Sorkin’s essay contains no recognition of New Urbanism’s successes (however partial), nor does it ever present specific cases to back his critiques. It straddles the lines of nihilism to say that nothing good has ever been done by New Urbanists and that his argument, despite its shallow examples and lack of specifics, should be accepted as the defining perspective on the subject.

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A. Alfred Taubman College of Architecture + Urban Planning
Letter from the Editor

In our call for submissions this year, we asked students to respond to the dual themes of endurance and adaptation. To us, these two themes are really part of the same mystery: in a world of such constant and immense pressures, how can anything possibly withstand the test of time? Though interpretation was left purposefully open, we hoped that students would explore these two concepts in a way that would help us understand how the seemingly opposite notions of persistence of character and dynamism play into long-term stability and permanence.

Our contributors did not disappoint. The pieces in this edition illuminate our themes from a number of different perspectives. They address familiar sub-themes like agency, power, social justice, and the natural environment. As we move from one article to the next, we're challenged to question the degree to which it's possible to plan, as well as the extent to which it's wise to design.

We open Agora 2011 with an article by Paul Irwin. In “Learning from the American Ghetto,” he describes the long-standing existence of enforced spatial segregation in America. Though this topic frequently arises in the context of African American ghettos in the inner city, Irwin frames his discussion around the historic and continued marginalization of Native Americans on reservations. His goal is to determine the cause of this perpetual separation, and whether it is the same set of structural factors that determine the segregated ghetto.

Continuing the discussion of compromised agency, Jonathan Tarr's piece on tall urban form questions the rationale behind ultra-high trophy skyscrapers. He discusses the disturbances that these forms introduce onto the urban landscape, as well as the oppressive qualities they present to urban dwellers. The main theme of this article is the disproportionate amount of power given to a select few who then dictate the shape of the urban environment for the rest of society.

Dorothy Schwankl's photographic essay on the demolition of Cabrini-Green Towers in Chicago helps to further illustrate the interplay between the built environment and stability. These images are a testament to the unintended consequences of a planning approach that neglects social equity.

Susannah Cramer-Greenbaum’s perspective on the Italian suburb of Garbatella offers a surprising contrast to the above pieces. It too describes the effect of place on a given community, but in this case, how it can result in health and longevity—this is the story of a planned working-class suburb that serves as a lasting example of Ebenezer Howard’s Garden City principles.

By now, the perceived importance of placemaking has become a salient theme. Eric Dennis addresses this as well in his piece on Detroit. Though the current status of the city as “fallen” or not is a matter for debate, Dennis draws us past the usual conversation into a lesson on non-place. If anything, it turns our attention back to the intangible infrastructure of intent glimpsed in the previous articles, as well as the ways in which it determines future development.

Beginning a new train of thought, Lauren Williams’ “The Spectacle Park” brings to light the slow evolution of familiar things. In this article, Williams describes an urban park typology that has only appeared in recent years. Spectacle Parks, she asserts, exist as a response to our changing relationship with public open space. But how do they compare when viewed next to the long-established and popular Pleasure Grounds?

The following piece on the LEED system not only acts as our segue into practical analyses, but provides a basis for us to begin speculating about the future. The authors demonstrate how the system acts as a platform for future development. They remind us again that cities are “path dependent,” pointing out LEED’s potential to spur positive environmental change, as well as the dangers of choices made to pursue points rather than site- or use-appropriateness.
“Re-Imagining Round Rock” was a piece developed in the joint architecture-planning studio at Taubman College. In it, Susannah Cramer-Greenbaum and Erica Wannemacher present zoning parameters based on the city’s underlying soil composition. The project brings out the theme of site-appropriate development and translates it into a way of implementing urban agriculture, positing that this productive coupling has the potential to sustain itself over time.

Melinda Morang’s literature review on bicycle infrastructure is an introduction to arguments surrounding best practices in promoting multi-modal transit. This piece acknowledges that the long-term popularity and ultimate success of cycling as a transportation option in any given place may be greatly influenced by the initial placement of the bike path. This is another perspective on the manner in which underlying structure can define our subsequent interactions with a place.

The “Southwest Detroit Wind Feasibility Study” is an extension of a discussion where endurance and adaptation are mutually dependent—the pursuit of stable sources of renewable energy. Excerpted from the final report of an urban planning practice course, this study details the kinds of issues that cities must address when considering massive infrastructure projects like turbine siting.

The Woodward Avenue Light Rail Project has drawn a great deal of scrutiny this year, not least from members of Taubman College’s urban planning department. The issue closes with two articles on the subject, each analyzing a distinct element of the project’s feasibility. Kevin McCoy’s piece is more immediate, addressing the current debate on center vs. curbside alignment. His analysis takes a more practical approach, considering factors such as safety, speed, and economics. Eric Seymour and Diana Flora’s piece shows us the project’s ethical underpinnings, bringing us again to the theme of social equity. Drawing from numerous case studies on gentrification and the uneven distribution of benefits in other light rail cities, this article serves as fair warning of the challenges that this project will ultimately face. Given the emphases of the other works contained in this volume, it seems appropriate to end on this note.

After four years of strong work coming from students across the University of Michigan, we are proud to present a fifth. This volume represents yet another multi-disciplinary collection of diverse, thought-provoking work. Agora exists as a place of exchange, where we can compare pieces like these to reveal connections in our understanding of genuine persistence and lingering challenges in our attempts to achieve true permanence. We hope that each reader takes his or her own lessons from this issue, and we look forward to returning year after year to continually build upon what we’ve learned in together.

Katharine Pan
Editor-in-Chief

Eastern Market, Detroit Michigan. Photo: Bryan Alcorn, 2010
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Learning from the American Ghetto
A Comparative Analysis of African American Inner Cities

Paul D. Irwin

Introduction
The American urban “ghetto” has been widely studied by social scientists for decades and has been characterized as a place of concentrated poverty, high unemployment, welfare dependence, isolation from the remainder of urban society, and a place of pathological social conditions. Native American reservations have received comparatively less attention from social scientists, but are sometimes compared to the urban ghetto. The comparison between the ghetto and Native American reservations is apparent even in popular discourse, such as when the Navajo Nation is depicted in African American rapper Akon’s “Ghetto” music video. The song and video narrate a class-based, interracial solidarity between those who feel helpless and struggle to live within the social constructs of the ghetto. How accurate is the comparison between Native American reservations and African American inner cities? To investigate the similarities and differences between Native American reservations and African American ghettos, this paper first compares their conditions, characteristics, structures, and historical context. Additionally, this paper examines tribal economic development strategies in order to determine whether social conditions stem from a lack of economic development and opportunity, or instead are the result of structural isolation and detachment from mainstream society and economic life.

Starting Point: Loic Wacquant’s Distinction Between Ghetto and Reservation

Wacquant (1997) addresses the American conception of the black poor and the ethno-racial dominations that have formed and distorted the understanding of the ongoing (re)articulation of color, class, and place in the American metropolis. He describes three deep-seated, pernicious premises that have dominated debate on racial division and urban poverty in the United States and which form the American conception of the ghetto. First is the tendency to simply designate the ghetto as an urban area of widespread and intense poverty. Second is the idea that the ghetto is a disorganized social formation that can be analyzed in terms of its lacks and deficiencies. Third is the tendency to exoticize the ghetto and its residents, highlighting only the extreme and unusual aspects of ghetto life. These premises are fallacies and Wacquant (1997) argues, “The fact that ghettos have historically been places of endemic and often-acute material misery does not mean that a ghetto has to be poor, nor that it has to be uniformly deprived” (p. 343).

