic (National Association for the Advancement of Colored People). Furthermore, unhealthy eating habits and lacking exercise are not the only cause of swollen, young, black
bellies. Black teenagers are twice as likely to become pregnant before leaving adolescence than white teens (Office of Adolescent Health). The US Department of Health and Human Services cites insufficient sexual health education in educational institutions serving high percentages of non-white students as the central cause of this disparity.

For those who manage to evade being a statistic by their twenties are not yet in the clear. Currently, 42 percent of the black population of the US over the age of 20 suffers from hypertension. Compare this to 34 percent of hypertensive whites in the same age group (Center for Disease Control and Prevention). On top of the aforementioned disparities, due to differences in health insurance, levels of trust of medical practitioners, physical access to medical advice, and a host of other reasons, black individuals are not only more likely than whites to suffer from certain ailments, they are also more likely to die from these afflictions. Blacks are 40 percent more likely to die from a stroke, 30 percent more likely to die from heart disease, 2.5 times more likely to die during pregnancy, twice as likely to die of prostate and cervical cancer, and 40 percent more likely to die from breast cancer than whites (Center for Disease Control and Prevention).

The differences in length and quality of life experienced across the two races do not end there. The destruction of the black body, being highly visible, is far more frequently addressed than the destruction of the black mind. There is danger in mistaking visibility for import; both those outside looking in and those within looking intra-communally are guilty of neglecting to tend to matters of black mental health. Black adults are 20 percent less likely to receive treatment for depression and black youth are 30 percent more likely to attempt suicide as a high-schooler (US Department of Health and Human Services). Ta-Nehisi Coates, arguably the most influential literary voice on the subject of black life in America of the last five years, briefly touches on the matter in his piece addressed to his son: “What I know is that when they loosed the killer of Michael Brown, you said, ‘I’ve got to go.’ And that cut me because, for all our differing worlds, at your age my feeling was exactly the same (Coates 2015, p21).” A generation gone by, a black president elected to two terms, minority empowerment through the global takeover of social media, widespread uptake of the natural hair movement, black academics serving as presidents of Ivy League institutions, and still so little has changed. The black psyche remains tormented by the upholding of injustice. Generation after generation after generation.

The numbers on education and employment, though improved over the last decade, are similarly dismal. Whites graduate high school at a national rate of 86.6 percent. Black students graduate at a rate of 70 percent. This gap is maintained beyond the twelfth grade. At a national level, 64 percent of white college students graduate compared to just 48 percent of black college students (National Center for Education Statistics). The pattern of injustice cannot be shaken even by those who make it through high school and go on to graduate as blacks are consistently made lower salary offers than whites for the same positions and comparable levels of experience (Fryer et al. 2014).
One of the five basic needs for human survival, shelter also happens to be one of the single most stable sources of wealth in the US. For better or worse—worse, in my personal opinion—home ownership is the cornerstone of financial stability for American families. As is to be expected, given the reoccurring theme of this exploration into American societal disparity, black individuals have been financially handicapped by racist practices in the housing market that have lasted centuries. The effects of redlining and other predatory lending schemes are still evident today in the harsh lines of physical segregation that characterize so many American cities. Their effects are further evinced by the numbers. 71 percent of white households own their home. Only 46 percent of black households own theirs (US Census Bureau). This disparity also applies to the population in this country without homes altogether. Of the homeless population, 41 percent are white—compared to 65 percent of the national population identifying as white. 42 percent of the homeless population is black, while just 12 percent (National Coalition for the Homeless).

Contributed to by the amount of wealth present in the housing market that black households are not currently reaping, the wealth gap between whites and blacks has shown no signs of improvement since the 1990s (Urban Institute). “The most recent federal survey in 2013 put the difference in net worth between the typical white and black family at $131,000. Yes, that’s a big number. But here’s an even more troubling statistic: About one-quarter of African-American families had less than $5 in reserve. Low-income whites had about $375 (Kiel 2015).” With such low reserves, Black America can only struggle to invest in its own future and protect itself from unexpected setbacks. Ultimately, and what should be common knowledge in the field of American urban planning, the modern roots of the racial wealth gap can be traced back to the post-World War II housing boom, when federal agencies blocked loans to black Americans, locking them out of the greatest wealth accumulation this country has ever experienced (Kiel 2015).

The element of black life currently receiving the most news coverage, inciting the most protests, and working its way into the most presidential campaign interviews is the intersection of Black America and law enforcement. People find themselves unable to remain silent as the killers of black minors walk free and receive pensions. While the numbers wage a less eventful war on the soul and tear ducts, they are just as jarring and should have the country just as unwilling to accept the present reality of the system that governs us:

One in three black men can expect to go to prison in their lifetime (Alexander 2012, Bureau of Justice Statistics). Black women are three times more likely than white women to be incarcerated (Sentencing Project). 1 in every 15 black men are incarcerated in comparison to 1 in every 106 white men (Department of Justice). 58 percent of black youth facing the juvenile correctional system are sent to adult prisons versus just 11 percent of white youth in the system (Sentencing Project). In the federal system, black offenders receive sentences that are 10 percent longer than white offender for the same crimes (US Sentencing Commission). Blacks are 21 percent more likely to receive mandatory-minimum sentences and are 20 percent more likely to be sentence to prison than
whites (Alexander 2012, Sentencing Project). Even those fortunate enough to avoid prison are likely to have a negative tale to tell featuring law enforcement as black individuals are four times more likely to experience the use of force during encounters with the police than whites are (Bureau of Justice Statistics).

Time and time again the argument that blacks simply commit more legal infractions than whites has been disproven. The Human Rights Watch, among other studies, have found that blacks and white are just as likely to commit crimes as one another. The element causing such drastic disparity in punishment figures is not prevalence of misconduct. It is much more surface level and easily identifiable; it can be determined in less time than it takes to tighten a trigger finger. In America, melanin is crime enough.

The extreme disparity in quality of life does not end when the cell gates close. The figures cited above say nothing of the injustices that disproportionately affect blacks upon release from the correctional system. Felony-disenfranchisement policies have led to 11 states denying the right to vote to more than 10 percent of their black populations (Bureau of Justice Statistics). “Black job applicants without criminal records enjoy roughly the same chance of getting hired as white applicant with criminal records (Coates 2014).” Worsening the matter are disparities in wage trajectory for past convicts. Wages grow at a 21 percent slower rate for black former inmates than white ones (Bureau of Justice Statistics). Policies and practices like these ensure that a ceiling is kept on black collective advancement.

The Feeling: What it is to be Black

“To be a Negro in this country and to be relatively conscious is to be in a rage almost all the time.” —James Baldwin

Curious as to how time, and the exchange of a Y-chromosome for an X, may have effected the sentiment expressed by James Baldwin above, I prompted several of the black women in my network—neighbors, friends, colleagues, teammates, peers—to finish the following sentence: ‘To be black in America is...’ I gave them no initial parameters regarding length, tone, voice, or intended audience; they were free to sing praise, express the joy they derive from their blackness, cry of their woes, or, as Baldwin might have anticipated, allow their rage to boil over onto the page where they logged their responses. Several of these (self)reflections on black life lived in the US by black women, a group often silenced and ignored by the literature and the black community itself, follow:

“To be black in America is to forever wonder if people see you.”
—RM, JP Morgan banker from Pittsburg, PA.

“To be black in America is to be in love with a country that won't let you go but won't let you live.” —MFH, Associate at the Mayor’s Office of Immigrant Affairs in NYC.
"To be black in America is to be feared for who you are and loved for what you create. It means to have every part of your culture stolen, only then appreciated, and renamed. It means to be seen as something less than human, a thing than cannot truly experience pain. It means, for many, having your history erased. Being deprived of the knowledge of the people from which you descend. –BC, Middle school teacher in Los Angeles, CA.

"To be black in America is to be othered, politicized, and included in an extensive narrative history of oppression and exploitation, whether you want to be or not, whether you self-identify with it or not, whether it is actually your story (African-Americans) or not (African/etc. willful immigrants). It is to be spoken of and for, and never listened to. –AB, college student in Chicago from Nigeria.

While several of the responses I received featured descriptions that suggested rage, many took on an air of sorrow, of disgust at the attempts America has and continues to make at stripping away a people's agency, and of internal division—being torn between loving Black America and despising a nation that constantly wages war on its own people.

One feeling expressed with particularly high frequency was that of guilt. A sense felt by these women that they were somehow responsible for elevating the condition of the race as a whole, for easing their own people's struggle, and were failing miserably. The literature confirms similar findings within certain socio-economic classes: "79 percent of middle-class blacks (nationwide) think that the black middle class has an obligation to help poorer blacks, yet only 17 percent of them think that middle-class blacks do as much as they should to help improve the condition of poorer blacks. This is a trenchant self-critique, and an indication that, while middle-class blacks have taken on the burden of improving the condition of poor blacks, they perceive that their efforts are never enough to make much of a difference. The persistence of black poverty and suffering is their proof (Pattillo 2008, p102)." High levels of self-critique, the setting of unattainable goals, and the internalization of a responsibility that ought to fall on the 319 million pairs of shoulders present in this country—rather than the 10 million pairs (US Census) that comprise the black middle class—are all detrimental to black joy and prosperity. Again, the black psyche remains unprotected and uncared for.

However, as to be expected, not all responses were cast in metaphorical darkness. Many spoke of the power that they feel coursing through the red veins beneath their black skin, and the unparalleled ability to overcome that characterizes Black America. A few such response follow:

"To be black in America is to be self-aware, self-assured, and self-motivated. It is, above all else, a blessing. Once you realize that, you are able to revel in the beauty, pride, and the
glory that comes with being black.” –EG, Athletic Agent with the NBA living in Orlando, FL.

“To be black in America is to be resilient and hopeful.” –OO, Administrative Assistant from Boston, MA.

“To be black in America is to be in constant crisis—mentally, emotionally, and physically. That said, crisis births courage, and the black experience in America is direct testament to the resolve of the human spirit.” –JP, college senior from Jackson, MS.

These feelings both of sorrow and of pride have resonated with black individuals in America for centuries. Black culture, one of the US’s greatest exports, has spoken of this paradox of struggle and triumph since its beginning. From the negro spirituals of slavery’s day to President Obama’s self-reported favorite album of 2015—Kendrick Lamar’s To Pimp and Butterfly—black music has told of the pain and pride that Black America wrestles with. And though not the words of Richard Wright, Audre Lorde, Cornel West, or Maya Angelou, I feel that the passage below merges all of the sentiments above and paints a particularly telling picture of just what blackness means to Black America today.

“To be black in America is often a condition that is too big to swallow, explain, or understand. It is the reason why at once I feel so eager to define it and encumbered by the chore of presenting our existential defense to those outside our race. To be black in America is to live constantly in a paradoxical state, at once burdened and free. I feel indignant in my skin, which necessarily means that at my core I feel righteous and defiant to exist as I am. On some days, I want to hide from the news tickers, the front pages, the talking heads. But it also feels that its the world that is wrong, not me—and from this I find it is easier to derive strength. I know that I am perfectly made not despite my skin, race, or culture but because of it. I feel free in the solidarity brought to me by my community and the closeness that comes from loving on one another out of necessity. We build this wall of love to armor ourselves from those who do not know what it is like to live in our skin in our neighborhoods, in our country, in this world. And behind this wall, outfitted by warmth emanating in particular from my black sisters (from every nation and of every hue) I am affirmed when I look in the mirror and am made to believe from the deepest parts of my heart that the work of my brown hands is important. It lends gravity to everything I do and a sense of purpose. Just like that! Adversity yields love! And when you are black in America, and you love—there is nothing more earth-shatteringly political, especially when that love is for yourself. Your love is grand and radical and important. And that feels so good. It helps me never to forget that being
black in America is something to cherish no matter the costs.”

- BD, Producer with CBS News in Washington DC.

Finally, motivated by the responses I received I took the task upon myself to explore how well my views on Black America aligned with those of Baldwin's. I landed, with resolve, on the following feeling: Freedom is access to the full set of choices that a society has to offer, including the choice of opposition to all that falls within that set. To be black in America is to see freedom all around you, to be told that you are free, and to be sure that you have never known the feeling for yourself.

1b. A Case for Reparations: Within the Field of Transportation

"In 1968, Dr. Martin Luther King Jr., described how city planning decisions result in transportation systems that underserve minority communities: 'Urban transit systems in most American cities have become a genuine civil rights issue—and a valid one—because the layout of rapid transit systems determines the accessibility of jobs to the African-American community. If transportation systems in American cities could be laid out so as to provide an opportunity for poor people to get meaningful employment, then they could begin to move into the mainstream of American life' (Sanchez et al. 2003)." In this section lies a brief discussion of Black America's history with transportation and an answering of the call to action posed by MLK almost 50 years ago. Here the planning framework is set within which the designing of transit with Black America at the forefront—and with the specific aim of increasing economic opportunity through 'meaningful employment' access—can take place.

Transportation's Relationship with Black America: An Ugly History

Though typically spoken of as compensation specifically for the hundreds of years of enslavement of black individuals by white individuals in the US, there is certainly a case to be made for reparations to Black America for the mistreatment dealt by the field of transportation. And though its evils are minor compared to those of slavery, the history of the relationship between transportation and black life in this country takes on a similarly discriminatory air.

Broadly speaking, "Americans are increasingly mobile and evermore reliant on automobiles for meeting their travel needs, largely due to transportation policies adopted after WWII that emphasized highway development over public transportation. These and other transportation policies have had inequitable effects on minority and low income populations, often restricting their ability to access social and economic opportunities, including job opportunities, education, health care services, places of worship, and other important sites the likes of grocery stores (Sanchez et al. 2003)." Transportation policies limit access to opportunities through direct effects—such as inequitable costs—and indirect effects,
such as residential segregation. Transportation as a field has not been able to escape this country's history of government supported racism. In fact, in many cities it has been used as a highly effective tool for physical, social, and economic division within politically (read theoretically) integrated environments; a tool for placing and keeping Black America in a state of lesserdom. The results of transportation's racist history have been long lasting effects that are observable many decades beyond their implementation.

During this country's era of extensive interstate roadway expansion, highway investment was the masked face of slum clearance in some cases and the creator of ghettoization in others—by creating physical barriers between black and white neighborhoods, highways cut off blacks from sites of employment, leisure, healthy food options, higher performing school districts, and a slew of other resources. Case studies allow for a specific look at this mistreatment brought on by expansion of the highway system.

Take for example Baltimore's locally coined 'Highway to Nowhere'—a strip of Route 40 just barely over a mile long. "Before that scrap of a freeway was built, the Franklin-Mulberry corridor contained a stable, vibrant, black lower middle-class neighborhood. But in the 1960s and early '70s, the government made room for the road by destroying 971 homes and 62 businesses. In the process, it displaced around 1,500 people (Kristian 2015)." Cases like this one in which healthy black communities were sacrificed to the mighty King Highway were far from a rarity during the twentieth century.

Current Secretary of Transportation Anthony Foxx, the third black individual ever to hold the federal position, has cited a now-vanished neighborhood in Charlotte, NC called Brooklyn as one such victim of racist transportation planning. In describing the vibrancy and rich cultural history of the town, Foxx says the following: "It was a place where black families of both blue collar and professional means thrived in the early and middle 20th century. It was the favored overnight stop for jazz greats like Duke Ellington when they played the city, and home to both Charlotte's first black high school and the first free black library in the entire South." The neighborhood sat within a desirable proximity to the city's central business district and activity hub; this was likely at the heart of its downfall. "By 1912, redlining and urban renewal were in full swing, making the community untenable for residents and newcomers alike. In a single decade, white city leaders ripped out almost 1,500 buildings in Brooklyn, displacing over a thousand black families and 200 black-owned businesses (Pyke 2016)." And when Charlotte eviscerated Brooklyn, road projects served as the scalpels. "First came Independence Boulevard, which cut a gash through the community," says Foxx; "This was followed by an inner beltyway, I-277, which remains to this day, and has stabbed, fork-like, into the neighborhood's heart (Pyke 2016)."

Commonplace practices the likes of these have shaped what we see in America today: urban settlement patterns in which poverty clings to the freeways like a shadow; a shadow cast by the dismantling of once thriving black neighborhoods by miles upon miles of highway development.
Physical separation and neighborhood destruction is not the only way that transportation has played racial favorites. In the early 1990s, the Los Angeles Metropolitan Transportation Authority (LAMTA) spent only 30 percent of its financial resources on bus transit, even though almost 94% of its riders used the buses and 80% of them were people of color. 70% of LAMTA’s financial resources went to rail, even though only 6% of its riders used rail. Rail riders were primarily white (Sanchez et al. 2003). One would be hard pressed to find a city in America in which this inequity of funding allocation was not the case.

Beyond financial inequity, specific examples from public policy, or lack thereof, and their suggestion of fundamental injustice served to Black America are not absent from transportation literature. “At the behest of the Johnson administration, the McCone Commission identified inadequate public transportation as a contributor to high rates of unemployment among center-city blacks (Cervero et al. 2002).” While this indicates that the negative affect of mobility policy on the advancement of black lives was being isolated as an area of unique interest as early as the Johnson administration and as high up as the federal level, it is disheartening that the exact relationship identified in this passage holds true today with little improvement. Further proof of injustice all the way at the federal level can be seen in the Supreme Court ruling in the Plessy vs. Ferguson case. The result of which was the creation of the separate-but-equal doctrine that required different races to use different railway cars; different in both placement and quality.

Finally, even in the rare cases of best intentions, the structure of MPO’s—the bodies responsible for much transportation planning in this country—are fundamentally skewed away from black advantage. MPO boards are overrepresented by suburban interests by virtue of a ‘one-area, one-vote’ system. This is absolutely the case for the Southeast Michigan Council of Governments (SEMCOG) and it is unquestionably hurting Detroit. Detroit with a population that is approximately 83% black, has an MPO board whose policies are set by a 46-member executive committee that is approximately 11% black (Sanchez et al. 2003).

Reparations (Urban) Planning

The idea of reparations is as ancient a practice as war. In his masterfully crafted article “A Case for Reparations”, Ta-Nehisi Coates cites Deuteronomy to emphasize perhaps both the moral imperative of releasing those that have served you with some sort of payment for that service and the age of the argument. Coates cites land theft, exclusion from capital markets, denial of federally supported assistance programs, corrupt credit schemes, redlining, and other racist practices that have barred Black America from tapping into otherwise accessible sources of wealth as grounds upon which to rightfully demand reparations.

Though Coates forms his argument around post-slavery elements of society that largely define twentieth and twenty-first century society, the argument for the need for reparations based purely on a history of bondage is strong enough to stand in isolation. Even great thinkers far removed and across seas noted the need for reparations if Black America
was to have a fighting chance at survival, let alone at thriving, in American society. Marx, reflecting on then-president Johnson's weak post-emancipation policies, said that unless changes were made to the current conditions of Reconstruction-Era social politics "... freedmen would return to a state of quasi-slavery (Foner 1977, p35)." Marx believed that the absence of reparations would maintain Black America in a position of lesser beings in practice though free in name.