Wacquant stresses the role of racial isolation, not poverty, in defining a ghetto, and claims that not all low-income areas are ghettos. He refers to Native American reservations as an example of such a low-income area. While this seems to reflect a clear opinion that reservations are not ghettos, in a footnote he states: “whether Native American reservations qualify as a subtype of ghetto or are best understood as a distinct mechanism of ethno-racial subordination would require an extensive discussion that is not possible here” (p. 344). This paper aims to address Wacquant’s question and to explain the historic and contemporary structures of African American inner cities and Native American reservations, which have led to their conflation.

Definitions: Social Exclusion, The Ghetto, and Native American Reservations

Madanipour (2007) writes that social exclusion should be understood in its political, economic, and cultural dimensions. From a political standpoint, the denial of participation in decision-making and lack of political representation can alienate individuals and social groups. Culturally, exclusion from common channels, cultural communication, and integration can similarly alienate and marginalize minorities whose language, race, religion, and lifestyle are different from those of the larger society. Economically, exclusion from employment leads to a lack of opportunity for production and consumption, and undermines the ability of individuals and households to actively participate in social processes. The combination of these forms of disenfranchisement can create an acute form of social exclusion, which keeps the excluded at the margins of society and can often be seen through

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1 Although the term “ghetto” carries pejorative implications, I use the term as it is commonly used in social science literature.
clear spatial manifestations in deprived inner cities and peripheral areas (Madanipour 2007, 161). The concept of social exclusion as understood in this framework is important because it is one of the underlying factors in the formation of ghettos.

Massey and Denton (1993) define the ghetto only in terms of a neighborhood’s racial make-up, and not by class or income. They described the ghetto as a set of neighborhoods that are exclusively inhabited by members of one group, where virtually all members of the group live involuntarily, yielding an extreme level of social isolation (Massey and Denton 1993, 10, 19). For African Americans, the high degree of residential segregation imposed on them ensures their social and economic isolation from the rest of American society (Massey and Denton 1993, 160). Wacquant would agree with Massey and Denton in that a ghetto is not a function of income, but would add that ghettos have become poor as a result of social and historical factors. “It is because they were and are ghettos that joblessness and misery are usually acute and persistent in them – not the other way around” (Wacquant 1997, 343). Today, the ghetto is a part of modern American society; it was created by whites to isolate and control the growing urban black population, and it is now maintained by a set of institutions, attitudes, and practices that are deeply embedded in the structure of American life (Massey and Denton 1993, 217). I will focus on the concept of ghettos in the African American-specific case here, though I do acknowledge that there are many other ethnically diverse ghettos not only in the United States, but in international contexts as well.

Similarly, reservations have been used as a mechanism to isolate and control the Native American population. Native American reservations are areas of land reserved for a tribe or tribes under treaty or other agreement with the United States as permanent tribal homelands, and where the federal government holds title to the land in trust on behalf of the tribe (U.S. Department of the Interior n.d.). There are currently 56.2 million acres of land held in trust by the United States, divided into approximately 326 reservations. The largest reservation is the 16 million-acre Navajo Nation Reservation encompassing parts of Arizona, New Mexico, and Utah; the smallest is a 1.32 acre parcel in California (U.S. Department of the Interior n.d.). Currently, there are 565 federally recognized tribes in the United States. Not all tribes have reservations, but some have multiple.

Reservations share many of the same social characteristics as urban black ghettos: they are homogeneous and segregated from other racial groups, isolated, and excluded. This belief is exemplified by Horatio Alger-type stories, written during the rise of urban America, of poor immigrant boys from American inner cities who were able to gain social and economic success via hard work. The ugly underbelly of these hopeful narratives is that those Americans who do not escape poverty, whether from the urban ghetto or the rural reservation, are individually blamed for not succeeding against the powerful structural forces that have been developed to maintain the economic power of the elite.

In other words, the notion of American exceptionalism has been promoted as meritocracy, where opportunities were equal for all and economic mobility was based on one’s ability and achievement, and even a recent immigrant or someone from the urban ghetto has the opportunity succeed. This belief has been used as a powerful justification for the ongoing structures that maintain race and class hegemony via spatial practice and
economic policies. In the twentieth and twenty-first century United States, these understandings of opportunity, labor, race, and class have been used to explain — and at times justify — the structural oppression of African Americans in the inner city and Native Americans on reservations. The poverty and lack of economic mobility of both groups, maintained by economic policy and spatial separation, have been wrongfully explained in popular culture as a result of race rather than a result of structural issues they stem from.

Racial exclusion and residential segregation have long been common elements in U.S. metropolitan areas. American urbanization in the late nineteenth and early twentieth centuries was fueled by massive European immigration, and urban spaces became notorious for their clear ethnic geographical boundaries. This gave rise to portions of the urban landscape that even today are known as ‘Little Italy,’ and ‘Chinatown,’ which have distinctive qualities representative of the identities of its inhabitants (Abrahamson 2006). African American urbanization also grew during this time period, mostly after the conclusion of the Civil War, which allowed newly-freed slaves to migrate to both southern and northern cities (The Great Migration), away from the rural plantations where they had been a captive labor force.

In U.S. cities, racially homogeneous neighborhoods have become common; for African Americans, however, these are socially and economically enforced conditions, while the ethnic enclaves which Abrahamson discusses often exist by choice. “In fact, African Americans are kept to restricted ghettos simply because white people, via numerous mechanisms of prejudice and privilege, do not allow blacks to live or live comfortably in white neighborhoods” (Goldsmith 2002, 132). These mechanisms have ranged from individual practices of racism and prejudice to structural policies, such as redlining conducted by lending institutions. Practices such as these greatly limit African Americans’ opportunity to live or afford to live in more integrated neighborhoods.

At the culmination of World War II these factors began to shape the areas where African Americans were and were not allowed to live and/or purchase property. Additionally, capital investments in housing, highways, shopping centers, and schools fueled the suburbanization of white middle-class households, creating a huge space of racialized poverty in the inner city. The construction of public housing (or lack of it) created separate, publicly subsidized, racialized spaces for whites and blacks (Zukin 1998, 515). For the majority of African Americans, living in highly segregated conditions is a fact of life; no other group in U.S. history has been so persistently segregated via economic and social structures except for Native Americans, who were segregated formally, by law, on reservations (Goldsmith 2002, 132).

Sturtevant (1976) describes how most portions of the American population decided to leave their native country, implying some dissatisfaction and thus readiness to adjust to a new environment, while others are here because they were violently forced into slavery and had no choice but to adjust and assimilate. However, for Native Americans this is not the case: they are members of societies that remained on their native lands, where they were invaded and overwhelmed by foreigners (Sturtevant 1976, 22). Popular culture in the United States typically depicts Native populations as conquered, giving rise to a conception of Native Americans as having lost their sovereignty. However, the reality is that few tribes in the U.S. were conquered militarily, and most entered into treaties with the United States Government (Kalt and Singer 2004, 8). These treaties were not always fair or respected, but it is this basic information that produces a vast difference between the historical experience of Native Americans compared to other racial groups that experience racism and exclusion.

Treaties between the United States and tribes were based on a nation-to-nation legal relationship in which the treaties preserved each tribe’s sovereignty and made other promises in exchange for the vast majority of land in the United States. These treaties promised to respect tribes’ rights and recognized their governance over reserved land (Kalt and Singer 2004, 8). No other minority group in the United States can claim the same sovereign legal and political status as federally recognized Native American tribes (Snipp 1986, 145). However, even with the recognition of tribal sovereignty, federal policy toward Native Americans has been assimilationist. Carter (2000) describes the nature of federal policy:

At the apex of United States trans-continental expansion, with most Indian lands overrun, the federal policy of assimilation actively sought to cleanse Indians of tribal traditions, including customary governing and justice systems. The success of this policy is demonstrated by the fact that many tribal governments had ceased to function in any effective way by the end of the nineteenth century.