The call for reparations made by Coates, and others both in academia and beyond, can be framed as a summons. As Black America charging society for a crime of great magnitude and duration committed against members of its historical community. Restitution is a reasonable successor of mistreatment; such is the basis of our entire legal system. Quite frankly, White America is fortunate that we have moved beyond Hammurabi's code.

Though absent from legislation at all scales—local to federal—not all demands of reparations have fallen on deaf ears. Legal cases have been won, such as that of Belinda Royall in 1783 in which she was compensated 15 pounds and 12 shillings annually for her years of bondage (Finkenbine 2007), and different proposals for exactly what form Reparations should take have been argued for. Some have argued that a total of $34 billion is owed to the descendants of slaves, while others argue that a payout to individuals is entirely too impractical to be realized and instead reparations should take the form of policies that target the wealth gap between blacks and whites (Coates 2014). Coates himself agrees that a payout is probably not best; that a "national reckoning that leads to spiritual renewal" is at least part of what is needed.

"Until the Negro's access to these (social, economic, and political) rights is the same as that of the white man and until these are fully recognized and freely accorded, all our talk about democracy and freedom is a vulgar sham and false pretense (Debs 1918)." Here we have a call for national accountability; a motion that encompasses some of what Coates deems necessary for a people's 'spiritual renewal.' On the matter of ensuring access to equal political rights, much progress has been made since Deb's day. However, with respect to the social and economic equality that Debs calls for, indeed the American Dream is color sensitive and the sour vulgarity he identifies is tasted by every non-white, non-heterosexual cisgender male as s/he/they mouth the closing lines of the national anthem.

But if not individual payouts, then what? If not $34 billion, then what? How does one ensure spiritual renewal? Motivated by the injustices thrust upon Black America by the field of transportation well after black bodies were allotted their long lost two-fifths, I propose the national adoption of the practice of Reparations Planning as the first step toward restitution.

Imagine a world in which every planner and public official lived by the following creed: "I pledge allegiance to the... cause of the advancement of societal standing and improvement in quality of life of the black mind, body, and soul... in the United States of America." What would our cities look like in such a world? Where would public dollars be spent? How might our public education system differ? How many black doctors would
we graduate a year? This is a world governed by Reparations Planning. Defined by the explicit objective of increasing access to economic opportunity for black persons, not in comparison to any other peoples but in uncaged absolute, Reparations Planning seeks not to detract for the prosperity of others. Rather, it acknowledges that Black America has a unique history that has dealt members of its community a unique disservice; one which the national must bare the burden of making amends for.

With this ideology I am not claiming to account for all that has been requested as reparations for the treatment of black lives in this country. What I am doing is suggesting a forward paying process with no cap and no terminal station on its timeline that has the potential to greatly improve the quality of life experienced by a currently and historically disadvantaged people.

But why the focus on economic opportunity? "He (the black man in America) simply wishes to make it possible for a man to be both a Negro and an American, without being cursed and spit upon by his fellows, without having the doors of Opportunity closed roughly in his face (Du Bois 1903, p45)." While in most of the country’s urban environments black individuals enjoy the human decency of days free of profanity and spit—though there are certainly places in the US where these acts are ever-present—it is this third injustice, the barring from ‘Opportunity’, that most consistently continues to plague Black America. Economic disenfranchisement of Black America is structural and prolific; its undoing is fundamental to upward social mobility of the race.

In short, the practice of Reparations Planning proposed here upholds the notion that it the responsibility of the urban planner to end the genocide of black futures that has characterized the US for over 400 years. Recompense in the form of public policy and planning ideology certainly seems a price the nation can afford to pay.

**Important Definitions**

Given the above definition of Reparations Planning and the framing of race-based matters as subjects of social justice, two terms will be used frequently throughout this piece. Therefore, it is necessary to specify what is meant by each. Firstly, *sites of economic opportunity* in this context shall be defined as places of employment and educational institutions. Increased physical access to jobs has been shown to increase the probably of welfare recipients and unemployed adults findings gainful employment and staying off of public assistance (Sandoval et al. 2011). I acknowledge that this definition is narrow and falls short of being all-encompassing. However, this lens is of a desirable scale for operationalization; it can be quantified, visualized, and tested.

Secondly, what is meant by *equity* requires clarification. “Benefits of transportation access are deserving of a non-market driven distribution. The distribution we propose is one where the maximum gap between the lowest and highest accessibility, both by mode and in space, should be limited, while attempting to maximize average access (Martens et al.
This is how Martens, the leading scholar on the relationship between transportation and social justice, defines equity. This is not to be confused with *equality* which he defines in the following way: "... the distribution of access evenly over people irrespective of the differences between those people (Martens et al. 2012)." Most scholars of justice agree, at least since Aristotle, that the distributive principle of *equality* can be perceived as the ‘default’ criterion for the distribution of goods over members of society. The challenge for scholars of social justice lies in providing convincing justifications for a deviation from this default (Martens et al. 2012).

Using the discussion of present societal injustices and the history of prejudicial treatment of Black America within the field of transportation presented in this section, I argue that the default of equality must be exchanged for a condition of equity defined by untapped black advancement. Equity definitions founded on fairness tend to look at conditions as snapshots in time. Take the wealth gap for example. To reach the *equitable* goal of a closed gap (snapshot in time), unequal policies are needed to advance the group at the bottom in relation to the group at the top. *Equal* policies would cause parallel advancement. I prefer to take a measure of equity that accounts, in a way, for lost time. Untapped advancement of the group at the bottom—in our wealth gap example—could theoretically result in their overtaking of what was previously the group at the top. In the case of White and Black America, I see no problem with this. The argument that such a mentality would only cause the same disparities we face today but flipped along the color line is too detached from reality to cause concern. What is of concern, however, is defining equity, a state of being plump with a sense of righteousness, as a condition in which black life is limited by white life. The objective of *sameness* after centuries of existence defined by *less* is merely the exchange of material in the glass ceiling for porcelain. If equity is to be set as a goal, and it is to reflect what is right, then it must represent black forward and upward mobility, unrestricted.
2. TRANSIT: Both Sides of the Coin

Introduction

"We (the transportation community) are often guilty of an obsession with doing things right in exchange for doing the right thing."

- Chris Zegras

A public transport system is an integral feature of an urban area, affecting its social and economic growth. "Public transportation planning covers a very wide research area. From the design of networks to the rostering of crews; from the evaluation of demand to transit trip assignment; from mathematical solution methods to evolutionary ones, the process of generating a public transportation system has been approached from many sides (Guihaire 2008).” In an effort to simplify things, one can think of transportation as a sum of two parts. One being related to physical mobility and the other related to everything other than physical mobility. Development, environmental impacts, land-use, policy, and cross-jurisdictional governance are just a few examples of what this 'non-mobility' aspect of transportation entails.

This chapter takes a close look at how the planning stages of public transportation systems are currently run and how they fail to promote social justice, let alone the idea of Reparations Planning. From there follows a discussion on how the specific non-mobility aspect of transit-oriented development (TOD) operates and could further contribute to the goal of Reparations Planning and racial equity within the built environment. The chapter concludes with a snapshot of the present transit conditions in Detroit; this sets the stage for the on-the-ground model implementation discussion in Chapter 4.

Ultimately while Chapter 1 spoke to why a need for reformation within the field of transit planning—specifically on behalf of Black America—exists, this second chapter speaks to which elements of the field would best facilitate this change.
2a. Transit as Mobility

"The availability, or lack, of transport shapes people's life opportunities. It determines whether a person can take advantage of education and health services, can access job markets and thus advance economically, can keep in contact with friends and family, or whether she/he can enjoy leisure and recreation facilities (Martens et al. 2012)." On the matter of how travel options shape one's 'life opportunities', this section features a discussion of the literature regarding network design, modal preference, and social-justice. This is done in an effort to paint a holistic picture of current practices within transportation planning regarding the mobility side of the coin.

Network Design

"The public transit planning process is usually divided into a sequence of five steps: (1) the design of routes, (2) the setting of frequencies, (3) the timetabling, (4) the vehicle scheduling and (5) the crew scheduling and rostering (Guihaire 2008)." While acknowledging that any transit system is a complex jigsaw of multiple moving parts, as suggested in the passage above, this section shall focus solely on 'the design of routes' (i.e. network design). The largest shortcoming of this isolation is likely in the ignoring of financial and operational constraints that would otherwise have significant influence over the effectiveness and physical form of the transit system. Especially given that transit infrastructure is most expensive when a city is big (spatially expansive) and travel demand is low, as is often the case in shrinking cities (Daganzo 2010). However, I believe that where stops and larger anchor stations are located and the series of links between them not only have the strongest influence over what economic opportunities individuals have access to, they also determine the sites of any subsequent transit oriented development and its associated externalities (which I will later argue are far more positive than they are negative, particularly in the case of Detroit). In short, it is this hand of transit design/engineering that I believe holds the greatest opportunity for reparations planning, and for this reason a focused look at current network design practices in the US is called for.

To that end, the transit network design problem involves the determination of a set of transit routes and anchors that achieve a particular desired objective. "This (transit network design) is typically formulated as an optimization problem paired with the goal of minimizing the total system cost, which is the sum of the operating costs and the generalized travel cost. A review of previous approaches to solving this problem reveals the deficiency of conventional optimization techniques (Agrawal et al. 2004)." This passage speaks to how transit network design in the US is widely handled while also opening a platform for discussion of methodological reform. In this section, I go into further detail regarding current transit network design practices specifically to highlight the egregious lack of attention paid to social justice as well as to lay a foundation for the thinking behind the design changes I propose in Chapter 4.
US metropolitan areas often make use of a trip-based or activity-based travel demand model in their efforts to design transit networks (Donnelly et al. 2010). In short, these methods use origin-destination matrices to look at where people travel to and from (trip-based) and what reasons they travel for (activity-based). From this information a logit model—or less often used linear or multiplicative model—is used to determine how a certain set of inputs will affect travel behavior (Gaudry 1978). From this determination, routes are assigned and the resulting set of possible travel patterns is assessed against a set of constraints that has to do with the systems desired objectives. In a first part, routes on the shortest path that connects a pair of terminals and serve the greatest number of origin-destination pairs are iteratively selected. In a second part, the transit network is also iteratively modified to minimize negative characteristics such as the total travel time (Guihaire 2008, Lee et al. 2005, Dantzig 1966, Whiting et al. 1960, Dijkstra 1959). Inputs such as vehicle fleet size, fuel pricing, tax policies, congestion levels, transfer penalties, population density, route length, total number of lines, and area coverage are typically considered in the network design process (Donnelly et al. 2010, Guihaire 2008, Murray et al. 1998). This computational work is handled largely by transportation engineers and planners using software such as Cube, TransCAD, Emme, Minutp, TransPlan, and Transportation Guru to name a few (Choi et al. 2000).

Some studies argue that while different cities have different transit needs and should seek to make their mobility systems as accommodating of their unique demands and constraints as possible, there are certain inputs that all network design models should feature. "Required input elements are as follows: origin-destination travel demand, distance or in-vehicle travel time on each link by mode, transit unit capacity of given mode, relative weight for waiting time compared to in-vehicle travel time, transfer penalty, and relative weight for transfer time compared to in-vehicle travel time (Lee et al. 2005, Van Nes 2002)." Here it is made clear the heavy dependence that this process has on quality data. Additionally, and with a great deal of import, within the list of ‘required’ variables is no mention of any equity stipulations along racial, socioeconomic, or even environmental lines; this is not ideal. The categorization in the minds of practitioners and politicians of racial equity, regarding opportunity access, as required would be a huge step forward. In its current position as a loose evaluation criteria racial equity can easily be paid lip-service and checked off as accounted for without much supporting evidence. In the network design reformation proposal of Chapter 4, several of these ‘required inputs’ shall be relaxed and several new, reparations-driven inputs shall be added.

As one might expect, the physical layout of a transit networks is highly dependent on the inputs it features and the objectives it aims to achieve. However, not all models begin the process with a list of inputs. Some models use simplified network structures such as rectangular (Newell 1979), polar (Van Nes 2002), and radial (Vaughan 1985) shapes are preliminary network constraints before applying the inputs discussed above. “Such (geometry-based) models attempt to derive optimum relationships of various operation-side transit system parameters such as..."
headway, route spacing, number of stops, and fare (Agrawal et al. 2004). The parameters listed above are largely cost related. So, if a transit agency has determined that finances will limit them to the creation of 16 stops, for example, they may find that headway is optimized using a rectangular structure. However, had finances been such that they could create 30 stops, headway may have been optimized using a radial structure instead. In this example, headway optimization is a desired objective and finances are a heavily weighted input in the network design process. While an emphasis on factors like 'headway, route spacing, number of stops, and fare' may encourage transit designers to turn to particular shapes, an emphasis on other factors—the likes of which shall be specified in Chapter 4—may encourage the abandonment of predetermined geometries altogether.

Regardless of how one chooses to begin the process, mobility network creation is an intricate process with many dynamic parts. And with high levels of complication tend to come many limitations. One such limitation is that "since the network configurations and their frequencies are generated by heuristics, they often do not represent an exact optimum (Lee et al. 2005)." In other words, though highly technical, transit planning is not exactly a science. While there may be best practices, there are generally no solutions in absolute. Therefore what eventually gets produced is often dictated by the largest purse, or loudest voice. Such has made transportation a highly political field in which certain groups are bound to draw the short straw—as is the nature of politics.

To add to the already discussed challenges of network design, perhaps the most difficult yet most necessary information to obtain is detailed public travel demand (Guihaire 2008, Lee et al. 2005). Origin-destination (OD) matrices are needed to define a transit routes network that satisfies as much as possible the community's demand. The information needed to create these OD matrices is generally gathered either of two ways. The first utilizes a revealed-preference (RP) method that looks at the data on where people already make trips to and from. The second utilizes a stated-preference (SP) model that gathers data on where people say they would like to go or what activities they say they need/want to partake in. Neither method is without shortcomings. One fundamental limitation common to all RP approaches is their inability to test demand for goods that do not yet exist. "Being based on choices people have already made, RP methods are inherently focused on the past, making the approach ineffectual for assessing policy or investment options not already represented in the market (Bartholomew and Ewing 2011)." Limitations of the SP model are different. "Because respondents have to only state a preference to a set of hypothetical possibilities, rather than having to make an actual choice with its attendant consequences, their responses are apt to be biased (Bartholomew and Ewing 2011)." RP models have been used more regularly than SP models. This could be because RP models use data drawn from empirically observed behavior, they have the intuitive strength of being able to demonstrate what people actually choose when they are required to prioritize competing demands for time and money (Whitehead et al. 2008).

In short—regarding the determination of travel demand—the issue with current practices is that they generally assume knowledge of all.
desired destinations (and trip origins) that will exist. This is clearly a major limitation when trying to create a transit system that will serve a demand profile that is not yet crafted both with respect to land use and population. This is particularly difficult for cities whose population is constantly in flux, that features a host of independent land use alteration projects, and whose spatial concentration of residential occupancy may be forced to shift—due to legal matters (foreclosures) or otherwise. Such is the case of Detroit.

**Differences Across Modes**

In analyzing the effectiveness of mobility, network creation methods and the physical layout of the resulting transit network are not all that play an influential role in travel behavior. The mode of transportation offered is also an important factor. In a 2002 study of the Greater Boston Area and the Washington DC Metropolitan Area aimed at analyzing mode preference using census data, the following was concluded: “There is no evident preference for rail transit over bus when quantifiable service characteristics such as travel time and cost are equal, but a bias does arise when rail travel offers a higher quality service (Ben-Akiva et al. 2002).” When taking this finding into account in an effort to determine which mode would be best suited to a new transit network in Detroit, two major concerns arise.

The first worry is with the limitation of the categorization of ‘quantifiable service characteristics.’ The study did not attempt to quantify differences in a sense of safety felt when using bus versus rail. Nor did it try its hand at accounting for riders’ preferences in racial demographic of fellow riders. Though these characteristics are not necessarily service-based characteristics, separation along racial lines and a strong desire for a sense of safety are variables that, given Detroit’s history and current social climate, may have a strong sway over mode preference and ultimately usage.

The second concern lies in the consistency with which, in practice, rail transit offers a higher level of service quality than bus transit in the US. “Rail tends to operate at higher frequencies than both suburban bus and city bus. In additional, most modern rail systems operate in exclusive rights-of-way with long station spacing. Local bus tends to operate in mixed-traffic with frequent stops. As a result, bus speeds are low compared to rail (Currie 2006).” Naturally, for the study to accurately compare the two modes and determine true preference, level of service needs to be controlled for. Again, the consistency with which quality of service is higher with rail than with bus cannot be ignored. Regardless of the reason for this finding—be it that rail transit is better funded or that it is easier to manage and regulate perhaps—its consistency suggests that rail may have structural advantages over bus that make an ‘all-else-equal’ conclusion, like the one of indiscriminate preference from the study above, incomplete and unviable.

Though rail may have bus systems beat in the category of quality of service, buses take home first prize in another important category: overall cost. “Among the different modes of public transport, bus transit
continues to take a major share owing to its flexibility and low cost of operation (Agrawal et al. 2004).” Though financing is not a focus of this piece, Detroit’s filing for bankruptcy in 2013 would suggest that construction and operational costs will play a highly influential role over all aspects of transit planning in the city’s future; mode choice not exempt.

Social Justice: At Both the Planning and Assessment Stages

Transport’s primary reason for being is to “provide access as a necessary prerequisite to fully participate in society and to fulfill life opportunities (Martens et al. 2012).” Within the realm of transport is private, highly personal transportation and public, shared transportation. All of the claims I’ve made thus far and those to come are based on the idea that individuals with a heightened capacity for private transportation—in the form of car ownership or the ability to afford cab services regularly—are best equipped to ‘fully participate in society and fulfill life opportunities’ in any urban form. Those who rely on public transportation are less well equipped to do so and therefore must be most catered to by transit systems. The level of success of this proposed catering falls, at least in part, on the shoulders of transit planners.

Observed travel behavior is largely the result of existing constraints—cost, time, or otherwise. This assertion suggests that transit network creation that uses current travel patterns as a foundational determinant of travel demand may actually reinforce the existing inequities in mobility and accessibility experienced across various demographic groups. “Transport network creation based on such demand will thus tend to recommend transport improvements that serve the rich—because they travel more and farther—rather than the poor, the strong rather than the weak (Martens 2006).” This reaffirming of existing disparities is essentially the antithesis of social-justice-based planning and certainly doesn’t lend itself well to the aims of Reparation Planning.

Regarding system assessment, though evaluations of urban form and transit systems have begun to quantify differences in levels of accessibility, “There is no clear definition, in practice or theory, of what constitutes a fair distribution of benefits from transportation investments; and no standards, goals or performance measures exist, against which agencies can measure progress or success in the distribution of transportation benefits (Martens et al. 2012).” Weak, loose, or entirely lacking standards means no accountability on the side of service providers or governing bodies to provide for their (most vulnerable) communities. As long as these factors are lacking, social justice in the field of transportation remains all bark and no bite.