Despite these assimilation efforts — such as forcible removal from ancestral homes, generations of children placed in boarding schools, and the undermining of traditional culture, Native American tribes endured and many still retain their distinct cultures (Phillips 1996, 240). Government policy toward Native Americans has been one of prejudicial spatial practice, with acts such as the Indian Removal Act of 1830, signed by President Andrew Jackson. In 1851, the U.S. Congress passed the Indian Appropriations Act, setting in motion an official federal policy that allowed for the creation of reservations and the placement of Native Americans on
them. Immigration and urban population growth within non-Native America led to government policy aimed at weakening tribal power by opening Indian Territory. The Dawes Act (Indian Allotment Act) of 1887 is commonly agreed upon as being one of the most devastating pieces of legislation for Native American reservations. The Dawes Act allotted portions of land to eligible Native Americans, imposing private property values and deeming the remaining portions of reservation land as surplus, open for non-Native settlers to purchase. “By 1934, when the Federal government ended allotment (through the 1934 Indian Reorganization Act), allotment had cost Native Americans almost 90 million acres, two-thirds of the land they owned fifty years earlier” (Bobroff 2001, 1561). Yet, as a result of the Indian Reorganization Act that ended allotment, tribes re-established congressional support of tribal sovereignty and tribal self-government.

Tribal sovereignty refers to the inherent, reserved, and aboriginal right to self-govern without limitations by federal or state governments. While the Indian Reorganization Act strengthened tribal government powers, it both enabled and required tribes to adopt constitutions and bylaws for their governments. Tribal governments have nearly the same powers as the federal and state governments to regulate their internal affairs, with only a few exceptions; these powers include, but are not limited to, the power to form a government, control their enrollment, regulate their property, maintain law and order, and regulate commerce. While the Reorganization Act has generally served many tribes well, it by no means fully satisfies the ideal of self-determined tribal government. Instead, it is criticized for imposing the foreign notion of written constitution into tribal tradition (Carter 2000, 8-9). Additionally, many tribes have not had the financial means to effectively exercise their sovereignty of government, although the right to self-government and self-determination forms the nucleus of Federal Indian Policy to this day. The lack of funding and ongoing authority of the Bureau of Indian Affairs (BIA) has prevented major progress towards self-sufficiency; and while the Indian Reorganization Act marked the beginning of a period of tribal self-control, it came in exchange for minimal economic support from the federal government (Gerdes et al. 1998, 20).

Funding has not only been an issue at the federal level, but also from financial institutions. An underlying issue on reservations is the inability to access loans and borrow against the value of land. The unique structure of reservations related to tribal land status, sovereignty, and the requirements to gain title from the U.S. Bureau of Indian Affairs (BIA) has meant an absence of private housing development and private financial lending institutions on reservations (Manchester 2001, 317). Historically, banks would not lend to prospective borrowers on reservations because the land is held in trust by the federal government, making it impossible to repossess if the borrowers were to default (McKee 2004). According to a U.S. General Accounting Office report, during the 5-year period from 1992-1996, lenders made only 91 conventional home purchase loans to Native Americans on trust lands (Manchester 2001, 317). The resulting housing stock has been largely federally funded, or consists of mobile homes that can be repossessed. In the 1990s, 80 percent of new housing units built on reservations were constructed under various Housing and Urban Development programs (Pickering 2004, 113). Lending practices have had significant impact on reservations, resulting in housing shortages to weak business development. This has also prohibited reservations from being able to urbanize as other areas across the United States have. While other areas have been able to utilize the financial system to facilitate improvements and development, reservations have not.

This overview of the historical differences between the development of the African American ghettos and Native American reservations exposes the need to understand the structural context of Native American reservations, and, in particular, to investigate whether the spatial segregation of reservations also produces economic segregation and oppression. The following section describes the current demographics of Indian Country, and examines tribal economic development strategies to determine if they have had any influence in reversing continued social and economic segregation.

Reservations: Social and Economic Conditions

The most obvious comparison between Native American reservations and urban ghettos lies not only in their spatial segregation, but also in the confluence of poverty and exclusion from mainstream society. Logan and Molotch (2007) describe the cause of these patterns:

These patterns of discrimination and deprivation are obviously not the result of recent trends like suburbanization or high-tech displacement. These patterns represent a historically consistent, sequentially reinforcing practice of repression. The only people lower than blacks in their contemporary economic standing are the Native Americans (Sowell 1981), also not “immigrants” but subjected as despised “savages,” to the harshest repression (indeed, genocide). Today they live in residential areas that, whether as remote reservations or urban slums, have high levels of dependence on outside bureaucracies and a weak “business tradition.” This situation, like that of blacks, implies something about the difference between immigration and subjugation, not arrival times. (p. 131)

Therefore, the continued poor economic standing of both Native Americans and African Americans can be
understood as a result of their historic and continued repression, rather than by recent spatial or industry trends or, for African Americans, by arrival time to this country.

The unique historic status of Native American tribes in law and public policy has characterized them as “captive nations,” referring to tribal communities as “domestic dependent nations” (as cited in Snipp 1986, 146). The continued poverty coupled with spatial segregation suggests that despite the divergent historical experiences of Native American reservations and urban ghettos, their contemporary economic and political contexts are more similar than they are different. For Native Americans, like African Americans in the inner city, their continued economic and political oppression is also intimately connected to federal and state policy. Matthew Snipp (1986) describes the consequences of federal policy on Native Americans:

The status of captive nation paved the way for internal colonization by making formerly self-sustaining Indian tribes dependent upon federal authorities. As a matter of stated policy, for good and bad reasons, American Indians were made “wards” of the State with federal authorities, primarily the BIA, assuming extensive oversight responsibilities for the management of remaining Indian lands. Since becoming federal wards, Indians have continued to rely heavily on activities such as hunting, fishing and subsistence agriculture for their subsistence. (p. 154)

Federal policy towards Native Americans dramatically transformed the way of life of formally self-sustaining tribes, and created a strong reliance and attachment to reservations.

The Native American attachment to reservation life has been viewed as a strong impediment to assimilation and absorption into the general population (Kelly 1957, 71). In spite of this, federal assistance programs were developed to encourage Native Americans to relocate to urban, industrial cities (Kelly 1957). The Bureau of Indian Affairs’ Urban Indian Relocation Program, begun in 1952, moved Native Americans from reservations to cities across the country including Chicago, Cleveland, Cincinnati, Denver, Los Angeles, San Francisco, and San Jose (The U.S. National Archives and Records Administration n.d.). The program relocated at least 30,000 Native Americans in the 1950’s and almost three times that during the 1960’s and 1970’s (Burt 1986, 85). An impetus for the relocation program was the tens of thousands of Native Americans who moved to cities during WWII for jobs in the booming war industries.

However, the relocation program had motives beyond the economic well being of Native Americans. The BIA tried to discourage Native Americans from returning to their homes, and at times refused to even give out names and addresses of other Native Americans in the vicinity. It believed that association would encourage cultural contacts and identification rather than assimilation (as cited in Burt 1986, 91). Many of those who were relocated could not adjust to urban life or became homesick for their families and communities, and ultimately returned home. City life was vastly different from what most Native Americans were accustomed to, and cultural dislocation became one of the most significant issues with relocation programs.

Despite federal programs aimed at improving economic conditions on reservations, historically, tribal communities have been economically devastated and isolated as a result of their relations with the United States. This has been compounded with the historic lack of access to loans for homes and businesses. Additionally, housing shortages have emerged due to that lack of financial capital and with a significant share of the housing stock dependent on federal housing programs. These shortages have had the potential of forcing middle income Native Americans off reservations for housing, when they exceed the income limit to qualify for federal housing programs. Housing shortages have only further impacted the social and economic conditions on reservations; they have the potential to force middle incomes to seek housing elsewhere. This prohibits those individuals from contributing to their communities and further isolates lower income groups.