Ultimately, transportation improvements inevitably lead to an uneven distribution of user benefits (Martens et al. 2012). It is precisely because of this inevitability that a non-equal distribution must be proposed explicitly. This is the ground upon which I make an argument for a distribution of transit access based on the economic advancement of black individuals. Though beyond the scope of this thesis, Martens speaks to another area of much needed research regarding social justice and transportation that I hope this and other works encourage: the setting of
measurable social justice standards against which transportation systems can be assessed, and even penalized if need be. Such standards must exist in defense of society’s most marginalized, who also make up the largest share of transit ridership in American cities.

2b. Transit as Catalyst for Development (TOD)

Transit oriented development is generally defined as “moderate to high-density residential development that also includes employment and shopping opportunities and is located within easy walking distance of a major transit stop (Parker 2002).” However, mixed-use programming and heightened mobility options are not the full picture. TOD is also thought of as a significant way of improving the effectiveness of transit as well as supporting community goals and improving overall accessibility (Cervero 2004). Furthermore, study findings articulate that TOD attracts individuals of varied socio-economic levels and for varied reasons, not limited to heightened transit access (Lund 2006). This section will explore the non-mobility based side of transit by looking at how the literature addresses effects on land use and urban form, and how mode choice renders varied development interests. The section concludes with a note of caution and a discussion of TOD’s drawbacks.

Influence Over Urban Form and Land Use

Transit-oriented development has gained currency in the US as a means of promoting smart growth, injecting vitality into declining inner-city settings, and expanding lifestyle choices (Cervero 2004). The widely promoted version of TOD involves the creation of walkable, mixed-use neighborhoods with varied structure typologies and good transit connectivity. As one might imagine, these environments appeal to an array of people: childless couples wanting to live and play all in walking distance and have easy access to work; the elderly, who wish to retain a certain level of independence without having to drive or travel great lengths for quick, necessary trips; tree-hugging students who prefer to ride their bikes on lengthier trips but enjoy close proximity to coffee shops and shoe stores and gyms; the carless; the car-averse; even the car-loving. In short, varied individuals are attracted to TOD sites for a variety of reasons.

Many of these attractions are brought about by particular combinations of programming. TOD is associated with ground floor commercial activity and is often closely paired with either office activity or a clustering of institutional structures (Dittmar and Ohland 2004). All of these land use patterns lend themselves to either job creation or heightened access to existing places of employment. Additionally, given that TOD can require zoning changes or the purchasing of land by developers at a subsidized cost, public agencies have a strong hand to play in TOD projects. This allows for increased affordable housing requirements. This is the case in Washington DC and Boston where we see instances of public housing developments making up a sizable portion of residential space within a five minute walking radius of passenger rail
stations (Cervero 2004). This particular combination of access to employment and the spatial merger of low-income housing and public transportation access is a large step forward in the direction of using transit's non-strictly mobility factors to economically advance Black America—who comprise the national gross majority of public housing residents (Rothstein 2012).

The benefits of TOD, as thus far alluded to, are not purely physically determined. TOD is not simply an assembly of buildings around transit nodes. It is also about community and neighborhoods. It is partly about building social capital—strengthening the bond between people and the places in which the live, work, socialize, and recreate (Cervero 1998). Though these are side-effects of TOD far more so than they are primary goals, and are not indisputable, they matter greatly. In shrinking cities the likes of Detroit where once vibrant neighborhoods are now freckled landscapes with unidentifiable centers and boundaries, development that contributes to placemaking and fosters a sense of community is extremely valuable.

Finally, it is worth noting that while TOD is often spoken of as a newly emerged concept within the field of planning, it borrows heavily from the past. "The transit village that came of age in the late 19th century exhibited all the characteristics modern TOD proponents describe as ideal for today, including a coherent transportation pattern that worked within each village at the pedestrian scale and multiplied efficiently throughout corridors and regions, connecting neighborhoods and suburban towns to the urban core via public transportation (Cervero 1998)." The ideals propagated by TOD have been at the core of urbanism for centuries. While the view of TOD as cutting edge may excite investors, the idea of being a guinea pig to new forms of urban intervention may make residents weary. As a result, there is much to be said for branding TOD as the practice of methods that have proven tried and true.

Ultimately, of all of the land use changes associated with TOD and the non-structure-based externalities of those changes, most important to the central topic of this work are the role played by TOD in promoting affordable housing, stimulating economic development, and revitalizing declining neighborhoods.

**Differences Across Modes**

Within the literature, much attention has been paid to the role played by factors the likes of governance, population density, and funding mechanisms in the outcomes of TOD projects. Conversely, far less discussion regarding TOD outcomes has centered on the power of mode choice of the transit network upon the bones of which projects are built. Though the networks discussed in the following section are intended to be far more explorative than prescriptive, it is worth noting that different modes (though run along identical networks) may render different outcomes with respect to resulting TOD in Detroit. The strengths and challenges of rail-based transit oriented development (RTOD) versus those of bus-based transit oriented development (BTOD) are explored here. Note that here BTOD generally includes BRT, but BRT is
categorized separately when it renders different outcomes on development than is argued in the case of regular bus systems.

"Developers and home buyers alike seem to be attracted to the permanence of rail transit (Currie 2006)." A heightened sense of permanence of the network that serves as the foundation of investment may provide interested parties with a stronger sense of security. This would encourage risk averse players to make investment moves, and without investment in development land use and programming at the sites of transit stations go un-optimized. That said, it is important to note that perception of rail's permanence may be more influential than reality in this case as numerous streetcar systems in the US have been removed—particularly in the era immediately following WWII—while many bus routes in cities such as Chicago have remained unchanged for almost a century.

Additionally, the notions of bright, shiny, and new may have strong influence over whether developers invest in an area or not. "The newness of rail investments was cited by the Chicago Department of Transportation as being a factor that provided an advantage over bus in attracting TOD (Currie 2006)." This is one of the differences in outcome in which BRT may align more closely with RTOD than BTOD as it too has an element of physical newness.

On a related note, Currie cites the lack of a long-standing track record of BTOD in the US as a disadvantage when compared to RTOD with respect to igniting developer interest. Only 8 percent of the TOD initiatives identified in the US, as of 2004, were bus transit oriented developments (Cervero 2004). This lack of knowledge of the possible successes of BTOD is such a strong hindrance to investment that Currie concludes with the following call to planners: "Given the prevalence of bus networks in US cities of varied sizes, there is a need to build knowledge and gain and share experiences to better develop, learn, and sell the potential benefits of BTOD to the community and the transit and urban development industry (Currie 2006)."

With respect specifically to size of resulting investment, rather than the absolute metric of some investment versus none, Currie has found the following: in the US "...rail is more closely related to high-density/large-scale development and bus with low density/small-scale development (Currie 2006)." In the case of Detroit, one ought to be weary of giving in to the assumption that bigger (investment scale) is bigger. The physical urban layout of Detroit, given its sparse population distribution, may be more reasonably compared to a suburban typology than what is generally meant when discussing urban built environments. Given this smaller scale of residential density, BTOD, though inciting 'smaller-scale development,' may be an attractive option in cases where communities do not wish to attract high densities.

In further expression of the features more commonly associated with buses than rail that would likely detract from the success of TOD, Currie argues that, "Buses are less attractive than rail from an environmental, street quality, and amenity viewpoint." Noise and fume emission are deterrents of home buyers and are also more common features of bus than rail transit. Furthermore, "A potential disadvantage of
BTOD is that it is difficult to concentrate development activity around the large number of bus stops in cities compared to the small number of rail stops (Currie 2006). This creates a platform for the proposal of a system that integrates both bus and rail modes in a single, comprehensive systems in which buses serve as tributaries to rail stations. These rail stations would then serve as the principle sites of TOD. This model is not without its own set of shortcomings, however. In particular, it encourages, if not requires, a heightened number of mode switches; a travel behavior with well documented disutility to riders (Agrawal et al. 2004, Guihaire 2008, Cervero 2004, Daganzo 2010).

On the matter of creation of employment opportunity, which is a positive side-effect of TOD, a review of TOD in the US (Cervero 2004) has found that only three percent of transit agencies engaged in BTOD had full-time staff to run BTOD programs. The proportion of rail agencies was 42 percent. While this finding does not speak to the difference in total number of individuals employed by BTOD versus RTOD systems, it does suggest that jobs created by RTOD have a heightened level of security and access to benefits. This also doesn’t speak to the difference in skillsets employed within the different system typologies. For example, rail may employ more engineers and managerial staff while buses employ more drivers. If such discrepancies were found to be consistent, this should play a role in which system Detroit deploys given it’s unemployment rate well above the national rate and high concentration of blue collar workers (as previously discussed).

There are several arguments to be made in support of BTOD in the specific form of BRT-based TOD. "BRT systems are more cost-effective to build and operate than light rail (US General Accounting Office 2001)." Additionally, both Currie and Cervero argue that BRT is not plighted by the same stigma as local buses; it does not have the image of being a second-class mode of travel strictly for the poor and racial minorities. As a result, BRT can attract ridership from more affluent residents of all races. This too is associated with higher levels of developer investment. Furthermore, BRT reaches optimal levels of service in cases where stations are comparatively far apart (Byron and Conte 2013). This is ideal in the case of Detroit where the city’s population is spread wide and thin with extensive patches of vacant land. Similarly well suited to Detroit is the use of right-of-way lanes in BRT systems. Detroit hosts more roadway infrastructure than it has private vehicles to fill. New lanes for BRT would most likely not need to be constructed. Rather designation of exiting lanes would do little to raise congestion to worrisome levels as even tertiary tier side-streets in the city are generally two lanes in both directions.

Though not without its challenges—requiring wide roadway infrastructure and "careful design of civic spaces that do not pose barriers for pedestrians and cyclists (Zegras et al. 2016)—for the many reasons listed above, BRT may be Detroit’s best bet with respect to meeting the mobility needs of its current transit riders and inciting new transit-oriented development. Therefore, the transit network developed in Chapters 4 and 5 is to be interpreted as that of a right-of-way BRT system.
Not All That Glimmers is Gold

"By helping to cluster development at station nodes and along rail corridors, investments in rail mass transit will discourage low-density suburban sprawl, promote open-space preservation, reduce development pressure on the natural environment, and make better use of existing infrastructure (Landis et al. 1994)." This list—though specifically discussing rail, is not exclusive to that mode—highlights a few of the non-mobility specific benefits that can accompany TOD. Unfortunately, not all of the externalities associated with TOD are positive. The changes in property values within walking distance of stations often cause displacement of lower-income communities. For renters, lacking price ceilings coupled with heightened investment and changing urban form can quickly result in being priced out. For homeowners, these changes can mean a large cash-in when they chose to sell their appreciated property.

Those who cash-in and those who get priced out, as one might imagine, tend to be divided across several easily recognizable demographic lines. The most noteworthy being race and socio-economic tier. While patterns of neighborhood change spurred by transit implementation vary, the most predominant pattern is on in which housing becomes more expensive, neighborhood residents take on a profile of increased wealth, and the neighborhood population becomes proportionately more white (Pollack et al. 2010, Kahn 2007). However, the extent to which these effects are realized on the ground depends largely on the nature of the resident stock in transit-rich neighborhoods. By that it is meant that areas with higher percentages of renters see the most significant manifestation of these effects. Whereas neighborhoods with high amounts of property ownership are generally less affected (Kahn 2007). Neighborhoods most likely to experience these changes are those in which renters dominate and the population is, by nature of their occupation, transient. "Neighborhoods that host students, and therefore are constantly experiencing tenant turnover, are most vulnerable to transit-triggered gentrification (Kahn 2007)." This is to be expected in the absence of housing market regulation in the form of rent ceilings, for example.

That said, findings on the capitalization of TOD effects into property values are not unanimous. Some studies find that in the case of TOD, areas immediately surrounding transit access points suffer property value depreciation—due to factors such as pollution and noise—while land just beyond this immediate ring sees varying levels of property value appreciation (Bartholomew and Ewing 2011, Landis et al. 1994). Others find that the effects on property values in cases of TOD using bus systems, versus other modes, are uniformly insignificant (Hess and Almeida 2007). Ultimately, while displacement—be it caused by construction or market price effects—is a likely and terrible associate of TOD, it is by no means guaranteed (Rayle 2015).

A further discussion of what one might expect to see in the specific case of Detroit regarding TOD-caused displacement is featured in Chapter 4.
2c. Transit Specific to Detroit

Mobility, travel behavior, and transit-related policy are by no means uniform from state to state or even across neighboring cities. As a result, it is important to address the case-specific condition of mobility that presently exists in Detroit. This section discusses current mobility construction projects, an assessment of the current mass transit system, transit rider testimonials, and connectivity of the larger metropolitan area. These elements contribute to both contextual clarity, a baseline for later comparison, and the claim of a need for system reform.

Transit Development Currently Underway

“The improvement of the link between a well-to-do suburb and a large employment area will virtually always perform better in a cost-benefit analysis than an improvement in the transport link between a disadvantaged neighborhood and the same employment area (Hodge 1995).” This argument, in the case of Detroit, would suggest that through typical methods of network design based on cost-benefit analysis, the link between downtown and the city’s surrounding suburbs would be prioritized. This is precisely what we are seeing with the soon-to-be completed rail connection between Royal Oak, a suburb just north of the city, and Downtown along Woodward Ave.

It is difficult to not perceive this provision of a corridor of convenience and modal optionality between the two wealthiest and whitest neighborhoods of the city—and its immediate neighboring areas—as a statement of who the city values most and sees as the key to any future prosperity. From a financial standpoint, this choice of placement for the rail line is difficult to argue with. Residents of both Downtown and Royal Oak have household sizes of two or less, high education attainment profiles, and particularly low levels of unemployment (US Census Bureau). Furthermore, Royal Oak is a favorite leisure activity hub of the yuppie class while Downtown is this same demographic group’s source of nightlife entertainment and office space. Thus, from a ridership-attraction viewpoint, the connection makes sense.

That being said, one struggles to envision a more blatant shrug of dismissal to residents of Detroit who do not have direct access to this mobility asset—particularly because no extension plan of the rail network beyond the Woodward line has been proposed. And what socioeconomic and demographic features characterize these non-benefitting residents? The answer is painfully easy to anticipate. Radiating outward from Downtown and away from Woodward the city’s population is (generally speaking) increasingly black, increasingly unemployed, evermore close to the poverty line, and increasingly indicative of the city’s population majority (US Census Bureau). These are the residents who would gain the most in marginal utility of modal optionality and improved access to job and joy hubs. Unfortunately, the residents of Royal Oak and Downtown are most likely to spend capital at the two sites, and assumingly along Woodward. The risk and loses of investment thus are lower for the rail provider along this corridor than along any other.
Note that making it possible for those with money to spend, and therefore invest, in the city such that some of that capital can be used to provide services for those in need is an undertaking worth supporting. However, there is lacking evidence to suggest that a plan for (explicit) systematic reinvestment in the city's black neighborhoods—the population gross majority, you'll remember—is in place. Because of this policy void, the rail line comes across more so as a gift to the haves than a mechanism by which to provide in other avenues for the have-nots.

So while current transit development in Detroit makes clear statements about who the city wishes to attract and plans to provide infrastructure for, the rest of the city is dependent on the existing transportation services. With no foreseeable major adjustments underway, the quality of these services is extremely important. It plays an influential role over people's travel behavior and, as previously stressed, their 'life opportunities'. As a result, an assessment of these services is undertaken in the following two sections.

Assessing Existing Mobility Services: The Numbers

A city that was once able to call itself the home of the largest municipally owned street railway system (Felton 2014), Detroit now relies on bus travel as its only means of public transit. The citywide bus system, provided by the Detroit Department of Transportation (DDOT), is comprised of three dozen routes, hosts an average weekday daily ridership of 106,000 people, and features major routes reporting headways of 20 minutes (DDOT 2016). This network is supplemented by the Suburban Mobility Authority for Regional Transportation (SMART) bus network. The SMART network moves 35,000 average weekday daily riders across a total of 43 routes (Felton 2014). Buses generally run from 4:30am to midnight; slightly shorter service windows exist on the weekends and across different routes with just a handful of 24 hour service routes down major thoroughfares (DDOT 2016).

Intended service levels of these bus systems, touched upon in the reported headways and hours of operation above, do not align with those experienced on the ground. In September of 2015 alone, 206 scheduled bus routes went unaccounted for (DDOT 2016); they never ran their intended routes, met none of their scheduled arrivals, and left their constituents unserved. I myself experienced headways of up to 55 minutes on routes that the DDOT claims are scheduled at 20 minute intervals. "It's an unfortunate reality for the residents of roughly 80,000 households in Detroit, of which 90 percent are black, who have no access to an automobile (Felton 2014)." Given the lack of walkable neighborhoods in the city, the opportunities for these individuals to actively partake in society are extremely limited to begin with, and a public mobility system that is unreliable only worsens that.

The tragic history of Detroit’s public mobility infrastructure is well summarized in the following passage: “The city’s extensive streetcar system halted operations in April 1956, and was dismantled within the following decade. The web of privately owned bus systems across the region dissolved soon after. The commuter rails that had
connected Detroit, Ann Arbor and Pontiac were discontinued in the '80s. Today, Detroit is basically left with two disconnected bus systems that generate more headaches than on-time transfers or speedy rides (Felton 2014)."

**Assessing Existing Mobility Services: The Experience**

Figure 1. Data Source: Data Driven Detroit

![DDOT Bus Stops](image)

Though the map of the DDOT network (see Figure 1) would lead one to believe that coverage of the city of very well accounted for by the existing system, riders will tell you that while a picture can tell 1000 words, nothing requires that those 1000 words reflect truth. While conducting interviews regarding housing tenure of residents throughout Detroit, I asked members of 200 households to indulg my seemingly tangential interest in mobility and voice their general opinions of the bus service provided by the city. These testimonies are from users of the system and shed further light on the condition of public transportation services in Detroit. They are included here in an effort to paint a more holistic picture of Detroit's transit profile than is provided by the quantitative data alone.

Several of these testimonies were particularly informative:

"In metro Detroit, public transportation is a bunk concept; most riders, with no hesitation, will offer a similar refrain when asked their opinion: They hate it. It's a sick joke." – Krysta Pate, employee of the City.

"If I need to go from Downtown to my job at Costco in Livonia, I need to budget two hours. In a car that trip only takes 15 minutes. And, I don't even know that the bus will come! That's ridiculous." – Rodney Hall, life-long Detroit resident.
“They know that many of us work extended hours and night shifts. We need overnight service. Closing before midnight is unacceptable. We need to work.” –Michelle Thomas, hospice worker.

These testimonies make clear a need for extensive system improvement, if not complete overhaul. Given just how poorly the existing system is viewed by Detroit residents—not one of 200 conversations I had regarding public transit features positive reflections—the network reformation proposed in Chapter 4 shall be carried out as if the existing system does not exist. In the sense that reliable service in smaller quantity is better than extensive coverage of an unreliable service, the proposed model of section’s to come should be viewed as coming into a city with no existing public transit, or as a wholesale replacement system.

The Metropolitan Area

Figure 2. Data Source: Data Driven Detroit

“Ask that question — *why is public transportation here so unreliable?* — and the finger-pointing begins: It’s the transit planners; there’s never enough funding; there’s not enough interest from the public. But the most frequent citing of blame is the divide between the suburbs and Detroit; this divide has made a reliable, comprehensive system near-impossible (Felton 2014).”
Figure 2 speaks volumes to the suburb-city divide identified in the passage above as being a hindrance to a successful system. The SMART routes do very little to provide service within the city; they essentially collect suburbanites and funnel them into Downtown along major thoroughfares. There clearly exists the potential, especially in the city’s northeastern region—currently avoided entirely by the SMART routes, for service collaboration between the larger, more updated buses of the SMART fleet and the DDOT fleet. The call for such collaborative efforts suggest a necessary look at regional transportation planning in the area.

While the Southeast Michigan Council of Governments—the MPO that governs Detroit—released a regional transit improvement plan in 2001 to be built out by 2020 that featured 12 corridors of rapid transit (Figure 3), their 2040 Regional Transportation Plan released in 2013 makes no mention of these recommended corridors. Neither does it make mention of operational improvements to the existing public transit system of Detroit. Nor does it suggest merger of the DDOT and SMART networks. It lays out a plan for the improvement of roadway quality and information access, above all else.

Figure 3. Image Source: SEMCOG 2010 Transit Proposal

This disconnect between regional transit provision and the specific mobility needs of Detroiter’s currently not being well met by the DDOT is in part why the scale of network design reformation explored here shall focus solely on Detroit and not it’s entire Greater Metropolitan area.
In addition to an exploration of maps, the numbers are also useful for staging a comparison between the travel behavior of Detroiter and that of residents of surrounding areas. The table below depicts mobility information regarding the journey to work of individuals who both live and work in Detroit against the same journey made by individuals who both live and work in the rest of Wayne County (excluding the city of Detroit). Note that this data is imperfect in that it only speaks to travel behavior of those employed outside of their homes. Detroit has a particularly large unemployed population that this does not account for. The comparison is useful nonetheless. *See Figure A3 in Appendix for county map.*

### Table 1: Mobility in Detroit Compared to the Rest of Wayne County

<table>
<thead>
<tr>
<th>Travel Mode</th>
<th>Detroit Mode share</th>
<th>Wayne County Mode share</th>
<th>Commute to Work In minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>5%</td>
<td>2%</td>
<td>11</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0.4%</td>
<td>0.3%</td>
<td>22</td>
</tr>
<tr>
<td>Bus</td>
<td>10%</td>
<td>1.5%</td>
<td>30</td>
</tr>
<tr>
<td>Shared Vehicle</td>
<td>11%</td>
<td>9%</td>
<td>40</td>
</tr>
<tr>
<td>Personal Vehicle</td>
<td>66%</td>
<td>84%</td>
<td>51</td>
</tr>
</tbody>
</table>

Data Source: CTPP 2006-2010

Most noteworthy from the table above is the difference in bus mode share between Detroit and the rest of the county—a county that is majority white and majority suburban. In short, whether by choice or due to dependence, Detroiter ride the bus much more than their neighbors. This speaks to the need to look at public mobility services offered specifically within the city and not to treat the entire region as a single unit.
3. DETROIT: Providing Context

Introduction

Founded as a French fort on the Detroit River in 1701, Detroit grew into a hub of the global auto industry hosting a peak population of 1.8 million in 1950 (US Census Bureau). From that point forth however, driven by the steady decline of the very same industry that propelled the city to its mid-century prosperity, Detroit has experienced 50% population loss (US Census Bureau). The city’s 1967 race riots—the result of decades of unmitigated police brutality, separate and drastically unequal housing and schools, and ever-increasing post-war black unemployment—apart from resulting in roughly 50 deaths and 7000 arrests, rendered approximately 2500 business establishments looted and a property damage valuation of $32 million (Thernstrom and Thernstrom 1999). The city burned for five days, but the effects of the country’s largest urban uprising of the decade (a title that would hold until the assassination of Dr. Martin Luther King Jr. the following year) would weigh on Detroit for the next four decades (Thernstrom and Thernstrom 1999). Many cite the 1967 riot as the catalyst for extensive white flight from the city; evidence of which is tangible when looking at population maps delineated by race, in which the city’s population is almost exclusively black and surrounding suburbs almost exclusively white (with the exception of Dearborn, a suburb to the city’s immediate west with a large Middle Eastern population).

Unable to financially stabilize itself amidst rapid population loss and structure degradation, Detroit became the largest US city ever to declare bankruptcy in July of 2013 citing over $10 billion in unpayable debt (Bomey 2013). While some thought this a depth of the well that Detroit could not possibly recover from, in November of 2014 federal bankruptcy Judge Steven Rhodes “gave a green light for Detroit’s government to cut more than $7 billion in unsecured liabilities and pour $1.4 billion over 10 years into basic services to rehabilitate the city reeling from a decades-long population exodus, disinvestment, and cash drain (Dolan 2015).” Since this ruling, the Mayor’s Office has demolition roughly 20,000 abandoned, unsafe properties and increased the city’s resource-strapped police force by 30% (Data Driven Detroit).

The haste with which reinvestment seems to be happening gives cause for optimism. That said, in looking forward, questions remains. Where else shall the city prioritize the utilization of these funds, who will get the short end of the stick, and will this reinvestment strategy actually provide a renewed sense, be it however slight, of stability.

This chapter is not designed to provide an extensive history of Detroit. Nor is it intended to be a space for future projection. Rather, its central aim is to contextualize; to briefly describe the current condition of the city outside of its transportation and racial profiles—which are each given specific attention in their respective sections elsewhere in this piece. This context forms the basis upon which the transit network design reformation operationalized in Chapter 4 and assessed in Chapter 5 is built.
3a. Understanding a City: Exploration Through Maps

Given that the nature of the beast that this exploration is attempting to tackle, namely opportunity access distribution, is a highly spatialized matter, a geographical understanding of the city provides much useful orientation. This section offers a visualization of particular governance boundaries, and neighborhood identifiers that will be referred to throughout this piece. Additionally, the city's lacking population density and plentiful sites of abandoned structures, two urban characteristics by which Detroit is both plagued and frequently defined, are visualized. This is done largely in an attempt to make clear the non-uniformity in Detroit's urban scape and on-the-ground experience. (Note that the white spaces in the city's center are two different micro-cities; Hamtramck to the northwest and Highland Park to the southeast. Both are entirely separately political entities from Detroit.)

Figure 4. Data Source: Data Driven Detroit
Figure 5. Data Source: Data Driven Detroit and US Census Bureau

Population Density

Unemployment

Undeveloped Plots
Interpreting Data Visualization

The largest sources of value of the maps representing the city districts and several neighborhoods in the southern hemisphere of the city are in geographical orientation. I will make reference to several of the districts and areas of interest labeled above throughout this piece; these maps hopefully aid in spatial familiarization.

The population density representation provides an idea of the sparseness of Detroit’s current population (688,700) against its vast physical footprint (143 sq. mi). It also provides a basis for assumptions about the city’s urban form. While a few—just shy of ten—census block groups host populations between 8000 and 11,000 people per square mile, the city averages a population density of 4,760 people per square mile. To put form to numbers, Manhattan’s skyscraper littered urban scape hosts a population density of 66,940 people per square mile, the row-house typology loving Philadelphia—a city victim to similarly post-industrial fall out—house 11,234 people per square mile, Detroit’s neighbor to the west, Chicago—ranging widely in housing typology—has a population density of 11,868, and St. Louis—a city that is troubled by much of the same negative stigma as Detroit, similar white flight, economic decline, and attempts at patches of densification—features a population density comparable to that of Detroit at 4824 people per square mile (US Census Bureau).

Detroit’s housing stock is overwhelmingly single family detached homes. This housing typology does not cater well to high levels of density. That, in combination with property abandonment and structure demolition, forms the foundation of a city in which it is not uncommon to find a single family living alone on an entire city block. The only neighborhood in Detroit with skyscraper structure typologies is Downtown, and most of these structures either lay vacant or house offices. As a result, though the building stock would suggest high density in this area, the residential population, as the map shows, sits below the average.

Most noteworthy when looking at the map of unemployment is the magnitude to which the legend extends. Plentiful are the number of census block groups that house populations defined by over 25% unemployment. To place this in context, the national unemployment rate in January of 2015 (the same month that corresponds to the data visualized in the maps) was 5.7% (Bureau of Labor Statistics). Detroit’s most dire areas are experiencing five times that. This further supports the need for action toward creation and provision of economic opportunities for the residents of Detroit. (Census block groups that are white are missing employment data.)

The visualization of naked parcels provides a spatial understanding of where within the city’s limits undeveloped land is situated. Many of these parcels are the result of burnt down structures or demolition efforts of blighted properties by the City. “Demolition of unnecessary structures may not have been irrational, but it also did not constitute a vision of what shrinking neighborhoods could be in the future (Ryan 2012, 185).” The future development of these sites shall be discussed in Chapter 4 and accompanying transit development patterns shall be modeled in Chapter 5.
Figure 6. Data Source: Data Driven Detroit and US Census Bureau

- **Percent Black**
- **Average Household Income**
- **Land Use**
An examination of the visualization of just how black the population of Detroit is and where black communities are situated reveals two points of particular interest. The first is that from the plane of Belle Isle and northward throughout the city, the black population is rather evenly dispersed and ranges between 70 and 100 percent of the population. The second is the comparative dearth of black individuals in the southwest of the city, with the exception of a small area at the city's southern most tip. This part of Detroit is home to the highest concentration of Latino residents in the city.

As of 2015, the poverty line in the US was defined as a household of two individuals living on a shared income of less than $16,000 (US Census Bureau). Keeping this number in mind in combination with the knowledge that the average household size in Detroit is currently more than 2 people per household, the map of average household income is shocking. Many of Detroit's households are evidently living on less than $17,500 and the majority of the city is living on less than $30,000 a year. One does notice a higher concentration of wealth in the Downtown neighborhood and the Jefferson Corridor. A wealth patch also appears in the central west of the city. It is worth noting that this area, mostly falling within the Bagley neighborhood, sits close to two universities and has the commercial corridor of Grand River Ave. running through it. These factors may have contributed over time to the site's retention of comparative wealth. Also of interest is the patch of rare wealth uniformity in the city's southwest. Though not at the spectrum's top, this area hosts a more consistent wealth profile than much of the rest of the city. This hints, if only slightly, at stability of the neighborhood. This may be associated with low resident turnover rates and low levels of property abandonment.

What jumps out the most from the land use visualization is the lack of commercial parcels, the concentration of industrial parcels along the city's riverfront, and the large swaths of uninterrupted residential urban scape particularly in the northern half of the city. The map gives weight to the claim that Detroit is a mono-centric city. It also, by way of the large industrial parcels, allows one to anticipates areas that have likely seen the greatest change in population and prosperity. It is fair to assume that when the industrial machine was thriving, areas surrounding these industrial parcels may have housed workers and stable communities. Today, they are the likely site of the greatest property abandonment.

3b. A Picture Painted in Words

Looking through literature on Detroit, one is more often than not flooded with imagery of extremism. The city is typically described from the view point of one of two poles. The uninviting, generally negative pole tends to focus on socio-economic statistics and structural ruins. These images lend themselves to a sense of doom and desperation for a city fighting to stay afloat. The positive, potentially romanticized pole tends to focus on the human stock of the city. As is often the case in difficult physical settings, Detroiter tend to be generalized as kind, smiley, Midwest-types. This description says next to nothing of agency,
organization, or action. In an effort to bring to light some of this polarity and explore further how the city is perceived, this section will look at how people have described Detroit when compelled to put pen to paper.

**A Dismal Portrayal**

Shrinking cities are often spoken of in ways that directly oppose the branding that the United States has thrived on for centuries (irrespective of its validity, or lack thereof): The Land of Opportunity. Detroit is, more often than not, spoken of with respect to its limitations and ailments. "Social needs in these (shrinking) cities' distressed neighborhoods are great, but the market is unable to provide for these needs. Market-driven urbanism has left most shrinking cities behind (Ryan 2012, p35)." This portrayal of Detroit as a place of great need and few resources/tools with which to serve this great need paints the image of a place absent of hope.

There are also the descriptions of Detroit that take on an apocalyptic tone. "It is hard not to think of Detroit as a ghost town. There is no power, the buildings crumble, the roads are choked with weeds, and the trees grow from the buildings. It's a visible representation of the destruction of civilization. In the absence of the imposed order of humankind, nature reasserts its hold and steadily takes back the space and the only thing you find on the streets is trouble (Ravenscroft 2013)." Passages the likes of this one are just a crew of zombies shy of describing the set of a sci-fi piece. And this passage is not an anomaly in its harsh, somewhat fright inducing imagery. "It (Detroit) is a fearsome-looking place, neighborhoods that appear to be the victims of a sadistic aerial bombardment (Chafets 1991, p23-24)." Rhetoric associated with violence, shadows, and danger is something that Detroiters have been forced to grow accustomed to.

**Praise for the Motor City**

Fortunately, Detroiters have not given in to the perception held of their city by those with a taste for the apocalyptic. "Ghetto ain't nuttin' but a word. The existence of a Black urban space—one that can be defined as positive on the inside (Wilkins 2007, p115)," not just negative from the outside. This misalignment of views from the outside (non-Detroiters) versus those from within is evident in the case of Detroit. Parts of the city are very much alive with children riding bikes in the street and drawing with chalk on the sidewalks, young, tattooed professionals spending Saturday afternoons outdoors in beer gardens, couples lip-locked along the Riverwalk, family barbeques on Belle Isle, and the revolving doors at the several institutes of contemporary art in constant rotation. Phrasing claiming Detroit pride are seen on murals, t-shirts, and bumper stickers across the city. Blight and all, Detroiters are proud to be so. Detroit is not merely the wasteland that outsiders and media outlets paint it to be. There is much worth salvaging and supporting in this once majestic urbania.

One of the elements of life in Detroit that deserves to have its praises sung is the population that call the city home. "Detroit may have lost a significant chunk of its population, but many of the people who are
left are doing something. That concentration of creators and doers creates an energy so powerful that it seems to settle in and rest on your shoulders (Lorimer 2012). A people with this spirit of creation and motion, paired with gorgeous parks, barbeque worth a several hour drive, artisanal coffee at an every-man’s price, farmer’s markets open every day of the week, a wide array of Middle Eastern cuisine, art on every corner ranging from Frida Kahlo exhibits to shoes stapled to the sides of houses, and diehard local sports fandom cast a brilliantly radiant light on Detroit for those who look long enough to see beyond the missing street lights and shattered windows (Lawrence 2016).

One field that has consistently recognized how extraordinary a place Detroit is is that of architecture. The Detroit skyline has been contributed to by many famous architects across the ages. Daniel Burnham of the Burnham Chicago Plan, Marcus Burrowes, C. Howard Crane—the legendary theater designer, George D. Mason—who designed the world’s largest Masonic temple in Detroit, Albert Kahn, Wirt C. Rowland, Louis Kamper, Gordon Lloyd, and Minoru Yamasaki—designer of New York’s World Trade Center all have prominent structures in Detroit. Further appreciation for the architectural grandeur of Detroit is evident in the selection of the Motor City as the focus of the American Pavilion for the 2016 Venice Biennale, the world’s premier exhibition of architectural innovation.

**Future Development**

Though Detroit has emerged from its 2013 state of bankruptcy and public dollars are being spent on vacant property deconstruction and renewal of the riverfront, the city’s real estate market is still very much in tatters and worry remains as to what role, if any, the powerful private sector will choose to play in shaping Detroit’s future urban form. “Unfortunately, many areas of shrinking cities have such low property values that any private construction, even with substantial public subsidies, is uneconomic (Ryan 2012, p35).” Ryan’s statement suggests that a fear of absent private investment is not unwarranted for a city the likes of Detroit.

That said, Detroit is not uniformly doomed to entirely relying on the public sector. “A dozen or more construction projects now underway will add more than 1000 new apartments to the city this year. The new construction represents the latest wave in what promises to be a flood of new residential projects to Downtown, Midtown, Corktown, and other nearby areas (Gallagher 2016).” These cases of proven private sector investment are, generally speaking, cause for optimism. However, this influx of private investment is not experienced citywide. It is important to note that these three neighborhoods host the city’s highest concentration of white residents. Midtown is largely comprised of students, Downtown houses bankers, brokers, and other luxury building craving professionals, and Corktown is home to maker spaces, vegan restaurants, yoga studios, local brewing companies. Living largely in households of two or three adults, these neighborhoods are generally void of children, all border one
another, and account for over half of the entire city's wealth (Data Driven Detroit).

Appreciation in these yuppie havens is further evince by the finding that since 2014, landlords have been able to raise rent as much at 15% in the Brush Park district, 14% in New Center, and 10% in the areas surrounding Wayne State and Detroit Medical Center (Gallagher 2016).

3c. My Home: In My Own Words

How better to learn of a place then from those who call it home. Over the course of the three month stint in which I too called Detroit home during the summer of 2015, I had many conversations with neighbors, store owners, community meeting attendees, and strangers. At some point during these conversation, I always made sure to inquire as to how the Detroiters I met felt about their own city. As to be expected, I received highly varied responses. Below are a few of those which I was granted permission to record.

The Feed Up

Cheryl James, a community meeting attendee of District 3, had the following complaint when asked to reflect upon how well she felt her city provided for her and met her basic, daily needs: "I can't rely on water and electricity, even though I pay my bills! And I have been inquiring about getting the lawns around my property trimmed for months. That brush is taller than me. And I always get the same answer, 'Your request is on the list and we will get to it as soon as we can. We have hundreds of lawn maintenance requests so please give us time.' Public services just are not what they should be here." Cheryl James is not alone in this sentiment. Many residents at the community meetings of Districts 3, 4 and 6—I was unfortunately unable to attend similar meetings of Districts 1, 2, 5 and 7—probed the Mayor on similar matters of unacceptable poor public service ranging from police response time to trash collection.

Katherine Morris, a self-employed mother of three children all below the age of ten, moved quickly to the issue of drugs in her community during our conversation of topics the likes of community leadership, where to get the best seafood, and her husbands snoring; "I wish it weren't true but some of the abandoned houses in my neighborhood have been turned into crack houses. I know that the police have been cracking down on this problem lately, but our children are not well protected from drugs and violence. The problem is the buildings. My daughter's school has burnt down houses right next to it. I know the kids play in them. They are not safe." Unfortunately, her statement gives some validity to the casting of Detroit as a crime laden, drug infested land of squatter-claimed structures.

Kevin Wright is an aspiring music producer. He plays five instruments, graduated from Wayne State University, and bought the house next to his childhood home—where his mother still lives—a few years back. He and I got to chatting about travelling while waiting in line for funnel cake at Detroit's Pride parade. He had the following to say: "I
would leave Detroit tomorrow! The problem is my mother refuses to leave and I can't sleep knowing that I left her here alone. But real-talk the weather is terrible, healthy living is expensive, and other than Downtown the city is dead at night.” Kevin’s feelings, I found, are shared by many Detroit residents in their mid-twenties. Many of these individuals are disappointed that Detroit does not have many of the nightlife and leisure opportunities associated with other cosmopolitan areas.