Demographically, Native Americans have fallen drastically below the national average in nearly every indicator of socioeconomic status. Cornell et al. (1998) provides research on the economic conditions of Native Americans prior to the emergence of gambling:

The available evidence on pre-gaming economic conditions in Indian Country provides a long list of alarming comparisons between tribal economic and social conditions and U. S. national averages: Indian per capita income is about 40% of the national average, the Indian poverty rate is almost four times the national average, the incidence of Indian homes lacking complete plumbing is over 14 times the national average, alcoholism death rates are more than five times the national average for Indian adults and more than 17 times the national average for Indian youths, and so on. (p. iii)
Economic development has become the top priority for nearly all tribes, and over the past two decades, gaming has emerged as the primary tool. The popularity of gaming derives from it being one of the few economic development strategies that utilize a tribe’s distinct sovereignty. For tribes that are often located in depressed rural areas with few other options, it offers the opportunity to draw in outside revenue. However, the spatial isolation of reservations makes it impractical for all tribes to successfully challenge structural economic inequality via gaming enterprises. “For some tribes, gaming has provided the only successful means to obtain the funds to be able to exercise their inherent powers of self-government” (Saginaw Chippewa Indian Tribe of Michigan n.d.). Tribes are able to utilize gaming revenue like a local or state government would use taxes: to provide for the general welfare of their citizens. Tribes without strong economic bases struggle and are unable to fund the same kind of governmental services and programs that tribes with successful gaming operations have. As of 2009, 237 of the 565 federally recognized tribes in 28 states were involved in gaming to create jobs, fund essential government services and rebuild their communities (National Indian Gaming Association).

Data as of 2000 revealed that per capita income of reservations with gaming only marginally benefited over those without, and while per capita incomes on gaming reservations increased at a greater rate of change over a 10 year period than both non-gaming reservations and the total U.S. population, the equity gap remains large. The available data on Native Americans make apparent that their social and economic characteristics fall dramatically below the total U.S. population, the equity gap remains large. The data not only makes the equity divide between Native Americans on reservations and the rest of the U.S. population, but also demonstrate that the benefits of gaming have been minimal, especially once the Navajo Nation reservation has been omitted. While there is no doubt that select tribes have attained economic prosperity as a result of gaming, those tribes that have succeeded tend to benefit from their geographic location and their proximity to urban areas or a larger population base. Against popular conception, data has yet to show that gaming has made significant improvements overall in bridging the equality gap between Native Americans on reservations and the total U.S. population. Future per capita income data for gaming reservations is expected to continue increasing, however, gaming is not a feasible option for all tribes and many Native Americans have not and will not participate in this prosperity. In addition to Taylor and Kalt's study, I have provided African American per capita income during this same period to allow for comparison. This statistic reveals the equity divide between African Americans and the total U.S. population, and while urban ghettos have not been discretely separated as reservations have, these statistics affirm Logan & Molotch's description of Native Americans’ contemporary economic standing in relation to African Americans.

Gaming is only one facet of economic life on Native American reservations, and while it offers hope for improving and funding government operations and providing for the general welfare of tribal citizens, I mention it only to illustrate that there is underlying spatial and economic barriers. These barriers correlate the economic conditions of Native Americans on reservations with African Americans living in inner city ghettos. To explain the economic standing of Native Americans, it must be acknowledged that “the fact that tribal lands are not have been discretely separated as reservations have, these statistics affirm Logan & Molotch's description of Native Americans’ contemporary economic standing in relation to African Americans.

These figures make clear the equity divide between Native Americans and the rest of the U.S. population, and explain pressures for economic development in Indian Country.

These statistics focus solely on real per capita income, but the trend remains throughout the social and economic indicators Taylor and Kalt present. The data not only makes apparent the equity divide between Native Americans on reservations and the rest of the U.S. population, but also demonstrate that the benefits of gaming have been minimal, especially once the Navajo Nation reservation has been omitted. While there is no doubt that select tribes have attained economic prosperity as a result of gaming, those tribes that have succeeded tend to benefit from their geographic location and their proximity to urban areas or a larger population base. Against popular conception, data has yet to show that gaming has made significant improvements overall in bridging the equality gap between Native Americans on reservations and the total U.S. population. Future per capita income data for gaming reservations is expected to continue increasing, however, gaming is not a feasible option for all tribes and many Native Americans have not and will not participate in this prosperity. In addition to Taylor and Kalt’s study, I have provided African American per capita income during this same period to allow for comparison. This statistic reveals the equity divide between African Americans and the total U.S. population, and while urban ghettos have not been discretely separated as reservations have, these statistics affirm Logan & Molotch’s description of Native Americans’ contemporary economic standing in relation to African Americans.

| 2 | Oklahoma Tribal Statistical Areas (OTSA) were omitted because they include nearly the entire state of Oklahoma (and some urban areas). OTSA’s reflect the conditions in the broader state economy to a degree not typically experienced on reservations. By excluding OTSAs it focuses attention on reservation conditions per se (Taylor & Kalt 2005, 10). | 3 | The Navajo Nation reservation was omitted because it did not have gaming in the 1990’s, and it is twelve times the size of the next largest reservation and has nearly three times the combined population of all other reservations that did not have gaming by decade’s end; as a result, comparisons between gaming reservations and all non-gaming reservations tend to be dominated by the conditions of the Navajo Nation (Taylor & Kalt 2005, x). |

These figures make clear the equity divide between Native Americans and the rest of the U.S. population, and explain pressures for economic development in Indian Country.
largely a function of factors, such as the lack of access to markets, an inadequate infrastructure, and a lower cost of living” (Leichenko 2003, 365). However, reservations’ rural locations fail to fully explain the lack of economic opportunity for Native Americans on reservations. In fact, when one looks at the economic promise and failures of economic development on reservations via gaming, it becomes clear that – like the Federal Housing Administration’s inner city redlining practices and public housing segregation during the mid-twentieth century – federal policies and structures have perpetuated economic discrimination and oppression for Native American reservations as well.

**Conclusion**

A comparison between Native American and African American relation to place can be made by evaluating government programs that have affected each. First is the U.S. Bureau of Indian Affairs’ Urban Indian Relocation Program that forcibly relocated large numbers of Native Americans to industrial cities. As a result, large populations of Native Americans still reside in these urban areas; however, many of those who were relocated ended up returning to reservations after some time. Their return, in part, had to do with the low population of Native people in cities, which did not create and support the types of relationships and networking that Native Americans were accustomed to on reservations.

The second is the Section 8 Housing Voucher Program provided by the U.S. Department of Housing and Urban Development (HUD) that attempted to desegregate the urban ghetto. The program combated criticisms that the federal government had confined minority groups to the ghetto and failed to develop housing programs outside of the urban core (Luttrell 1970). The housing voucher program, initiated in 1974, provided rent subsidies that could be used anywhere in the service area—city or suburb—and in non-segregated neighborhoods. However, according to Leif and Goering (1987) and Hays (1985), Section 8 beneficiaries have contributed little towards integrated housing and desegregation because most holders tend to relocate near their original homes (as cited in Chandler 1992, 526). The choice for Section 8 recipients to reside near their original homes may draw some parallels with what motivated Indian Relocation Program relocatees to return to their reservations. The communities, linkages, and networks established by those in the inner city may give people a reason to stay there, despite the fact that housing vouchers would allow them to leave segregated neighborhoods. These attachments to place are similar to those expressed by researchers as a hindrance to Native American assimilation and reasons for which relocatees were drawn back to reservations despite having the opportunity to live in industrial cities.