The Proud

In contrast to the reflections that fall short of positive, I engaged many Detroiter who couldn’t stop singing praises for the Motor City. “What a lot of people don’t know is that we have a thriving arts community. Music, street art, metal work, you name it!” This was told to me by Jessica Rahim, a high school teacher who spends her Tuesday nights in jazz dives and her weekends at the local artisan booths at Eastern Market—Detroit’s notorious seven-day-a-week flea market. Detroit’s musical history is legendary; housing the famous Motown Records label and producing several Grammy award winning artists. Far less well known, however, is the current music scene. The city hosts several active jazz clubs, a slew of afterhours open-mic performance spaces, and is still a consistent stop for touring artists both in the Midwest and nationally.

Two of the most commonly expressed sources of pride for the city were its cuisine and neighborly feel. “You might take a day trip to Chicago for some fun, but I bet you gon’ rush back to be home for dinner. Detroit’s the best eating in the Midwest,” said Tyson Bell; who claims his ribs give Slow’s—Detroit most famous barbecue restaurant—a run for its money. Kayla Jackson felt similarly to Bell and raved about the variety, price range, and quality of dining options in Detroit. In addition to praising the food, Jackson said the following that I found particularly telling of the feel of everyday life in Detroit: “I can’t think of anywhere else that you get a mega-city backdrop and a small town feel. That’s it really… it’s a town. Not a city city. Here, you feel like you know people and people know you. You matter. You’re not just a tiny, replaceable piece because Detroit needs you. I love it here.” I too began to feel this town-like scale. I just three months I had hosted my neighbors for dinner four times, gotten on a first name basis with the barista at my neighborhood café, and had a regular order at Tony’s (a bar near New Center) that always managed to find its way to my table before my coat hit the back of my chair. Such feats took two years in Washington DC, and five in Boston.

I was surprised to hear such a consistent do or die self-description from the Detroit residents I met. It mirror that of New Yorkers more so than any other population I’ve personally ever interacted with. “Detroiter are unique people. You can tell a Detroiter a mile away. We’re resilient. We’re tough. You drop us in the desert, we’re sure to find water,” said Amira Dawson with a smile on her face that left no question in my mind that she was proud to be from Detroit. Her sentiment was further supported by common t-shirt slogans that I can into contact with that read the likes of ‘Not just anyone can be from Detroit’, ‘Detroit Strong’, and ‘Proud Import of Detroit’.
Of all of the many warm reflections I was made privy to while in Detroit, one stood out to me as acutely self-aware and unintentionally poetic without being overly romanticized. Efe Bess, as he took a ten minute break from the nine drums he was playing on Cass Ave. outside of Avalon Bakery for a few sips of lemonade he made the following statement: “Detroit ain’t ever gonna beg you. It ain’t gon’ beg you to come to the rescue, ain’t gon’ beg you to extend your visit and stay. You ain’t gon’ find no outstretched palms here. What you will find are open arms, and smiling faces, and a spare shovel. We’re happy to have you, but you gon earn ya keep.” Now, months later, in reflecting on my time there I find this description of the city most truthful, and unexpectedly inviting.
4. OPERATIONALIZING REFORMATION

Introduction

"You're either part of the solution or part of the problem."

-Eldridge Cleaver

The aim of transit route network design is to determine a configuration of links and anchors that achieves a certain desired objective, subject to a set of constraints (Agrawal et al. 2004). It is the scope of these desired objectives and constraints that I seek to expand to include a social justice element in the form of a Reparations-based approach to accessibility of economic opportunity. I attempt to achieve this by creating two different network design models while remaining cognizant that from a user perspective, a transit network should cover a large service area, offer numerous direct-through trips, hardly deviate from shortest paths, and should globally be able to meet travel demand (Guihaire 2008).

Additionally, it goes without saying that factors like vehicle capacity, timetabling, and fleet size will effect the quality of service along the network. These are elements that transit planners and engineers absolutely must concern themselves with. However, this study aims to experiment with how a different network creation model would afford residents—specifically black residents—of Detroit increased economic opportunity. To focus on this objective, high quality of service (effected by factors like headway, vehicle cleanliness and comfort, etc.) is assumed and treated as constant across all versions of both models.

The chapter begins with a discussion of just how the problems highlighted up until this point shall be incorporated, and hopefully mitigated, by the method of transit design applied here. From there the chapter dives into Model 1—targeted at applying Reparation Planning solely to the mobility side of the transit coin—and concludes with the details of Model 2—aimed at integrating Reparations Planning and TOD to account for the non-mobility side of transit.

In sum, being able to plan and execute mobility infrastructure that effectively serves the current population, is flexible enough to accommodate future population and demand fluctuations (ideally growth), and encourages development simultaneously is no small feat. This is the challenge currently facing actors involved in transportation globally. In this chapter I attempt to be a part of the solution; to make headway in addressing this challenge in the case of Detroit while prioritizing the objectives raised in Chapter 1’s discussion of Reparations Planning as a professional responsibility.
4a. Methodological Approach

This section explains the operational approach taken here toward designing a mobility system aligned with the principles of Reparations Planning that maximizes economic opportunity for black individuals in the city of Detroit. The section begins with a discussion of how travel demand calculation was weighted and how typical network design practices—discussed at length in Chapter 2—were altered. That is followed by an explanation of the data, tools, and software used to run the model and visualize the resulting networks.

A note on scale: You will notice that all data, model versions, and visualizations are clipped along Detroit’s political boundary. This is not to say that Detroit should always be looked at as an island, disconnected from its surroundings by an unsurpassable barrier. However, the following is a frequently expressed finding in the literature regarding shrinking cities: “Nor was regional accessibility important in explaining employment outcomes (Cervero et al. 2002).” Given that the goal of this experimentation is to affect economic opportunity, it is reasonable to claim that Detroit needs to be focused on in isolation rather than at the scale of the regional MPO. This is further supported by the fact that current mass transit in the city is provided by the City of Detroit and does not service outside regions. It is then logical to assume that any future transportation investment would be similarly internally focused.

Reformation of Network Design

Network structures are, in their simplest form, the spatialization of an optimization problem (Daganzo 2010). Therefore the factors that one chooses as inputs and the constraints have unparalleled influence over the form the realized network takes. The reformation of practices proposed here is not in the foregoing of the optimization structure. Rather, it is a change in the inputs and constraints that form that structures foundation.

Karel Martens, one of the few voices in the discussion surrounding the interaction of social justice and transportation, argues that the largest step toward social justice-based transportation planning reform would be to “disconnect total trip numbers and aggregate benefit altogether by replacing travel savings (time and cost) with accessibility gains as the key benefit of a transport project (Martens 2006).” You will see in sections 4b and 4c that this is largely what I have attempted to do.

In the models proposed here there is no mention of elements the likes of transfer penalties, in vehicle versus on foot travel time, waiting time, or any of the other similar factors that dominate current planning practices. What is present in this reformed model is a set of inputs associated with race, education, employment, childcare, income, homeownership, and geolocation. These factors alone fall short of accounting for the full spectrum of accessibility factors that Martens likely had in mind. However, all origins and destinations are not created equal. The value of access to a park is not equivalent to access to childcare or employment. While an ideal mobility system provides connection between a wide array of activities—as discussed in Chapter 2—it is hard to argue,
given the unemployment rate and inequitable resource allocation across races, that Detroit’s needs are not hierarchical in nature.

To stress this hierarchy, the models presented here do not strive for all inclusiveness. That is not to say that mobility systems should not strive to provide all-encompassing access to as many existing activities and opportunities as possible. In fact, an ideal system would even take a step further and contribute to the creation of new activity and opportunity profiles. Similarly, the elements that Martens sites as barriers to social justice-based transportation planning—such as transfer penalties and trip time factors—unquestionably affect travel behavior; thus they must be acknowledged. However, Detroit’s current condition of mobility is poor enough that people are not making modal choices and trip behavior based off of the difference between a 10 minute wait time and a 20 minute wait time. Trips are being made on the basis of what is possible and impossible (as addressed in section 2c). Given this extremely limited mobility profile, the provision of travel options over travel luxuries (10 versus 20 minutes, for example) is prioritized in the models.

In sum, the goal of the model is not perfection. Rather, it is advancement. Advancement with respect to mobility, to quality of life, to racial equity, and to the entrenchment of socially responsible planning in the field of transportation. It is from this baseline that further steps toward an ideal system may be taken.

**Tools: ArcGIS Network Analyst**

As data science plays as evermore valuable and commonplace role in the way we understand the built environment, network analysis measures have proven to be useful predictors for a number of interesting urban phenomena. “They (network analysis measures) have been helpful in explaining the importance of particular junctions in transportation networks, the connectedness of rooms inside buildings, the flow of pedestrians traffic on city streets, and the distribution of retail and service establishments in urban environments (Sevtsuk and Mekonnen 2012).” ArcGIS offers one such handy analytical tool in the form of its Network Analyst Toolbox. This toolbox provides network-based spatial computing, modeling, visualizations, and monitoring. Using a precise network dataset complete with speed-limits, distances, one-way restrictions, corner angles, traffic circles, stop lights, pedestrian crossings, and more one can plan routes for entire fleets, calculate shortest path routes, determine drive-times, locate closest facilities, and more. The tool is easily adaptable and, as a result, is most limited by the creativity and patience of the person running it. It is this highly adaptive nature that makes it possible to determine a transit network—a process generally rot with rigid rules, exclusivity via computational difficulty, cost-benefit parameters, and claims of strongly apolitical stances founded on efficiency (see Chapter 2)—based on the equity principals presented in the concept of Reparations planning.

From the many features of the Network Analyst Toolbox, this method of network design and anchor determination uses the Location Allocation setting. This feature of the analyst tool performs dual functions simultaneously in order to determine which spatial features of your
choosing best meet your dictated constraints. The first of these functions, in this particular case, is to optimize the weighting equation (found in the sections discussing model 1 and 2) based on Reparations planning concepts and ranking each spatial unit (census block group in this case) accordingly. The second function is the placement of these optimal sites such that they do not account for overlapping demand. In cases where two optimal sites do account for overlapping demand, the function selects the next best optimal options that mitigate the double counting.

It is worth noting that location allocation only renders station sites. The links between them, forming transit lines/routes, is not accomplished via this particular process. Not having these routes assigned via the toolbox algorithm allows for case specific agency over how anchors connect. The most scenic route could be selected. Or the shortest with respect to time; or distance, if preferred. Or the route that would disrupt the least amount of existing traffic given that the implementation of BRT would take away an entire travel lane from all other automobiles.

**Location Allocation: The Specifics**

In order to run the Location Allocation process several factors must be predetermined. Demand sources, station site candidates, the number of candidate stations to select as optimal from the total set of potential station sites, how to distribute weight to candidate sites, the impedance limitation (physical distance in minutes walked to allow candidate sites to calculate as coverage reach), optimization type, and number of sites to designate as stations are all factors that have great influence over the allocation tool’s results and require careful consideration.

To this end, demand sources were set as all 879 census block groups in the city. Similarly, all 879 census block groups were allowed to stand as candidates to hosts the stations that would be the anchors of the resulting transit network. The impedance limitation—coverage/catchment/reach threshold—was set to a 10 minute walk shed. This 10 minute shed was not applied to straight-line distance. Rather, it was overlaid on the street network and accounted for elements like traffic lights, pedestrian crosses, the presence of sidewalks, etc. 10 minutes was selected because literature suggests that in the US, travel by foot as a means of reaching a second travel mode beyond 10 minutes begins to influence travel behavior in favor of other modes or foregone trips all together (Lewis-Workman and Brod 1997). The optimization type selected for this purpose was *attendance maximization*. This selection tells the tool to select stations such that as much demand weight as possible is allocated to each candidate site. There are five other optimization types that would each render different station sites. These are used in cases when aiming to optimize market share, or spatial coverage, or minimize turns requires for example.

The final two inputs required to run the Location Allocation tool are the number of stations to select as optimal and a means by which to distribute hierarchical weights to each candidate site based on what the network aims to achieve. The latter, being the *goals* of the network, is
explored in the creation of two different models in sections 4b and 4a; each features a slightly different objective. The former, number of stations to be determination, was decided upon using the following approach:

Mass (rail) transit systems in Boston, Washington DC, and Philadelphia were looked at in an effort to draw out information on how many stations Detroit might be best suited for. These three cities were selected for several reasons; all three, like Detroit, host stark lines of racial segregation, and have historically—and currently—displaced and disenfranchised black communities. Boston and DC feature similar populations to that of Detroit, while Philadelphia and Detroit share a common urban area size. Finally, the three cities set for comparison cover a wide spectrum with respect to the current states of their mass transit. Washington DC is currently the poster child for successful TOD (Cervero 2004), Philadelphia's system is in somewhat of a state of disrepair and is losing ridership (SEPTA 2016), and Boston's system is in dire need of expansion as the travel demand for the service sprawls outward into the Greater Boston Area.

Several characteristics of the three cities and their transit services were compiled in the table below. A value was calculated representing the number of stations per unit density (population over area). The average of these values was determined and set as the desired station per unit density of Detroit. From there, given the city's actual size and population, the number of stations required to meet this average value was calculated. The resulting values are featured in the table below.

<table>
<thead>
<tr>
<th>US City</th>
<th>Population</th>
<th>Area (sq. mi)</th>
<th>Number of Stations</th>
<th>Stations per Population Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>650,000</td>
<td>90</td>
<td>125</td>
<td>0.017</td>
</tr>
<tr>
<td>Washington DC</td>
<td>660,000</td>
<td>68</td>
<td>90</td>
<td>0.009</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>1,500,000</td>
<td>142</td>
<td>140</td>
<td>0.014</td>
</tr>
<tr>
<td>Detroit</td>
<td>690,000</td>
<td>143</td>
<td>60</td>
<td>0.013</td>
</tr>
</tbody>
</table>

In addition to a 60 station network, 40 and 30 station versions of each network were also created. This was done to examine the difference in level of coverage of networks created under potentially varied budgetary constraints or any other factor that might limit the realizable scale of construction. Chapter 5 features a comparison of how intra-model versions compare to one another as well as a cross-model comparison.

Data Sources

These models are heavily dependent upon the 2010 Census, the 2014/15 American Community Survey, Detroit Land Bank sales, and ESRI street network data specific to Detroit. Additionally, a set of 200 interviews with both squatters and past home owners whose properties have been foreclosed upon from all over the city (collected by myself in partnership with the Detroit Land Bank) have been coupled with the aforementioned data to paint a holistic picture of the resident profiles of
Detroit’s black population and where they call home. (The application of this Detroit Land Bank data is featured in section 4c.)

Furthermore, all data has been aggregated at the census block group level. As a result all origin-destination sites and station candidate locations have been determined at the census block group scale as well.

4b. Model 1: Access via Mobility

Before the Location Allocation tool could be run, two separate equations were created that were then fed into the spatial optimization tool. The first represented the demand for mobility and the second represented the supply of economic opportunity. Both somewhat crude and neither all-inclusive, but useful for modeling an applications of Reparations Planning nonetheless. Demand was represented by value X and supply by value Y. A value for both X and Y was determined for all 879 census block groups in the city. It was then decided that in this model, designed to optimize access to existing sites of economic opportunity, 10 candidate sites would be selected as supply stations and the rest of the allotted stations—50 in the 60 stations version, 30 in the 40 station version, and 20 in the 30 stations version—would be optimized according to the demand equation. The choice of 10 supply sites is somewhat arbitrary; at present, Detroit is very much a mono-centric city with roughly three census blocks accounting for over 80% of commercial land use. In an attempt to provide access to smaller hubs of economic opportunity as well this number of supply sites was expanded from three to ten. Finally, one can think of this demand-supply divide as an origin-destination split.

This section discusses the selection of input variables that both the demand and supply equations were comprised of as well as how Reparations was incorporated into the model.

Inputs

Model 1 is comprised of the following variables:

<table>
<thead>
<tr>
<th>Table 3: Input Variables for Model 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>B: black population</td>
</tr>
<tr>
<td>U: unemployed population</td>
</tr>
<tr>
<td>D: sites of past or scheduled demolition activity</td>
</tr>
<tr>
<td>L: households with income below 15k</td>
</tr>
<tr>
<td>WH: employed population; work from home</td>
</tr>
<tr>
<td>EM: places of employment</td>
</tr>
<tr>
<td>T: population that commutes by transit</td>
</tr>
<tr>
<td>ST: student enrolled in K-12</td>
</tr>
<tr>
<td>G: university students</td>
</tr>
<tr>
<td>P: households receiving public assistance income</td>
</tr>
<tr>
<td>J: number of jobs</td>
</tr>
<tr>
<td>CU: number of colleges/universities</td>
</tr>
<tr>
<td>S: number of K-12 educational institutions</td>
</tr>
<tr>
<td>CH: childcare facilities</td>
</tr>
<tr>
<td>C: number of children in childcare facilities</td>
</tr>
</tbody>
</table>
Every variable was converted into comparable units. The unit selected was people (affected) per day. For example, variables the likes of population are already in people (affected) per day units. However, all variables that represent housing units were multiplied by the average number of persons per household (roughly three in the case of Detroit) to be made combinable and comparable with variables—like population—that represent persons.

Locations associated with economic opportunity, sites of employment and educational institutions, were scaled using the number of jobs featured at each site and number of students enrolled at each institution.

The results of this methodological approach are the demand and supply equations below.

\[ X = B + U + L - WH + T + P \]
\[ Y = (EM \times J) + (S \times ST) + (CU \times G) + (CH \times C) - D \]

**Reparations: Placement Within the Model**

In identifying the specific Reparations elements of Model 1, it is important to keep in mind the following two ideas. The first is that Reparations Planning in the case of this study has been defined as the creation of policy and implementation of design that explicitly strives for the advancement of quality of life of black individuals. The second is that “... the chief reason for chronic unemployment among blacks is race, not space (Cervero et al. 2002).” Given this foundation, as well as the ultimate goal of providing access to sites of economic opportunity for black individuals, Model 1 features three vital decisions that make it a tool for Reparation planning.

The first is the use of only the black population of census block groups to base travel demand determination on as opposed to the count of the entire population of each census block group. This decision may not be reasonable when planning transit for cities with particularly small black populations (with respect to percentage of total population). However, in the case of Detroit, this decision is likely to be met by less outrage and polarization given the fact that the city’s population is 87% black and that car ownership among whites is over 1 per household (ACS 2013); which suggests less reliance on public transit infrastructure to meet mobility needs. Therefore, in placing the onus on transit planners to attend to the care of black lives over others, one is merely asking that special attention be given to the gross majority of the population. A majority that also happens to be the community most starved for choice with respect to physical and social motion.

The second Reparations Planning element in Model 1 is the inclusion of childcare facilities as a necessary contributor to the assessment of economic opportunity. From the interviews conducted through the Detroit Land Bank Authority regarding housing foreclosure, it was determined that roughly 15% of black homeowners in the Occupied
As alluded to in the discussion of network design and its many challenges, higher transit demand as well as densification of the built environment tend to generate more efficient transit networks due to the resulting higher frequencies of routes and consistency of ridership (Lee 1998, Cervero 2004). This strikes at the core of Detroit’s biggest challenge in planning mass transit for its future. Transit utility may fail to be maximized if a baseline density that can functionally support/feed the system does not exists.

“Transportation and land use are intertwined, each influencing the development of the other. Providing high-quality transit together with development policies that allow or encourage transit-oriented development can influence land use patterns toward higher densities, better pedestrian environments, and mixed-used developments clustering around rail transit stations (Lewis-Workman and Brod 1997).” This suggests that attempting to plan for either neighborhood or transportation development without examining how the two could work in tandem to render the best outcomes for both fields is a wasted opportunity. In short, this passage is a call to shapers of urban form to view TOD as an effective single-stone-bird-killer when dealing with highly integrated urban issues.

Furthermore, TOD allows for what is too often treated as a cut and dry division between origins and destinations within the field of
transportation to blur. Depending on programmatic offerings, TOD sites may be both origins and destinations. These future development patterns are difficult, if not impossible, for planners to regularly account for when designing transit networks. However, this section argues that transportation planners in Detroit are in a unique situation in which they are better suited to incorporate some of this development forecasting into their modeling. This would require cross-field collaboration between the city's largest housing authority, developers, and the transit providing agency. What such collaboration might look like and who it would affect most is explored in this section and applied in this second model.

**Detroit Land Bank Authority**

The Detroit Land Bank Authority (DLBA) is a public authority dedicated to returning Detroit's vacant, abandoned, and foreclosed property to productive use (BuildingDetroit 2016). As of October 2015, the DLBA owned just over 79,000 properties in the city of Detroit making it the city’s largest land owner a thousand times over (MacDonald 2015). The DLBA is invested in facilitating and partnering with community organizations, churches, and resident cooperatives to minimize the effects of blight and make Detroit’s neighborhoods safe and active. The DLBA attends community meetings, has it’s own 311 complaint line called Blexting (blight + texting), and provides spatialization visualizations via a tool called Motor City Mapping in which residents can investigate ownership information of their neighboring properties should they be interested in buying adjacent land (BuildingDetroit 2016).

Within the last two years, the DLBA has rolled out three new housing programs that, if paired with a forward looking development strategy, could make Detroit an ideal location for widespread transit-oriented development projects. The first of these programs—the Auction Program—aims to sell properties in need of rehabilitation to individuals committed to bringing the property up to code. Everyday three new properties, complete with interior and street-side photographs, are posted to the DLBA auction website. Properties are generally posted a few weeks before their auction date and open house viewings are often offered the week of auction. All auction properties begin at $1000, and if a property is not sold, it either cycles back several months later or is made available through the Own It Now Program.

The second of these three programs, Own It Now involves the direct sale of properties as opposed to the auction process in which property prices have no ceiling. ‘Direct sale’ means that those interested in purchasing a property listed on the DLBA sale website purchase homes for the price listed by the DLBA. These homes tend to be in better condition than auction homes (more live ready), often do not require major renovation, are situated in less blighted neighborhoods (fewer demolitions and abandoned neighboring properties), and as a result tend to start well above the $1000 auction starting price. “This program tends to attract newcomers to Detroit more so than the Auction, which generally attracts current residents looking to relocate to less blighted areas than their own,”
said Darnell Adams, Director of DLBA Inventory, when asked—by myself—about demographics of program participants.

The third housing option offered by the Land Bank, and most active—with respect to number of participants—is the Occupied Program. This is a five-step process geared towards providing legal tenure to individuals currently squatting in properties. Squatters vary in profile from families who have lived in their homes for generations and have been foreclosed upon due to an inability to keep up with property taxes to groups of young individuals who have moved into abandoned properties and have begun to fix up the homes themselves not know that the property was owned by the DLBA. In either case, Darnell Adams stressed—in my conversation with him regarding all three programs—that "the DLBA's priority is minimizing vacant properties and maximizing safety in occupied property." This is done through the following five steps: 1. notifying individuals that they are currently living in an DLBA owned home; 2. making personal contact with individuals occupying DLBA homes in the form of an in-person or phone interview; 3. home inspection; 4. enrollment in Homeownership Education Training; 5. closing. Closing involves sale of the property and transfer of the deed to current occupants for exactly $1000 with all back taxes dropped, assuming proof of ability to keep up with taxes going forth. To qualify for this program you need to have proof of your family name on the deed, an official rental agreement, or be able to show proof of having invested in the property's upkeep—the DLBA provides a list of what 'upkeep' entails such as a receipt for any repairs or a series of paid water bills. Given that roughly 4500 of the DLBA's properties are estimated to have people living in them as squatters, this program is extremely valuable to the city's residents (MacDonald 2015).

Strategy: Merging DLBA Programs and Development Patterns

Turning now to a discussion of the good that would likely befall Detroit if a widespread urban development scheme of transit-oriented development were adopted, the literature is extensive and in agreement regarding the need for creation of employment opportunities. "The key to fiscal sustainability and a better quality of life for Detroit is not simply higher population, although population increases would be welcome. Increasing the ratio of jobs to residents will contribute to the financial stability of the city while creating economic opportunity for residents (Detroit Future City)."

Less frequently addressed is the matter of how housing and mobility infrastructure play into this much needed creation of employment opportunity. Though not Detroit specific, Robert Cervero—arguably the leading voice in transportation-related academia—has the following to say on the subject: "Concentration of housing near bus and rail routes appeared (in a nationwide study) most important in stimulating employment (Cervero et al. 2002)." This suggests that if what Detroit needs most is employment opportunity, then transit and housing have an influential hand to play in the matter regarding design and development.
The creation of successful TOD through transit and housing planning, however, is no small feat. Though barriers to TOD include congestion issues, accounting for parking mandates, logistical dilemmas, and getting the mixed-use formula just right (Parker 2002), much can be hurdled if the public sector is able to offer enough subsidy assistance to incite action on the part of developers. “Developers indicated that the cost and risk of negotiating to assemble land is ordinarily too great to justify the reward; they believe that much more TOD would happen if the public sector could deliver preassembled parcels (Cervero 2004).” This idea of preassembled parcels is precisely where Detroit’s DLBA housing programs can best be utilized to bring about the employment opportunities needed as well as the Reparations benefits desired.

The DLBA owns many properties and vacant plots that often times sit adjacent to one another; it is not uncommon for the DLBA to own entire vacant parcels or even entire census block groups. Selling these parcels in bundles is both ideal for the Land Bank and for the developer. This creates the opportunity for revitalization projects of sizable scale. This presents a situation that lends itself to integrative design in which transit stations are placed in partnership with mixed-use development that further ensures a ridership base.

Another element of these housing programs that, when paired with transit network design, make Detroit particularly well suited for TOD is that they effectively—through almost guaranteed home ownership—allow TOD projects to come into neighborhoods without the fear of having the current community pushed out by unreachable rents when the positive effects of any transit interventions are realized. Thus, dramatically lessening the threat of displacement. In short, great value can be derived from a strategy that pairs the aforementioned housing policies with transit network design by providing heightened access to existing opportunities while simultaneously creating new opportunities predicated on guaranteed access.

Put plainly, Detroit would benefit from a development plan focused on TOD. Such a plan might allow Detroit to set multiple desired sites of densification rather than engaging in reactionary planning; the results of which have thus far led to the concentration of activity, wealth, and commerce strictly in the vicinity of Downtown, Midtown, and Corktown—the three least black neighborhoods in the city. And the selection of these sites in partnership with DLBA assistance housing programs gives black individuals, who constitute 95% of DLBA property purchasers, priority status among the development beneficiary community. Such a development strategy would meet the goals of Reparation Planning: explicitly attempting to provide the highest level of access to new sites of economic opportunity to black residents.

Inputs

In an effort to incorporate these advantageous conditions into the network design model, several alterations were made to Model 1. The result is Model 2, which is comprised of the following variables:
Variables A and DS have been explained in the discussion of the potential role of the Detroit Land Bank in TOD-focused transit network design. Variables SL and DC, however, are newcomers.

The Detroit Land Bank sells vacant/cleared side lots in their inventory on a first-come first-serve basis to owners of properties that border the lot for $100. Much like auction and direct property sales, the purchase of a side lot speaks to the intention of property owners to remain in their homes and even to potentially expand. A high number of side lot sales in a given area may speak to the intended improvement of the area by communities themselves. This can be seen in the art projects, playgrounds, and even vegetable gardens that Detroit residents have implemented in side lots throughout the city. As previously argued regarding strategic merger of DLBA housing policies and transit allocation, variables like A, DS, and SL may be worth seeking to optimize when trying to anticipate/plan for TOD capacity because of the resident investment that they represent.

A demolition site cluster (DC) is defined as the following: a minimum of 6 adjacent properties set for demolition, or already demolished, that sit on DLBA owned land. Note that this number (6 properties) could easily have been made more or less. The reason the number 6 was selected as the variable threshold is because the average number of properties per block across the city is roughly 6. Thus purchasing of a cluster by a developer, for example, allows for agency over the design of an entire block. Similarly, the block is an easy scale/unit off of which the DLBA could package land deals if they chose to offer development incentives to developer interested in TOD design models.

Once it was decided that variables A, DS, SL, and DC were to be included in the model, they were converted into units of people (affected) per day. In the cases of A, DS, and SL this was done by multiplying each property by the black population that falls within a 15 minute walk-shed. A and DS were then made subject to the average persons per household multiplier as well given that each property was being converted from vacant to inhabited. The DC conversion involved the average persons per
household multiplier as well. However, rather than a 15 minute walk-shed, cluster sites were argued to have an effect on the black population in a 20 minute walk-share. This widened lens, and therefore stronger effect in the model’s optimization calculation, was based on the idea that demolition clusters are well suited as the sites of TOD or residential reshuffling aimed at concentrated site densification (see Strategy section for further explanation).

The result of these combined steps was the X and Y equations below used in the optimization calculation of the Location Allocation process for Model 2.

\[ X = B + U + L - WH + T + P + A + DS \]
\[ Y = (EM \ast J) + (S \ast ST) + (CU \ast G) + (CH \ast C) + A + DS + SL + DC \]

**Reparation: Placement Within the Model**

In addition to the Reparations elements present in Model 1, Model 2 has its own set of features that are specifically geared toward the advancement of Black Detroit. Of the four DLBA variables in Model 2—aimed at facilitating TOD and ensuring that black homeowners are able to enjoy all of the positive externalities associated with that TOD—the gross majority of land purchasers were black households. Specifically, 98% of side lots purchased as of August 2015 were sold to black households; as were 80% of direct sale properties and 89% of auction properties (interview with Darnell Adams). Though the level of property value appreciation and access to mixed-use programming depends on the specifics of station location at a more precise scale than the census block group, the inclusion of these black-owned properties in the determination of potential TOD sites serves to potentially increase the value of black investments (in the form of real-estate) in the city. To an extent, this allows Black Detroit to not only benefit from any immediate transit investment but also builds in structural benefits for future generations.
5. RESULTS and ANALYSIS

Introduction

"Extraordinary claims require extraordinary evidence."
-Carl Sagan

"Evaluate what you want, because what gets measured gets produced."
-James Belasco

Think back to the travel nightmares shared by Detroit residents featured in Chapter 2. Envision the hours spent waiting for a bus that never comes. The days taken off of work because your car won't start and there isn't a bus within a 3 mile walk. The trip to the grocery store exchanged for that of the corner convenience store, void of a produce section, due to the need to borrow a neighbors car to get there. The otherwise disposable, or better utilized, income that is poured into private vehicle ownership, maintenance, and insurance. Safety, options, convenience, and, most important in this case, the capacity for stability and advancement through economic opportunity. How well does the proposed model improve upon these hardships or make these theoretical desirables a reality? It is not enough to say that any investment is better than none. It must be proven and the extent of 'better' must be tested.

This chapter presents visualizations of both models and all three of their versions. Beyond mere presentation, analysis is run at all scales of interest: both intra and inter-model. The chapter concludes with an assessment of how each model compares to the existing conditions as well as to each other with respect to provision of access to economic opportunity for Black Detroit; the maximization of which being the ultimate goal of this reformation of practice within the field. In short, compiled here are the models' results, explanatory analysis, and experimentation evaluation.

It is worth mentioning that sites selected via the 10 station optimization of equation Y and those selected by the 50, 30, and 20 station optimization of equation X are visualized all together; stations are not divided into demand and supply. While dividing the two would have been visually informative, all stations belong to the same system and can serve users as either origins or destinations, so selected candidates should not be viewed along this line of division but as parts of a larger network. Additionally, each model could be improved. A discussion of these shortcoming and potential improvements is not featured here, however. Such occurs later in Chapter 6 so as to not distract from what valuable analysis is made possible through these tests.
5a. Learning from Model 1

This section examines the results of the three varied versions of Model 1 through several different lenses. Firstly, points of interest—be they evidence of outliers or unanticipated results—are identified, and their reasons for being are explored. Secondly, the 60 station version of the model, being the network's original design constraint determined in Chapter 4, is looked at in relation to spatial patterns of land use and the residential configuration of Detroit's black population. These two factors are of particular import as they largely determined the weighting scheme of the location allocation algorithm used to create the mobility network generated in the model. From there the section moves into a comparison of Model 1 across its three versions, again with respect to land use and race. Finally, the 60 station version is assessed with respect to how well it accomplishes the exploration's ultimate goal of economic opportunity access optimization.

Results

Two elements, present in all three versions of the model, stand out as worthy of discussion prior to any sort of comparative analysis. The first is the candidate site selected through the optimization process as a transit station even though it serves no demand sites within a 10 minute walkshed. This station is located directly Downtown along the water's edge. Given that sites of employment and number of jobs offered at each of these sites were given particularly high value in this model, and that Downtown features the highest concentration of employment positions, it is likely that though this station is not within a 10 minute walk from any other demand site it is still a crucial economic opportunity destination in the model. A second explanation could be that since both travel demand and candidate location where placed at the center of each census block group polygon in combination with that fact that census block group polygons are not spatial normalized, there simply may be no other census block group centroids within the 10 minute walkshed dictated to the algorithm. Regardless, the identification of this site as being a wealth of economic opportunity suggests that Detroiter's will likely be willing to travel on foot more than the assume 10 minute comfort maximum to reach this station.

The second oddity is the seeming abandonment of the mobility network of Belle Isle and the travel demand associated with it. Though Belle Isle hosts no residential units, it is a popular destination for families wanting to spend the weekend picnicking, runners, and beachgoers when the weather permits such leisure activities. Using a more all-encompassing idea of accessibility and placing quantitative value on leisure activities or green space, for example, would almost certainly have assigned a station to Belle Isle. However, given that Belle Isle features no residential population and very few employment possibilities (maintenance and park care account for fewer than eight jobs on the island), Model 1 did not deem transit access to the island a valuable connection for economic opportunity optimization.
Figure 7. Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit

MODEL 1: 60 stations

MODEL 1: 40 stations

MODEL 1: 30 stations
60 Station Network: Under a Microscope

Figure 8 shows the areas of Detroit that Model 1, in its originally envisioned 60 station version, leaves starved for transit access. These patches of transit desert are then overlaid with maps of the city's land use configuration and black population distribution. Three areas of particularly poor coverage are highlighted.

With respect to land use, Area 1 can be explained by the generally low population per census block group in the region. This is due to the north-south corridor of green space that makes up Detroit's western border. The low population would also serve as a contributing factor to poor coverage when looking at the overlay of the race-based map and the transit desert patches. This is because the model was calibrated to take into account black population as a per person count not as a percentage of the total population. In other words, the model aims more so to serve as many black people as possible than all people residing in the blackest neighborhoods. Thus the map's revealing of a comparatively small black population in this location further explains the identification by the network design tool of Area 1 as an inopportune region for station placement.

With respect to land use programming, Area 2 accounts for one of the city's most diverse regions. Here, industrial parcels are intermixed with green space, residential structures, and two commercial corridors. The presence of sites of commercial activity, which are heavily weighted in the model, would lead one to anticipate that candidate stations in this area would be selected as optimal. The explanation for why this anticipated result is not observed likely comes from the only factor in Model 1 of greater value than employment: blackness. A sizable amount of Area 2 overlaps with Detroit's highest concentration of Latino residents. In fact, this is the area of the city least populated by black people. Given Model 1's inputs, the lack of a black population explains this area's transit access dearth.

Area 3 features several small parcels of industrial land use. These account for the transit desert in so much as industrial sites feature no residential population, and, if inactive also do not contribute to the pot of employment sites. However, the industrial sites present in Area 3 are far fewer in number and smaller in footprint than those near Midtown, those along the southwest waterfront, and those to the southeastern Jefferson-Chambers regions; all of which were assigned transit access points. As a result, one is led to believe that lacking travel demand or opportunity sites are primarily responsible for the Area 3 transit void. Race reveals itself to be the more likely factor of greatest influence in this case. Area 3 overlaps with one of the city's smallest black population clusters. Model 1's weighting scheme would thus deem this area as poorly equipped to accomplishing the goal of optimized economic opportunity for black individuals.
Figure 8. Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit

Intra-Model Comparison

One lens through which to look when comparing the three versions of Model 1 is that of travel demand satisfaction. Detroit hosts 879 census block groups. Given that this was the level at which travel demand, in combination with capacity for the creation of economic opportunity (both previously defined), was calculated, satisfaction of demand can be thought of as how many census block groups have access to a station within a 10 minute walk-shed. Regarding this form of analysis, the 60 station version provides transit access to 742 of 879 census block groups. The 40 and 30 station versions provide transit access to 609 and 494 of 879 census block groups, respectively. This method of comparison, however, will always imply that more stations reflect a better network up until the point where 100% of demand sites—census block groups in this case—have transit access within a 10 minute walk-shed. As a result, it is not a fair cross-version assessment of network quality.
Nonetheless, it is worth examining the specific locations of decreased coverage between each version. In other words, *where* is demand satisfaction dropped between the 60 and 40 station networks and then again between the 40 and 30 station networks. This would shed light on exactly which populations would lose out in the case of budget cuts, or other limiting factors, resulting in the construction of a network with fewer than the intended 60 stations. It would also allow for an understanding of which, in particular, of the many input variables combined to calculate travel demand had dominant influence over the optimization process.

Figure A1 (see Appendix) shows the new areas void of transit access that appear in the 40 station version of Model 1 that do not exist in the 60 station version as well as those that appear in the 30 station version that are absent from the 40 station version. Using the 60 station network as a baseline, one sees additional access loss in three particular areas of the 40 station network. These are situated in the southwest most corner of the city, the eastern border of Hamtramck, and Detroit’s southeastern border neighboring Grosse Pointe. In trying to describe the population that suffers the most as a result of constructing a 40 station network rather than a 60 station network, these three transit deserts are looked at in combination. These regions serve as hosts to Detroit’s largest Latino population, numerous parks, and the single largest industrial zone in the city. The majority of transit access loss in the 40 station version falls in Districts 3 and 4. Unfortunately, these are Detroit’s two poorest districts (Data Driven Detroit). This is particularly important for any transit provider to consider. If the goals of transit, as it is here, is to increase equity, any model that renders lacking access to the poor is a failed network design method. As a result, the 40 station version of Model 1 may not serve the ultimate purpose of this transit design reformation particularly well.