Aside from personal connection to place, both African Americans and Native Americans have been bound to place as a result of a set of discriminatory institutions, attitudes, and practices. For African Americans, redlining of neighborhoods is just one of many practices that have historically bound where they could or could not live; this is reminiscent of boundaries created under federal policy for Native Americans. While on one hand reservations were meant to protect Native Americans, on the other they were meant to isolate Native Americans from the wider population. Given Massey and Denton’s definition of the ghetto as a set of neighborhoods that are exclusively inhabited by members of one group and where virtually all members of the group live involuntarily, the historical context of reservations’ formation and the continued reliance upon them suggests that reservations do fall under this characterization. For some tribes, the land that they retain is their ancestral homeland, but others were forced onto marginal and unproductive lands. The exclusion prevalent in both the urban ghetto and on reservations creates an acute form of social segregation that has kept these racial groups at the margins of society in deprived inner cities and peripheral areas.

Social exclusion and economic isolation lay the foundation for the formation of ghettos. Ghettos should not be viewed simply as places of poverty; rather, their social and economic conditions should be understood as a result of historical causation and racial segregation. It is because they are ghettos that these conditions persist. The same can be said for reservations, where Native Americans suffer socially and economically as a result of their imposed structure. Neither Native Americans nor African Americans are or have been traditional immigrants to this country, and their treatment stems from a historical attitude of subordination. Federal policies and structures have perpetuated discrimination and oppression for African Americans in inner cities and Native Americans on reservations. Their current social and economic characteristics appear and can be described as a similar, and their formations have been based on the same institutions, attitudes, and acts of ethno-racial domination, but Native American tribal sovereignty and reservation land held in federal trust creates circumstances unique to Native Americans.

**References**


Tall Urban Form and Counting as an Expression of Power

Jonathan E. Tarr

The design and construction of skyscrapers has engrossed cities throughout the world as a means to express wealth and influence. This has made tall urban form a key component of cities’ infrastructure over the last century. The high price and scarcity of land in central cities are major motivations for constructing towers—primarily for office space, but also for residences and hotels. In this paper, I use the trope of the anthropology of numbers, first used by anthropologist Diane Nelson, to explore who “counts” and how people with power in cities undertake the process of counting (Nelson 2008). The process of counting numbers brings greater understanding to the ways urban residents do or don’t interact with tall urban form as it is built around them. Along the way, this approach reveals problems with excessively tall towers that are often felt but rarely expressed. Numbers and the practice of counting form a lens that observers of cities can use to read urban form and decipher unequal power relationships between groups of urban dwellers.

This paper will also explore the role that counting and numbers have played, among other interdependent factors, in envisioning urban form. Studies of Hong Kong, New York, Chicago, and London will assist this process. The influence of gender is one such factor, where tall buildings are conflated with power and masculinity. Also key to this paper will be the role of corporations—the institutions that count in several ways: in their practices of accounting, in their number of employees, and in the dollars on their balance sheets that propel urban form skyward. Each of these contributes to the argument that counting is a frame through which to view cities that have a significant number of towers. Despite the huge numbers of individuals in the world’s largest cities, very few control the creation of the urban forms that everyone uses. The divergent interests of corporate institutions and city residents raise questions of power relationships. Arjun Appadurai considers power relations in terms of numbers in his study of globalization, as well as the ethnic and religious violence that results: [n]umerical majorities can become predatory and ethnocidal with regard to small numbers precisely when some minorities (and their small numbers) remind these majorities of the small gap which lies between their condition as majorities and the horizon of an unsullied national whole, a pure and untainted national ethos (p. 8, emphasis in original).

I rely on Appadurai’s work here because of his careful consideration of power dynamics between groups in a rapidly globalizing world. Like the cities in this paper, the arenas of Appadurai’s book are best explained in numerical terms. He argues that the very fact that a minority group

The City, Building Form, and Actors

An initial definition of the city as a conglomeration of diverse types of people is useful for this paper. The city, with its range of ethnic, socioeconomic, generational, and occupational diversity, is the reality in which city builders work (even if the structures they create are intended only for a small number of residents). Larry Ford echoes this interpretation when he describes the impact of towers upon the American city: “Tall office buildings and the resulting skyline came to epitomize what an important city should look like in America” (Ford 2003, 141). Following the era of modernist city building, the largest of these places became what Saskia Sassen calls globalized cities, “international business and financial centers … sites for direct transactions with world markets that take place without government inspection” (Sassen 1991, 216). This type of business justifies the existence of large towers, containing millions of square feet to house workers.

These are the contexts in which American cities have built towers, while places like Hong Kong and London followed suit in their quest to become prominent global financial and corporate centers. All of these cities, through the presence of corporations that increasingly decentralized to more numerous office locations, entered a postmodern era with great uncertainty, both in the size of the municipal tax base and number of jobs created or lost (Harvey 1991, 240; Sassen 1991, 221). These trends informed the direction of cities as they built new towers.

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was numerically small accounted for the threats arising from larger majorities. These are conceived in the first place, Appadurai claims, via instruments of the modern state, as “[m]inorities and majorities emerge explicitly in the process of developing ideas of number, representation, and electoral franchise” (p. 41-42, 50). I will narrow the application of Appadurai’s theory to the large “global” cities like New York, London, and Hong Kong, but his claim could stretch much farther.

I argue, then, that majorities and minorities, small and large numbers of people, are key to comprehending the city and its power structures. Here I focus on the builders and occupiers of tall urban form, numerically a tiny minority but disproportionately powerful in their effect on how the city works and what it looks like. Appadurai calls these the “oligopolies, elites, and tyrannies” that also comprise small numbers (p. 61). The large majority of urban residents, by contrast, only passively interact with towers.

Municipal governments have usually supported the construction of skyscrapers. The economic boost of massive construction projects followed by leases from large corporations virtually guaranteed the support of mayors, city councilors, planning commissioners, and economic development officers. Moreover, the symbolism of a trophy tower—signifier of a wealthy and powerful city—can direct city leaders to support buildings much taller than the local real estate market would otherwise support. A rare but notable exception is the use of floor-area ratios (FARs) in zoning codes to restrict height and implement building setbacks. First practiced in New York almost 100 years ago to limit a building’s bulk, this was a rare instance of using numbers as a regulating force (Ford 2003, 143). However, the primary use of an FAR is to define an area in which taller buildings can occur, delineating a Central Business District (CBD) area and keeping tall urban form out of other neighborhoods at the same time. It was not until the 1950s that the New York Department of Planning and Zoning offered FAR “bonuses,” in the form of allowing higher floor-area ratios for buildings that also included public plazas, access to transit stations, or other amenities to benefit individuals (Ford 2003, 143). With this spatial separation in place, city leaders have promoted towers whenever possible for their CBDs.

Building tall for status does not occur only in American cities. Anthony King argues that London’s power as a financial center is visually represented by its tallest building, at the time of writing the NatWest Tower, today only the fourth-tallest in London as others continue to seek the trophy distinction of highest tower (King 1990, 88). And as for Hong Kong, Huang notes, [m]onumentality in Hong Kong’s urban contexture is
best manifested by its distinctive capitalist architecture, i.e., the skyscrapers that assume the functions, forms, and structures of monuments. Global compression requires monumental buildings … [to serve] as a mirage of collective will, in Hong Kong’s case, a will to achieve phenomenal economic success from its liberal economic system and global city status (Huang 2004, 18).

Towers, therefore, carry a great deal of symbolic weight for their host cities and will likely continue to be built.