Using the 40 station network as a baseline against which to draw comparison, one notices two regions of major transit access loss in the 30 station network. They fall along the northern border of the city at the center of the eastern hemisphere and roughly along the central axis of Detroit just to the west of Highland Park. These two regions account for areas of relatively diverse land use programming and fall along major arteries of the city, namely Grand River Ave., McNichols Rd., and Eight Mile Rd.. Given the weighting emphasis placed on places of employment in Model 1, transit deserts in these locations are somewhat counterintuitive. However, the presence of industrial land use, in the case of Detroit and other shrinking cities, often means inactive or abandoned land. These sites neither hosts a residential travel demand population nor sites of current economic opportunity. This, in combination with a small black population, likely explains the model’s lack of station allocation in these areas when limited to a 30 station network. However, irrespective of why the 30 station model leaves these areas poorly connected, the fact that it recommends low transit access along major commercial corridors also speaks ill of this version’s ability to best meet the primary goal of the model.
5b. Learning from Model 2

Similar to the previous section dedicated to Model 1, this section examines the results of the three varied versions of Model 2. It begins by exploring readily identifiable points of interest. Secondly, the 60 station version of the model, is looked at under a microscope. However, dissimilarly from Model 1, Model 2 overlays sites of demolition and Detroit Land Bank Authority sale spatial information. These two factors are of particular import as they largely determined the weighting scheme of the location allocation algorithm used to create the mobility network generated in this model. From there the section moves into a comparison of Model 2 across its three versions, again with respect to demolition sites and DLBA properties. Finally, the 60 station version is assessed with respect to how well it accomplishes the exploration’s ultimate goal of economic opportunity access optimization.

Results

Three elements in Model 2 stand out as worthy of discussion prior to any sort of comparative analysis. The first two are featured in all three versions of the model and were also present in all three versions of Model 1. These are the station selection site Downtown that seems to feed into no other demand sites and the neglect of Belle Isle by the mobility network. Though Model 2 features different inputs than Model 1 that result in a different weighting scheme for each travel demand site and station candidate location, these presence of these two features in Model 2 can be explained by the same rational presented in the case of Model 1.

The third element of note, however, is only present in the 60 and 40 station versions of Model 2 and appears in none of Model 1’s versions. In both of these versions, there are two stations deemed optimal by the algorithm in the southwest corner of the city that serve no other travel demand sites within a 10 minute walkshed. These are largely explained by the strong concentration on demolition sites at this site. An examination of the land use of Detroit reveals that this was once the site of heavy industrial activity that now lays unused and scheduled for demolition. Given the emphasis on easily combinable parcels for development that exists in Model 2, this station allocation makes sense. However, in a reality in which transit precedes development, these two stations will likely host low levels of riders boarding and offloading. In the TOD-based model, the mobility system will run very differently prior to development than it will post development. Though this difference is tangential to the avenue of exploration taken here, it is worth acknowledging in so much as it is a difference that may have tangible effects for system users.
Figure 9. Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit

MODEL 2: 60 stations

MODEL 2: 40 stations

MODEL 2: 30 stations
60 Station Network: Under a Microscope

Figure 10 shows the area of Detroit that Model 2, in its originally envisioned 60 station version, leaves starved for transit access. These patches of transit desert are then overlaid with maps of the Detroit Land Bank Authority property sales as of December 2015 and scheduled and completed demolition sites. Featuring more evenly distributed coverage across the city than Model 1, Model 2 rendered a single area of particularly poor coverage. This zone is highlighted.

Area 1 covers a similar region of the city to Area 3 from Model 1’s 60 station analysis. Though Model 2 is comprised of additional input values, it features the same land use and race-related weighting scheme as Model 1. Therefore, some of what is causing this transit access desert are the same factors responsible for Area 3 in Model 1. That said, employment access and presence of black residents only paint a portion of the picture. Regarding DLBA sales, this area hosts but one single property sale. Additionally, though Area 1 has several sites of demolition encapsulated in its overlay, these sites are too few and far between to constitute ‘demolition clusters’—as defined in Chapter 4. These two factors further contribute to the void of station allocation in this region.

Intra-Model Comparison

In conducting for Model 2 the same travel demand analysis conducted for Model 1, the following findings present themselves: the 60 station version provides transit access to 761 of 879 census block groups; the 40 and 30 station versions provide transit access to 606 and 503 of 879 census block groups, respectively.

When comparing Model 2’s 40 station version to its 60 station version, four regions lacking access to transit stand out. These are seen in Figure A2 (see Appendix). Two of the four are regions that Model 1’s 40 station version also leaves bare of station allocation. Thus, it is fair to conclude that the southwest neighborhood and the zone bordering Grosse Pointe suffer from the same factors contributing to transit neglect as those expanding upon in the intra-model comparison of Model 1. The other two transit deserts of the 40 station version, however, are specific to Model 2. Situated in the center of the western hemisphere of the city and along the southern border traveling up toward Midtown and west of Downtown, these two regions are best explained by low concentrations of demolition sites; a positive input variable in Model 2. Though these regions overlap with a comparatively small black population—making their lack of access only minimally detractive from the ultimate aim of the network design reformation—they host a wealth of existing commercial activity and employment sites. Given that Model 2 is tailored to support future TOD and the creation of new economic opportunities, this is understandable. Nonetheless, understandable and desirable are not synonymous; an ideal transit system, even one designed to prompt TOD, provides access to existing opportunity hubs. As a result, those who lose in the 40 station version of Model 2 are those who already have, or are seeking employment, between Midtown and Downtown on the west side of the city.
The additional transit deserts found in Model 2's 30 station network are almost exactly the same as the additional access voids found in Model 1's 30 station network. Again, given that Model 2 builds on Model 1 without eliminating any input variables, this is somewhat anticipated. What contributes further to the lack of station allocation in these zones is the sparse distribution of both demolition sites and DLBA property sales. As a result of few instances of existing residential investment/interest—as evinced by low DLBA property sales—and the lack of easily packaged land to temp developers with—an argument at the heart of the value placed on demolition clusters—these areas may not be well suited for making major contributions to Model 2's vision of TOD prompting.

Figure 10. Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit
5c. Cross-Model Comparison

This section looks at the geographical differences in network coverage between Model 1 and Model 2 across each of the three structure versions. In the visual comparison below, numbered regions represent areas of no transit access that are present in Model 1 that are not present in Model 2. Lettered regions represent areas of no transit access that are present in Model 2 that are not present in Model 1. Regions demarcated by a filled in shape represent areas of interest—with respect to lacking transit access—that are featured in both models.

Spatial Network Differences: 60 stations

When looking at both Model 1 with 60 stations and Model 2 with 60 stations, most apparent is the desert of transit access in Model 1, labeled region 1, that is not present in Model 2. This difference across the two models likely exists because Model 1’s travel demand calculation has a stronger emphasis on the density of the black population across the city and this particular region features a comparatively high Latino population. One also notices that Model 2, in comparison, hosts a more even distribution of station sites across the city; Model 1 shows a concentrated clustering in the northwest and northeast with sparse station allocation toward the city’s southern half. This difference across models is likely due to the presence of DLBA property sales in the southern region and the strong influence over travel demand placed on these properties in Model 2.

Elements A and B of Model 2 are not present in Model 1. Element A represents an industrial area scheduled for demolition. The size of the area accounts for many of the previously define demolition clusters that Model 2 emphasizes in an effort to make packaged parcels available for sale to developers interested in TOD. The value of potential development is not a contributing factor to Model 1. Thus element A’s absence. Element B, the transit desert in Model 2 not present in Model 1, covers a region with next to no DLBA sales. It also in a region that has several parks inside of it. This would render station candidate locations with low population counts. As a result, both models would place this region’s demand sites low in the ranks of optimization. Though Model 1 places a single station in region B, it too have overall low coverage in the area.

Finally, both models feature the region labeled with a triangle. This unique station allocation site—given that it reaches no demand sites in a 10 minute walking distance—has already been discussed. It is highlighted in this cross-model analysis only because it is interesting that both Model 1 and Model 2, different in their input values, classify the unique site as one of the 60 optimal station locations.
Figure 11. Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit

MODEL 1: 60 stations

MODEL 2: 60 stations
Spatial Network Differences: 40 stations

A cross-model look at the 40 station scenarios reveals further differences between Model 1 and Model 2 that build upon those discovered in the 60 station comparison. While both models lessen their coverage in the far southwest region, Model 1 expands its southwest transit desert all the way up toward Midtown. This is seen in the region labeled 3. Model 1 also features a large expansion of its transit desert on the eastern border of Hamtramck; most likely due to low population count and a comparatively low percentage of the population identifying as black. This region is labeled 2.

Model 2’s expanded areas of lacking transit access are highlighted by regions C and D. In contrast, while Model 1 lost stations to the southwest and the central east, Model 2 lost stations to the central west and the northeast. What results from this station allocation pattern in Model 2 is the isolation of the far northeast section of the city, and diminished connectivity along the east-west running corridor of the city’s northern border. The region labeled with a star is also of interest. Both models host a transit desert in this region in their 40 station model versions. This suggests that this area is neither well suited to meet the goals of Reparations planning nor the TOD-DLBA merger strategy constructed here. This is not surprising given that this area of the city borders Grosse Pointe, a comparatively wealthy, white, waterfront suburb of Detroit and has a population who benefits from spill-over effects (and demographics) of this neighboring area.

Spatial Network Differences: 30 stations

In the 30 stations version of Model 1 versus that of Model 2, region 4 stands out. With this transit desert expansion Model 1 becomes guilty of creating a similar northeastern isolation zone as that created by region D of Model 2 in the 40 station version, but to a greater extent. Model 2’s expanded transit deserts are represented by regions E and F. With the addition of these regions, Model 2 further features poor connectivity along the city’s northern border.

Ultimately, when looking at both models in totality (from the 60 to 30 station versions), as the number of optimized station sites decreased Model 1 retained a high concentration of transit access points in the western hemisphere of the city while Model 2’s wealth of transit access was best maintained in the northeast. These consistencies throughout model versions are as anticipated given that Model 1 prioritizes black lives and western Detroit is the city’s blackest set of neighborhoods (both by percentage and population count). Similarly anticipated, Model 2 prioritizes DLBA-owned land and clustered, prepackaged parcels. These are most concentrated in Districts 3 and 4 to the city’s northeast.
Figure 12: Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit

MODEL 1: 40 stations

MODEL 2: 40 stations
Figure 13. Data Sources: US Census, ESRI Business Analyst, DLBA, Data Driven Detroit
Coverage

A version to version cross-model comparison of travel demand satisfaction reveals the following: In the networks featuring 60 stations as well as those featuring 30 stations, Model 2 met the largest amount of travel demand; In the 40 station networks, Model 1 outperformed Model 2 in travel demand satisfaction.

Table 5: Model 1 Coverage

<table>
<thead>
<tr>
<th>Version</th>
<th>Coverage</th>
<th>% of Total Demand Met</th>
<th>Coverage Decrease</th>
<th>Decrease as % of Total Demand</th>
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<tr>
<td>60 stations</td>
<td>742</td>
<td>84%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>40 stations</td>
<td>609</td>
<td>69%</td>
<td>133</td>
<td>15%</td>
</tr>
<tr>
<td>30 stations</td>
<td>494</td>
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<td>13%</td>
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Table 6: Model 2 Coverage

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<th>Version</th>
<th>Coverage</th>
<th>% of Total Demand Met</th>
<th>% of Total Demand Met</th>
<th>Decrease as % of Total Demand</th>
</tr>
</thead>
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<tr>
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<tr>
<td>40 stations</td>
<td>606</td>
<td>68%</td>
<td>155</td>
<td>18%</td>
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<td>30 stations</td>
<td>503</td>
<td>57%</td>
<td>103</td>
<td>12%</td>
</tr>
</tbody>
</table>

Standout findings include the discovery that the scenario in which travel demand of the city was best met only accounted for 87% coverage. This value may prove valuable when trying to sell the public on the urban intervention or if the provider decides to gain financial support from the federal government or through a public private partnership. Setting a hard line of minimum coverage required of the system holds the provider accountable. Should this value be above 87%, it is clear that more than 60 stations are required. If it is less, then the coverage minimum—rather than the average determined through a comparative analysis of Boston, Washington DC, and Philadelphia—can be used to determine the advised number of station candidates to optimize in the mobility network. Additionally, the largest decrease in coverage, both with respect to count and percent, occurred in Model 2 between the 60 station version and the 40 station version. This suggests that Model 2 may be comparably hyper-sensitive to constraint changes. Thus that the number of stations allotted to the network—should Model 2 be implemented—must be paid very careful consideration.
5d. Meeting Goals: Assessing Economic Opportunity

Access

Though informative, the metric of coverage is not enough to assess the extent to which each model managed to provide access to economic opportunity for Detroit's black population. To accomplish this, a comparative reach analysis test was run. The closer to Downtown and to the rail line on Woodward Ave., the better connected one is. Keeping this in mind, six sites of travel demand—representing 6 households—at the geographical far extremes of the city were selected. These areas are particularly poorly connected to the concentration of opportunities in Midtown and Downtown; testing these extreme sites then suggests that all other sites have higher levels of access. Naturally, this assumption does not hold true in 100% of cases, but it is a fair assumption for the sake of comparative assessment.

From there, each of the six selected sites was tested against two access measures. The first calculated the number of businesses and educational institutions reached from each site within a given travel profile. The second calculated the number of jobs reached in that same travel profile. Three travel profiles were compared. The first is defined by the absence of a transit network. In short, the first scenario's travel profile is a 30 minute walk under existing conditions. Scenario 2 is defined by the presence of the 60 station network created by Model 1. Similar to scenario 1, a 30 minute travel profile was applied. However, this second travel profile was comprised of a 8 minute walk to transit, 3 minutes of wait time, 15 minutes of BRT travel at a generalized speed of 30 mph, and 4 minute station to site walk. Additionally, a 45 second decrease from the 15 minute vehicular travel time was applied to each station passed on the BRT line in an attempt to account for boarding and off-loading. The same travel components were applied in scenario 3, but using the network created by Model 2.

Figure 14. Selected Test Sites
As is to be expected, sites of economic opportunity are not evenly spaced across the city. Nor does every site host a uniform number of positions. The maps below reveal that there is a higher concentration of schools and businesses in the West of the city than the East and the single highest concentration exists Downtown. Also important to be aware of when calculating the second access measure is the concentration in Midtown of businesses with large numbers of employees. These maps reiterate the early assumption that making it possible, if not easy, for people on the city’s periphery to get to these activity hubs is necessary.

The links between identified stations in both Model 1 and 2 were made to follow the shortest path subject to time (see Chapter 6 for map of identified routes). This was used for the assessment, but is not recommended as a blanket approach to link determination should the network be implemented. Additionally, no transfer penalty was accounted for in the travel profiles of scenario 2 or 3. Again, such is acceptable to the sake of comparison as long as conditions are kept constant across scenarios.

Figure 15. Data Sources: US Census, ESRI Business Analyst
In comparing tables 6, 7, and 8, several interesting findings reveal themselves. Firstly, under the exiting, transit lacking scenario, site 1 has access to the largest number of employment and education facilities. The next site with greatest access reaches only 0.75 as many desirable sites. Site 1 is clearly benefiting from its proximity to the commercial corridor of Grand River Avenue. Most access starved in this scenario with respect to the first access measure is site 2. Far from any boulevards and out of 30 minute walk reach of the central activity hubs, this is to be expected. Of note, however, is that while site 2 performs the poorest in the first access measure, site 3 under performs the other 5 sites regarding the second access measure. Though the household at site 3 is able to reach more structures housing economic opportunity, these sites employ few people than those that the household at site 2 is able to reach.

To help with contextualizing the numbers, it is valuable to keep in mind that Detroit houses 571,621 black lives (US Census Bureau), hosts 20,950 places of employment, 249 educational institutions, and 290,623 jobs (ESRI Business Analyst).

Table 7: Economic Opportunity Access under Existing Conditions

<table>
<thead>
<tr>
<th>Selected Sites</th>
<th>Access Measure 1 Employment &amp; Education Sites Reached</th>
<th>Access Measure 2 Number of Jobs Reached</th>
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</thead>
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<tr>
<td>1</td>
<td>508</td>
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<td>2</td>
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<td>6</td>
<td>175</td>
<td>1044</td>
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</table>

Table 8: Model 1– 60 stations

<table>
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<tr>
<th>Selected Sites</th>
<th>Access Measure 1 Employment &amp; Education Sites Reached</th>
<th>Access Measure 2 Number of Jobs Reached</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>43967</td>
</tr>
<tr>
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<tr>
<td>4</td>
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<td>61741</td>
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<tr>
<td>5</td>
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<td>48644</td>
</tr>
<tr>
<td>6</td>
<td>8216</td>
<td>163612</td>
</tr>
</tbody>
</table>

Table 9: Model 2– 60 stations

<table>
<thead>
<tr>
<th>Selected Sites</th>
<th>Access Measure 1 Employment &amp; Education Sites Reached</th>
<th>Access Measure 2 Number of Jobs Reached</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6915</td>
<td>44451</td>
</tr>
<tr>
<td>2</td>
<td>5437</td>
<td>38696</td>
</tr>
<tr>
<td>3</td>
<td>1539</td>
<td>19002</td>
</tr>
<tr>
<td>4</td>
<td>6150</td>
<td>63177</td>
</tr>
<tr>
<td>5</td>
<td>4912</td>
<td>49035</td>
</tr>
<tr>
<td>6</td>
<td>11034</td>
<td>172234</td>
</tr>
</tbody>
</table>
The largest change in level of opportunity accessed across scenarios, as to be expected, comes from the transition between strictly pedestrian travel and transit use. To gauge the scale of the added value that comes from transit, both the smallest and largest changes in opportunity access between transit and no transit were calculated. The smallest added value multiplier was determined to be $13$ for the first access measure and $14$ for the second. This means that the smallest increase seen in the number of sites of reachable economic opportunity under the condition of transit was $13$ times that of the walking condition. An assessment of greatest added access provided by transit rendered an added value multiplier of $129$ for the first access measure and $175$ for the second access measure.

Between Model 1 and Model 2, sites 1, 2, 4, and 5 experience roughly the same amount of access to economic opportunity with respect to both access measures. This is likely due to the fact that the 60 station versions of Model 1 and 2 are almost identical in these particular areas. Households at sites 3 and 6 experience the most sizable difference in access under the two transit conditions. Site 3 has access to a larger number of opportunity structures and jobs under Model 1. This is somewhat counter intuitive, given that Model 2 features many more stations in a 30 minute travel-shed of site 3 than does Model 1. However, given the 45 second distance penalty applied to each station, this means that travelers originating at site 3 get less far into Midtown in the allotted 30 minutes. Midtown hosts both many opportunity sites and a high concentration of businesses with larger numbers of employees. For this reason, Model 1 outperforms Model 2 for households at site 3, but Model 2 would provide access to larger percentage of the population in the southwest region than would the few stations in the area under Model 1.