Within these urban contexts, the people who assign numbers act as oppressors, whether deliberately or not. The next section will detail how oppression arises with building, but in general most urban residents only interact with the numbers themselves (in the form of square footage, or numbers of floors), not the people who created them. The response of urban theorists, led by Sassen, has been “to understand the global city as a dual city with the intensification of two classes—the new elite or the international business people and the low income ‘others’” (Huang 2004, 5; Sassen 1991, 210). Here, I extend this argument to the site where these two classes meet and interact: in and around the towers where much of the city’s business occurs.

The Anthropology of Numbers: Who Counts and Who Gets to Count?

The design of towers is usually not friendly to passing city residents, as exemplified by Tsung-yi Huang’s research. In reality, the massive scale of the built environment in Hong Kong, Tokyo, and Shanghai alienates the individual attempting to navigate superblocks. Buildings both tall and short present blank walls toward the sidewalk. This is similarly true in large cities worldwide, where a modernist aesthetic fused with bullish economic ambitions to create fortress-like skyscrapers that leave few available parcels of land in Central Business Districts for pedestrian-oriented open space.

But if towers in particular are oppressive and isolating to passersby, I argue that the situation of workers inside them is even more difficult. These instrumental people fit into Appadurai’s binary of minorities in a globalizing world: “needed but unwelcome” (p. 44). In order to support huge buildings, and to run the businesses housed inside, legions of workers are necessary, but towers remain unresponsive to their needs. In this section, I use the questions framed by ethnographer Diane Nelson—

1 Nelson originally used the anthropology of numbers in her study of Guatemalans attempting to make sense of civil war and genocide, asking such questions as whether a numerical threshold of victims is required to term a mass murder a “genocide.” I have chosen to adapt this frame of counting and numbers for this paper because of the close ties to hegemony and class conflict in the world’s largest cities, where many thousands of laborers find urban form that was decided for them by small who counts and who gets to count—in order to tease out the relationship between the power holders, the powerless, and the expression of power through numbers. This exploration covers several themes: who is disadvantaged by building design, the power that corporations hold in marking city skylines and urban identity, and the firms that inhabit or own towers as practitioners of accounting.

Skyscrapers have frequently been built tall as status symbols for their corporate clients, their host cities, or both (Ford 2003). Even if scarce land and the real estate market call for a tall building, its height is often pushed yet higher to make a more striking impression. Leslie Weisman argues that these buildings cause multiple problems that are ignored in favor of achieving monumental height. Even with no specific need to be tall, “the excessive height of these antihuman, environmentally irresponsible man-made mountains has been lauded by many architects as the ‘answer’ to the future development of urban form” (p. 40). Weisman advocates returning to a smaller-scale design. As for their location and its relationship to power, Huang notes that in Hong Kong, “high-rise skyscrapers with corporate names … in a sense are built not with glass and metal but with the space taken from the anonymous high-rise buildings in which the majority of inhabitants have no easy access to the global monumental space or the information flow” (Huang 2004, 28-9).

Urban towers have also been problematized for being excessively masculine. Weisman classifies this form as a phallic, fear-inducing shape reflective of the mostly male-led corporations that build and occupy them: “No single architectural form better incarnates the union of social roles and sexual anatomy than the American skyscraper, the pinnacle of patriarchal symbology and the masculine mystique of the big, the erect, and the forceful. Allusions to male sexuality are unavoidable when referring to the skyscraper” (Weisman 1992, 16-17). Casting the tower as aggressively masculine is another way to claim that its form exerts power over individual city residents.

As the post-Fordist economy took shape in the United States and other industrialized nations, the effects were far-reaching (Appadurai 2006, 27; Filion 1999). As the American economy shifted in the last four decades from producing manufactured goods to providing information and services, the names on the towers symbolizing wealth and power shifted along with them. In New York, for example, some of the most famous skyscrapers built before 1960 held the names of Woolworth, Chrysler, and GE. Since then, the tallest towers built have borne the names of service providers and money managers: AT&T, Chase, Time Warner, and Bank of America. These newer “trophy” towers conceal reality, for in many American cities in the 1960s corporations began moving away from Central Business Districts, and numbers of powerful government and business leaders.
the towers that they had used there, for cheaper and more flexible office space elsewhere. Greater numbers of square footage became available for fewer dollars in suburban office park locations fewer miles from their executives’ new homes, so the decision became a matter of merely following the numbers. What effects did that have? First was the empty real estate and accompanying loss of jobs in the city center, another effect of a powerful minority upon the majority of residents in central city neighborhoods (Jargowsky 2002). This became evident to anyone who visited a CBD, where relatively few workers remained in office towers still sporting corporate logos. Second was a loss of urban identity, as evidenced in Chicago. That city’s tallest building, the iconic Sears Tower, is now known as the Willis Tower after its most recent leaseholder, an insurance firm, purchased naming rights for 25 years. No Sears employees at all remain in the Tower, as that company moved its offices to suburban Hoffman Estates, Illinois years ago (Chicago Tribune, March 12, 2009).

Chicago also provides an instructive case study for one instance of the opposite occurrence. Acting in the opposite direction of most corporations, United Airlines moved its headquarters in 2006 from Elk Grove Village, Illinois, a suburb 23 miles from the Loop, to a high-rise tower at 77 W. Wacker Drive (ChicagoBusiness.com, May 13, 2006). This notable exception to corporate real estate trends usefully informs the discussion of corporations and how they use towers, for branding at the same time as for actual office space. United leveraged monetary incentives from the City of Chicago to move to the city’s iconic2 Loop rather than to Denver or San Francisco, creating an artificial attraction to a tower by a small number of powerful elites (ChicagoBusiness.com, July 13, 2006). Due to the strong influence of government in this decision, this action is not likely to be replicated elsewhere, with the possible implication that older towers will largely remain absent of major corporate tenants.

Also notable about the United Airlines office move was that the City of Chicago’s incentive package required a minimum number of employees—350—to be sited in the Loop for a minimum of ten years (ChicagoBusiness.com, July 3, 2006). Here the use of counting to frame the occupancy of a tower again arose. The City believed that the deal would only be worthwhile if a minimum number of workers were located downtown. However, the agreement never specified who these workers were or what should be provided for them, only that their numbers must reach a specific threshold. At every decision point where United and the City of Chicago made a choice here, numbers determined the outcome.

Another American city, New York, provides key context for how companies with sweeping control over the economy have blended this power with their habitation in skyscrapers. Investment banks in the late 20th century emerged as extremely powerful entities, dictating how to run a corporation for maximum shareholder return and when and how to undertake a corporate merger for the same purpose. Thus, they had a hand in directing how accounting—the practice of counting and its use in corporate operations—should be practiced (Nelson 2008). While this role is powerful in its own right, I argue that investment banks hold even more control than is evident. This is because they turned skyscrapers in New York—the prime headquarters city for global banking—into symbols of greed and wealth that were celebrated by some and reviled by many. Bankers themselves regarded the skyscraper as a positive symbol of prosperity, as did municipal leaders if celebrating an economic boon for their city. After the first economic crisis of the 21st century was traced to the instruments of capital that investment banks created, these reactions became even more salient.

Karen Ho’s ethnography of Wall Street is a rich source for unpacking what banks control and how to expose that power through counting. Ho found that investment bankers enriched both themselves and the leaders of the companies whose funds they controlled while preventing anyone else from participating in this extraordinary wealth creation:

As Wall Streeters understand it, by the time stock market knowledge seeps to the masses, the bull market has turned into a bubble economy … Wall Street, then, views the democratization of stock market participation as a bellwether of oversubscription and as a signal for insiders to sell, meaning ‘latecomers’ to the market tend to bear the brunt of crashes (Ho 2009, 23).

Thus, investment bankers did not intend for their strategies for stock market success to be adopted by many people; in fact, that was considered poisonous to their strategy. When people outside of small, exclusive Wall Street networks began to gain expertise in multiplying wealth in the stock market, then, the opportunity to capitalize on it was already lost.

How does this relate to the towers that house

\[ \text{“If numerous and diverse city users had been asked for input, would central cities have taken the form of towers?”} \]
many investment banks? Their physical presence—in the form of office space—in global financial centers is key to their operation, even if they are not permanently staffed (Ho 2009, 311). Thus, physical space in the financial districts of multiple global cities is widely considered a necessity, even if their operations are run from New York. The towers of Lower Manhattan that house the largest banks, like Goldman Sachs and Merrill Lynch (before its acquisition by Bank of America), have long been icons of American capitalism in the popular imagination, tempered more recently by the greed and outsized lifestyles of their executives.

After the attacks on the World Trade Center on September 11, 2001, the surviving skyscrapers in Lower Manhattan became even more iconic (Ho 2009, 8-9). The Deutsche Bank and the original 7 World Trade Center buildings (both irreparably damaged from the collapse of the WTC towers) in particular became symbols, and further conflated the identity of investment banks with the towers housing their headquarters and sometimes bearing their names. When the stock markets rose and corporations were profitable—yielding large numbers in the form of windfall profits—there were positive connotations; when widespread subprime mortgage defaults dragged the American economy down, however, they became more negative and resentful. With few tangible symbols to ascribe to stock trading and the institutions that controlled the process, towers became their popular signifiers.

Who Doesn’t Count?

An Exploration of Oppressed City Users

When planners and bureaucrats impose urban design from above, few city users get a say in the form that it will take. If numerous and diverse city users had been asked for input, would central cities have taken the form of towers? Moreover, would the city be less oppressive if allowed to form organically? I argue that some cities would not have risen vertically to the extent of cities like Chicago and Hong Kong. The scarcity of land and its high cost would still account for some towers, but the “trophy” towers we see today would be fewer in number and smaller in terms of floors, height, and square footage. While a more equitable urban experience would not be guaranteed with organic, less tall urban form, at least the problems described here would be mitigated.

Having established that the designers and builders of towers, as well as the corporate and municipal leaders that helped get them there, mattered in urban power relations, it follows to ask who does not “count.” As Huang describes it, “we will have to clarify whose open space is enabled by the social infrastructures of global cities” (p. 11, emphasis added). Often, the answer is that few people do benefit, while most are not even considered.

In the realm of office towers, employees and the general public did not count when corporations undertook the practice of accounting (Nelson). This is evident in Karen Ho’s ethnography, where she argues “[e]mployees, located outside the corporation’s central purpose, are readily liquidated in the pursuit of stock price appreciation” (Ho 2009, 3, emphasis in original). Shareholders, on the other hand, were the subjects that counted based on their control of large numbers of dollars that investment bankers spent their time multiplying exponentially. The move from acting in the interest of the corporation (and, by extension, its employees) to pleasing its shareholders above all others is telling. Because increasing stock price enriched the bankers as well as shareholders, the corporation’s mission and work came to be ignored unless either or both offered a strategic opportunity to drive share prices higher. As Ho describes it, “[w]hile a rising stock market necessitates exuberant marketing to generate buyers, it is also undermined by this exuberance as the companies the stocks represent often do not ‘grow’ as quickly as the stock price” (Ho 2009, 330).

The work of investment banks became multiplying dollars for relatively few investors, even if it did not actually benefit the corporation whose shares they traded. This trend, of a powerful elite acting to benefit a small minority, occurs in many aspects of urban economies. As a result, the needs of the large majority of city residents are ignored.

Potential Solutions: New Urbanism and Reducing Height to Human Scale

One remedy to the tall urban form that dwarfs and ignores individuals is the smaller scale espoused by the New Urbanism movement. If towers are unwieldy behemoths that impede pedestrian flow, deaden neighborhoods by presenting blank walls to the street, and function without regard to workers’ needs, better forms should be pedestrian-oriented, interactive with their surroundings, and designed and built with the individual user in mind. These solutions are embedded in the practices of New Urbanist building. When designing urban areas, Andres Duany and Elizabeth Plater-Zyberk propose as a model a mixed-use neighborhood with about a quarter of a mile between its center and its edges. This approach overcomes the issues that zoning codes have exacerbated in the United States: sprawling communities and dependence on automobiles to reach the workplace, schools, and shopping destinations from home (Duany and Plater-Zyberk 1996, 211). This could achieve the truly walkable city with open space as exemplified by Huang, assuming that changing or working around zoning codes will allow such development in the first place; otherwise, not much change can occur.

The Central Business Districts of Chicago and Hong Kong are large and generally do not incorporate housing with office and retail areas, and hence would not fare well under the New Urbanists’ measurement tools. However, an opportunity exists to instill some elements
of a smaller scale by adhering to the principles laid out by New Urbanism's proponents for new construction. Moving from the monumental scale of trophy towers to the human scale will alleviate many problems. Of course, this scale is not practical for large corporations needing to house many workers or areas that need thousands of apartment and condominium units to satisfy housing demand. Even though its application cannot be universal, with careful attention, the New Urbanist model can be applied where it is appropriate.

Is it possible to minimize power differentials with the shift in focus to building at the human scale? At the least, building at a smaller scale would exclude large firms that locate in skyscrapers for symbolic purposes in addition to their need for space. As a result, the oppressively large numbers of trophy towers built for awe and not for the everyday experience would be minimized. However, this would not preclude their presence, as cities usually want to attract these corporations and will help them locate somewhere. In this case, perhaps it would only prevent towers from rising in certain neighborhoods. Still, the possibilities embedded in building differently are clear: urban residents and workers might feasibly walk to workplaces and sites of leisure; would have interactive, mixed-use neighborhoods rather than walls facing the street; and would not work in offices characterized by unhealthy environments. Moving away from the use of large numbers to express power would contribute positively to the urban environment.

Conclusion

Skyscrapers, then, do not only engender feelings of awe at their massive size; equally important is their effect on the people who live in the cities in which they are built. Too often, towers are cited for their efficient land use in crowded areas, while the downsides they have brought to urbanites are not acknowledged. By exploring these issues with the trope of numbers, the stark power differentials and disregard for human users come into focus. More than simply elegant and efficient forms that provide needed space and a tangible symbol of economic success, towers can also be oppressive and destabilizing for the many people who do not control them. While powerful corporations and city government officials hold the power to determine urban form, we should attempt to democratize urban form itself. While it is not practical to reduce the height of extant buildings, constructing new buildings at the scale of the individual human—especially the pedestrian—is the best course of action. Focusing on this small number—one—is key to refashioning the city for its individual citizen and worker.

References


The Demolition of the Cabrini-Green White Walls Towers

Dorothy Schwankl

At the intersection of Division and Halsted on Chicago’s North Side, the Cabrini Green White Walls development was completed in 1962 as part of the urban renewal movement. Cheap construction methods and poor maintenance took their toll on the towers and in 1995 demolition of the eight towers began. Once a center of gang violence and social problems, Cabrini Green has been reduced to one tower, nicknamed “Scamplife” by the residents, but it too is slated for abandonment and demolition.
form
The original complex contained eight identical towers, creating a heavily shadowed megablock. The last remaining tower stands as a lone figure against an emptied ground plane.

identity
Demolition on the towers continues slowly, leaving the interiors of the units with their painted block walls exposed.
**boundary**
The metal gates have been removed, but the brick wall structure that supported them still stands, clearly delineating the site from the street.

**infrastructure**
A fire station across Larrabee Street now stands alone, no longer surrounded by the towers. The neglect of the building is visible on the exterior. Hints of the state of the interior are also discernible.