Model 2 outperforms Model 1 at site 6 for similar reasons. Within the 30 minute travel-shed, Model 2 transports riders from site 6 up into Midtown and grants them access to part of the Grand River Ave. commercial corridor. Model 1 gets riders from site 6 only to the lower half of Midtown and virtually none of Grand River Ave.
6. A FAMILIAR FORM

Introduction

"Regular maps have few surprises: their contour lines reveal where the Andes are, and are reasonably clear. More precious, though, are the unpublished maps we make ourselves, of our city, our place, our daily world, our life."

- Alexander McCall Smith

“A transit map has a tremendous impact on a passenger’s perceptions and his or her usage of the transit system (Guo 2011).” The visuals of station location allocation presented thus far, though informative, are hardly user friendly; one couldn’t plan one’s trip using them. This chapter presents a consumer friendly map of both Models 1 and two styled in accordance with subway maps from around the world. These two visualizations of BRT system proposals are then compared to five other consumer friendly maps of rapid transit in Detroit. This comparison then leads into a discussion of what the Reparations Planning-based models created in Chapter 4 and analyzed in Chapter 5 may have left out that would have better contributed to the meeting of the system’s goals.

It is important to note that in transit system visualizations—such as those that users are accustomed to engaging with and are stylistically mirrored here—much artistic license can be taken by the map creator. Distances between stations can be greatly distorted, directions of lines can be warped from reality, relative scale can easily be made inconsistent all within a single map. These representation choices affect travel behavior in so much as they influence path selection of system users. While the way that users interact with the maps featured in this chapter is not important for the comparative analysis discussed here, this power of artistic license is worth keeping in mind while engaging with these visuals.
6a. Fantasy Mass Transit Maps

This section looks at the similarities and differences across seven different consumer-friendly maps of rapid transit systems proposed for Detroit. Some of the proposals are for rail service, others are for buses, those created from Models 1 and 2 are for BRT, and others are not specific as to which mode the map creator envisioned. Noting that a comparison of these proposals may not be a perfect apples to apples situation, there is still much that can be learned from looking at the work of other mobility enthusiasts be they professionals, system users, or neither.

Unfortunately, with the exception of the SEMCOG proposal, not many of the specifics that guided the creators of these proposals is known. However, where information is available, it is incorporated into the discussion of how these proposals compare to those created explicitly for Black America and inferences as to what explains these findings are drawn. The section closes with a brief reflection on what these non-Reparations Planning-based proposals have to offer the networks of Models 1 and 2 that might better help the BRT proposals reach their previously stated goals.

Proposal Map 1. Image Source: SEMCOG 2040 Transit Proposal
Proposed Map 6. BRT Map of Model 1

Proposed Map 7. BRT Map of Model 2
Comparing All 7 Maps: Similarities

Undoubtedly influenced by the existing land use and programming of the city, all seven of the proposed transit maps presented here feature a station in the heart of Downtown that offers at least one transfer and as many as four in proposals 2, 3, and 5.

Similarly, several areas are identified in each proposal as important locations to grant access to irrespective of to whom access is being granted. New Center, Midtown, Corktown, Campus Martius, Hart Plaza, Cobo Center, East Village, Highland Park, Young Airport, Wayne State, Eastern Market, and Warren Avenue were sites identified by all of the models (with the exception of Proposal 1 which did not give specific station sites) as areas to which transit much be provided. Whether partnered with transit or not, these sites should be on the radar of public officials and developers interested in transforming the currently mono-centric Detroit into a policy-centric city—a practice strongly advised and incorporated into Model 2.

This is where the across-the-board similarities end and the far longer list of differences present themselves.

Comparing All 7 Maps: Differences

In general, the proposals disagree on the number of routes that their creators believe best for the system. That said, the difference in number is small. Proposals 2, 4, and my own 6 and 7 all feature six distinct lines. Proposal 5 recommends one additional line, bringing the recommendation up to seven routes. Proposal 3 goes one step further and argues a need for eight. The reasons for the selection in number of lines for the fantasy proposals of maps 2 through 5 is difficult to know as their creators did not provide written accompaniment describing their thought processes on the matter. However, it is not unfair to assume that level of service was a strong driving force. For example, while creating my own proposals (maps 6 and 7) part of the need for six lines was trip time. As stated earlier, the average trip time to work for an individuals who live and work in Detroit and commute via bus is currently 30 minutes. Noting that people are accustomed to riding buses for this amount of time in a single trip, I made sure that given city speed limits, no single line would take more than 30 minutes to ride in it’s entirety. Thus, either one would reach one’s desired destination within 30 minutes or one would make a transfer within 30 minutes. While making a transfer means that one’s journey is not complete, transfers are experienced differently than continuous riding and I decided that the change of behavior required at a transfer was enough of a difference to serve as a trip divider that lets people experience their journey as two separate legs of a trip each less than 30 minutes. It’s not perfect, but it at least builds upon existing transit expectations. Perhaps trip time across lines also influenced the creators of the other proposals.

Additionally, the maps differ greatly in their overall coverage. Firstly, two of the seven propose a line that extends into Windsor, Canada. While this may be a custom’s nightmare depending on current border requirements, the proposal is unique and warrants at least brief
exploration. The proposal makes two moves that I find particularly wise regarding the Canada lines. The first is the selection of two major potential sites of employment for Detroiter. Just across the river from Detroit sit the University of Windsor and Cesar’s casino. Both of these are positioned on the routes proposed. While granting physical access to these sites does not in any way guarantee that positions of employment will be offered to Detroiter—particularly since the international divide may make work provisions difficult—physical access is certainly a step toward opportunity.

Secondly, access to the Windsor rail station is provided. This station grants train connections to urban hubs the likes of Toronto, and from there all of Canada’s larger cities. This makes regional travel easy for Detroiter’s, but, more importantly, may encourage regional tourism from Canada into Detroit. For all of it’s negative imagery, Detroit has many attractions worth making the train ride for; particularly in the realm of art. For example, the city houses the nation’s largest collection of works by Diego Rivera.

Again on the matter of coverage, each proposed system differs in scale as well as proportion of the system dedicated to internal travel within Detroit. It is this latter point that distinguishes the first five proposals from the Reparations Planning based proposals most. Both BRT models created (proposals 6 and 7) feature 60 stations that all fall within the political boundary of the city of Detroit. The system proposed in fantasy map 2 has 64 stations with only 39 of them falling within Detroit. Proposal 3 hosts 106 stations. Of these 106, a mere 19 rest in Detroit. Proposal 4’s system is comprised of 149 stations; 53 in Detroit. Proposal 5 features 119 stations in total and 47 Detroit stations. Proposal 1 is difficult to compare in this way due to that fact that SEMCOG makes no explicit statement about where stations shall be. However, they do make clear that the rapid transit proposed in their 2040 plan, were it to be taken up, would feature 12 transit corridors. Of those 12, 5 pass through Detroit. With the exception of proposal 1, this information is summarized below.

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Total Stations</th>
<th>Stations in Detroit</th>
<th>% of stations that fall within Detroit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>64</td>
<td>39</td>
<td>61%</td>
</tr>
<tr>
<td>3</td>
<td>106</td>
<td>19</td>
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<td>4</td>
<td>149</td>
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<td>100%</td>
</tr>
<tr>
<td>7</td>
<td>60</td>
<td>60</td>
<td>100%</td>
</tr>
</tbody>
</table>

This difference in coverage within Detroit is made special note of because of what it says about the priorities of each proposed system. The priorities of the Reparations-based system have been expressed at length in previous chapters, but, briefly, their aim to provide access to black individuals and create sites of economic opportunity within the city led to the placement of the system solely within Detroit.

(Note that what is shaded in grey on Proposals 2 through 5 falls within the city limits of Detroit.)
The creator of Proposal 5, for example was most interested in operational efficiency and standardization across the entire system. This conclusion is drawn from his reporting to the Detroit Press—when his fantasy map received some media attention—that within the city, he placed stations at $1/3$ mile intervals between Downtown and New Center, $2/3$ mile intervals everywhere else within the city, 1 mile intervals in the suburbs immediately surrounding the city, 2 mile intervals in the second ring of suburbs from the city, and avoided areas of heavy abandonment (which he does not define further) all-together (Detroit Metro). He does not explain, however, why he extended the system to the second tier of suburbs. Regardless, his priorities resulted in a system with 39% of it's stations placed within Detroit.

Though I do not have explanations of design intentions of the creators of Proposals 3 and 4, inferences can still be made as to the priorities of both proposals. Both proposals can be read any of several ways: One possibility is that the creators of 3 and 4 wanted to provide access, both for Detroiters and neighboring suburbanites, to activity hubs throughout the region. Another possibility is that both proposals aim to make it possible for individuals who live outside of the city and work within the city to commute to work via transit. This is strongly hinted at given that both proposals follow the five major arterial throughputs that extend beyond the city's limits and channel outside mobility directly to Downtown—the largest CBD in the region. A third possibility is that these systems either followed a population density standard or a distance-between-stations standard and placed stations accordingly. However, one chooses to interpret them, much like Proposal 5, there is no hint at a particular care for marginalized or low-income communities, let alone the black community specifically.

These differences go to show that transit is not a cut-n-dry science. Priorities can drastically effect the service and physical form of mobility systems; all the more reason why these priorities should be selected with great care and explicit intention.

Where the Reparations Planning-based Models Fall Short

An element present in 100% of the non-Reparations Planning-based proposals is a transit connection to the DTW Metropolitan airport that sits roughly 80 minutes—by car—west of the city. Though my BRT proposals focused on creating opportunity and providing access within Detroit, exclusion of this site within the proposed network is a missed opportunity. Airports in general are a large source of blue collar job opportunities. As a result, DTW should have been included as a major site of economic opportunity in both Models 1 and 2.

Furthermore, all of the other proposals, for one reason or another, have a heavy focus on placing stations in locations outside of the city. While the decision to create the resulting networks of Models 1 and 2 solely within Detroit was made with an explicit goal, it is a bit of a double edged sword. There are unquestionably economic opportunities that black Detroiters could capitalize on that lay outside of the city. Neither of my proposals provide access to these opportunities in exchange for improved intra-city mobility. While I stand behind my initial decision, I am aware
that this choice has the potential to render the unintended consequence of non-optimal employment levels.
7. CONCLUSION

Planners have "a responsibility to themselves, a responsibility to the struggling masses, a responsibility to the darker races of men whose future depends so largely on this American experiment."

-W.E.B Du Bois

7a. Conclusion

Too often the plight of the black (wo)man has been broadly, and incorrectly categorized as the plight of the poor (wo)man. "Reducing American poverty and ending white supremacy are not one in the same. The urge to use the moral force of the Black struggle to address broader inequalities originates in both compassion and pragmatism. But it makes for ambiguous policy (Coates 2014)." Motived by the need for a widely applicable, explicit initiative that—as the Du Bois quote above calls for—cares for the endangered future of Black America, here I have proposed the ideology of Reparations Planning. I have defined its parameters, laid out its goals, and applied it to the case of transportation network design in Detroit.

The result of this application was two-fold: the provision of access to tens of thousands of jobs and hundreds of educational institutions that black Detroiter currently do not have, as well as a development strategy designed to encourage transit-oriented development in a city in much need of investment and non-traditional approaches to the shaping of future urban form. Though the system of mobility demand determination, regarding the weighting of inputs, was specific to Detroit, its larger aims and application are generalizable to Anywhere, US that Black America calls home.

The method explored here, that of Reparations Planning as it applies to transit, may not be the cure-all solution to the many holes in the planning field or the many injustices currently facing Black America. But what it is, where its greatest value to the practice derives from, is explicit in its intention and unrestricted in its potential. That alone makes it a significant step forward with respect to how the US handles matters of race both in the field of planning and at large.

All in all, within much of public policy and urban planning, how interventions affect different demographics is often studied after the intervention has been carried out; race as a tool of evaluation, rather than an input of creation. But for the set of actors whose aim it is to achieve a system founded on the advancement of a people wronged, ‘after’ is too late. If optimization of access to economic opportunities for black lives in America is the system’s objective, ‘after’ is too late. The operationalization of reparations and racial equity, regarding access to the ‘full set of life opportunities’, needs to be moved from the bottom of the list of planner priorities to the top. From the back of the bus to the front, if you will.
7b. Limitations

Regarding the creation of the two transit network design models created here, the scale to which data was aggregated—the census block group—was not as precise as would have been ideal. Census data at the scale of individual buildings would have allowed for drastically elevated specificity of station location allocation. If implemented, this scale would be necessary to explore given that on the ground, a census block could encompass upward of eight blocks; the exact placement of a station within these eight blocks would undoubtedly effect user travel time and experience. Additionally, census block groups are uniform by neither physical size nor population. While this would not necessarily effect allocation based on time spent, economic opportunity sites accessible, or number of black households provided access, it does make assessment of any resulting networks via these models all the more difficult to compare to other models, should one wish to do so.

Similarly related to the issue of using census block groups as the primary unit of aggregation, both models converted entire census block groups into a single point at the block groups spatial center. This spatially distorts the actual location of where travel demand is coming from, precisely where black households are situated, and where within a census block group station candidacy is optimal. Again, this issue can be solved by improvements on the classic plight of all research: quality and availability of data.

While the rationale discussed earlier behind looking at Detroit in isolation rather than as a part of the larger region that falls under the SEMCOG Metropolitan Planning Organization holds, the exclusion of Highland Park and Hamtramck—the two cities entirely encapsulated by the larger Detroit—may not have been as reasonable. These two cities host black populations, though not as proportionately high as a Detroit’s, sites of economic opportunity, and, most importantly for the transit networks modeled, sit along the currently under construction rail line down Woodward Ave. Integrating the Woodward Ave. transit line into the proposed reparations-based networks would suggest that these two cities serve as both possible opportunities and possible sites of reparative responsibility. If either model were to be implemented, the integration of Highland Park and Hamtramck into both the calculation of travel demand as well as the identification of station candidate sites is advisable.

Within the framing of the larger goal of this reformation of practices within the field of transportation, a broad definition of economic opportunity was adopted. Constraining the metric of economic opportunity to elements of employment and education solely, is somewhat limiting. Furthermore, the model does little to match skillsets to particular employment positions. The model assumes that a mechanic derives the same utility from access to an available position at a law firm and one at an auto shop; clearly this could be improved upon. Finally, on the matter of measuring economic opportunity, all assessment measurements of Model 2—designed to work in tandem with a city-wide policy of transit-oriented development—are incomplete. Model 2 is intended to both provide access to existing sites of economic opportunity and to incite the creation of new
sites. However, at this point there is no way to be certain of what programming new TOD would entail, if indeed development occurred at all. As a result, the level of access to economic opportunity in Model 2 was evaluated in the same way as Model 1. This is not an apples to apples comparison. Ideally, exploration into reasonable assumptions regarding TOD programming, employment and education sites, and number of positions that are, with a certain level of likelihood, anticipatory would have been done and the number of sites of economic opportunity for Model 2 would have been adjusted accordingly prior to evaluation.

The final limitation of note regarding the network design reformation proposed in Chapter 4 involves funding and the question of just who shall provide mobility services for the city of Detroit. A discussion of available funds would likely change the scale of the proposed models. An attempt at allowing for different budgetary constraints was made in the experimentation with networks of different size—60, 40, and 30 stations. However, even rough financial estimates would have minimized the need for the creation of so many potential scenarios and would have added a sense of reality to both model proposals. That said, the greatest value of this piece lies more so in the network creation methodology than in the on-the-ground implementation potential. Nonetheless, to Detroit specifically—as opposed to the planning and transportation communities—I imagine that great value would have been derived from concrete figures/parameters.

This discussion of available funding would have been largely informed by an exploration of cross-sector shortfalls and benefits. With respect to transit, in which cases does the public sector perform well? When does it perform poorly. How do these performance measures change when evaluating the private sector? Is BRT particularly well suited for instances of public-private partnering? And what lessons can be learned from other, active BRT systems around the world? While addressing these questions was not necessary to create and assess a well-informed model, their presence in the thinking responsible for all that is discussed in Chapters 4 and 5 could only have improved the quality of the network design.

7c. Areas of Further Exploration

The changes to standard practices within the field proposed here are by no means the end of the line. Building upon the approach to transit network design applied here, several areas of further study reveal themselves as natural courses of action. Firstly, Detroit is not the only place in the US, let alone in the region, in dire need of improvements to the existing state of mass transit. Perhaps before tackling the entire nation, exploration of how the SEMCOG Metropolitan Planning Organization can improve regional connectivity while applying the values supported by Reparation Planning ought to be undertaken. For example, how can Detroit, via transit, benefit from some of the financial strength present in the city’s surrounding suburbs, and how can black suburban communities experience increases in their set of economic opportunity?
Secondly, for the sake of exploration and because of such poor levels of current service, the network creation process applied here treated the existing bus service as non-existent. To this effect, all results and proposals were intended to completely replace the bus network. While the BRT network may indeed make some routes obsolete, it is far more likely, and would ultimately provide fuller coverage for transit users, that existing bus routes would be modified to support the BRT system. They may run routes that feed into the larger, faster, BRT networks from areas of particularly low access. The best use of the existing bus fleet in a scenario that assumes full build-out of a BRT or rail network is worth exploration.

Third, transit does not exist in a vacuum; Detroit is unfortunately, and as all cities are, plagued by numerous factors of urban living to which the following characterizations apply: unsatisfactory, inequitable, broken, dangerous, and stagnant. A look at how the models created here and their resulting networks might affect or be applied to non-transportation problems. How might this network improve Detroit’s schools; or aid in provision of basic services; or encourage healthier living, for example? Urban planning is a naturally interdisciplinary field, and so it is my hope that this research not be siloed strictly to the realm of transportation. Especially since the idea of Reparation Planning is not at all transportation dependent; it lends itself particularly well to urban planning at large, public policy, urban design, and community organizing.

Finally, with the construction of an entirely new above ground mobility system, be it purely theoretical or in the pipeline, comes the opportunity for significant design proposals. Detroit is no stranger to non-traditional urban design proposals (Ryan 2012, xiv), and the Reparations Planning-based models of mobility created here suggest that urban design will play a sizable role in shaping the city’s future urban form as well as transit rider experience. In sum, much like a need for a close look at the precise programmatic elements best suited for any TOD projects throughout the city. Detroit’s built environment may call for the implementation of out-of-the-box design approaches to render future urban forms that further support Reparations Planning ideals.
REFERENCES


MacDonald, C. (2015). Land Bank to sell properties to occupants for $1000. *Detroit News*


APPENDIX

Figure A1: Intra-Model Comparison for Model 1

Data Source: U.S. Census Bureau via Data Driven Detroit
Figure 1: Site-Model Comparison for Model 2
Figure A3: Wayne County Map

- Detroit in Red
- Wayne County in thick black outline
- The state of Michigan in bottom right corner with Wayne County highlighted