**scraped**
A lightpole on the western edge of site reveals layers of paint accumulated over the years.
A lone planting survives along the unforgiving face of a school on the site.

palimpsest
The unbroken grid of the street facade of the last remaining building highlights the damage that the concrete has accumulated over the years.

scarcity
A lone planting survives along the unforgiving face of a school on the site.
The Roman suburb of Garbatella was conceived of as a conscious effort to employ the strategies for improving social health and welfare that Ebenezer Howard laid out in Garden Cities of To-Morrow (1902). When initially designed, Garbatella was a rare example of a working class suburb. Although built of inexpensive materials, designed to support high-density living, and located in the outskirts of Rome, it was also a livable, walkable neighborhood, connected by rail to the city center and complete with communal gardens, public courtyards, shops, and schools.

Garbatella both adheres to and concretizes Howard's vision for future cities. Howard proposed an escape from the horrors of the contemporary city, and justified the proposal with detailed financial calculations. Garbatella housed a working class population displaced from the city center by the government, and applied Howard's principles to justify and mitigate the displacement. While Garbatella and the Garden City respond to different social, political, and economic factors, through careful physical planning Garbatella achieves Howard's ultimate objective; that of a healthy, economically viable, livable urban environment.

The planning commission of Garbatella interpreted Howard's main premise to be the encouragement of a healthier alternative to urban living. Howard introduced his text citing the filth and congestion of the contemporary city, and offers his Garden City proposal as a solution to the urban problem. Describing his objectives in planning the Garden City, he focuses on its economic goals: “Some of the chief objectives are these: To find for our industrial population work at wages of higher purchasing power, and to secure healthier surroundings and more regular employment” (Howard 1945, c1902, 51). While the desired end result is healthy surroundings, Howard's understanding of urban health is predicated on the financial considerations that would make the physical realization of the city possible.

Howard's Garden City was to be built with private funds for the public good, while Garbatella was constructed with public funds, purportedly for the public good, but essentially for political gain. Howard envisioned his Garden City to be a philanthropic effort, funded by four wealthy gentlemen interested in making low yield investments in the common good. These gentlemen would purchase the land and fund the enterprise until the rising land value and rent, reinvested in town infrastructure and development, took over as the primary source of city funding (Howard 1945, c1902, 59). The construction of Garbatella was entirely funded by the government of Rome, acting through the Istituto per le Case Popolari (ICP). Whereas rising rent in the Garden City model would eventually account for all further investment in municipal infrastructure and communal good, Garbatella remained rent-controlled to accommodate mixed-income working classes and had no growing fund for reinvestment within the community.

The ICP began planning the satellite neighborhood of Garbatella in 1919, at the end of the First World War. The suburb was designed as part of a city master plan commissioned by the ruling monarchy (Figure 1-2). This plan specified an urban industrial complex south of the city center with direct rail connection to the maritime industry and port city of Ostia, and designated the area that would become Garbatella to house the industrial workers (De Michelis 2009, 510). The location outside the
city limits made land less expensive for development while offering investment potential from its access to railways linking it to the capital and the sea (De Michelis 2009, 511). As Rome expanded around the new neighborhood the value of its location increased, especially after 1935, when Mussolini proposed a new governmental center to be built south of Garbatella for the Rome Universal Exposition (EUR). While the Exposition itself never took place, the built EUR campus became for some time the government headquarters for Rome.

While the ICP established a number of low-income housing construction projects in Rome in the first half of the twentieth century, the organization used the opportunity to construct Garbatella and another satellite town, Aniene, to experiment with applying Ebenezer Howard's Garden City principles to Roman urban planning. The government planning commission for Garbatella argued that merits of the nation’s war heroes and industrial workers should be rewarded with “the creation of a ‘vast, populous, beautiful garden city of workers’ housing’ within a ‘spacious and salubrious rural setting’” (Etlin 1991, 143-5). The commission felt a “moral and social responsibility” (Howard 1945, c1902, 145) to create housing that lived up to the standards set down by Ebenezer Howard in Garden Cities of Tomorrow in 1902 (Howard 1945, c1902, 145).

The finances of both Garbatella and the Garden City depended on connectivity and interregional trade between the cities and their neighbors. Garbatella's planners shared Howard's understanding of the importance of transportation to and from any planned development. As the Garden City model is propagated in offshoot cities, Howard called for development of public transportation infrastructure to connect the garden cities, arguing: “the inhabitants of the one could reach the other in a very few minutes; for rapid transit would be specially provided for, and thus the people of the two towns would in reality represent one community” (Howard 1945, c1902, 142). In Diagram Five (Figure 3) of Garden Cities of To-morrow Howard spells out the importance of transportation, captioning the diagram as “Illustrating correct principles of a city’s growth – open country ever near at hand, and rapid communication between offshoots” (Howard 1945, c1902, 143). This rapid communication is depicted in the form of railways and access roads in the diagram, railways and roads that both circumnavigate each development and also connect one garden city to another.

The initial impetus for Garbatella was as much a public works project as a social housing issue, and aligns with a number of Howard’s connectivity principles. It is no accident that the neighborhood was slated to be built at the terminus of the planned railway line connecting Rome to the seaport at Ostia Nuova, and was thus easily accessible to the city center and ultimately easily accessible by subway to the EUR. The initial plan included a canal linking Ostia and Garbatella, connecting ship as well as rail traffic from the city to the coast. At the same time, a ring road was also under construction that would circumnavigate the city, connecting Garbatella to points north, east, and west (De Michelis 2009, 510-511). Transportation for goods and materials was as important as transportation for people in the Garbatella development. Although the primary inspiration taken from the Garden City was the creation of a “spacious and salubrious rural setting” (Etlin 1991, 143-5), not efficient transportation, the development thoroughly realizes Howard’s mandate for access and connection to good railway lines as well as secondary modes of transport.

Connectivity served a similar purpose in both the Garden City and Garbatella; that of driving the development of the region’s economy. The transportation network Howard called for established proximity between agricultural production and the locations where produce could be sold, between demand for labor and workers seeking jobs, and between professional capacity and
professional demand:

To enterprising manufacturers, co-operative societies, architects, engineers, builders, and mechanicians of all kinds, as well as to many engaged in various professions, it is intended to offer a means of securing new and better employment for their capital and talents, while to the agriculturists at present on the estate as well as to those who may migrate thither, it is designed to open a new market for their produce close to their doors (Howard 1945, c1902, 51).

While he claims that these proximities can be addressed by a compact mixed-use city planned along his principles, he also recognizes that no city can or should be fully self-sustaining. He maintains that people living within the Garden City are not required to only buy produce from within their own city:

While the town proper […] offers the most natural market to the people engaged on the agricultural estate […] yet the farmers and others are not by any means limited to the town as their only market, but have the fullest right to dispose of their produce to whomsoever they please. Here […] it is not the area of rights which is contracted, but the area of choice which is enlarged (Howard 1945, c1902, 56).

He argues for a free and open market, and claims that the competition from surrounding municipalities would ensure high quality products from all areas, while simultaneously allowing gaps in the production of one city to be filled by another. The efficacy of this free market model requires good transportation, both to deliver goods within the city and also to deliver goods to and from surrounding cities. The emphasis on transport, while asserted for community connectivity, is equally for the benefit of industrial development and subsequent economic growth.

Unlike Howard’s model, Garbatella was not designed to produce most of its own food, but its focus on transportation and industrial production was similarly intended to create avenues for economic growth. In the early twentieth century Rome was looking to expand its economic power and reach and increases in industrial production and access to the Mediterranean were critical. At Garbatella’s official opening in 1920, overseen by Italy’s King Vittorio Emmanuele III, the neighborhood was deemed to signify Rome’s much awaited “economic renaissance” (De Michelis 2009, 511). While Howard promoted a free market model from which individual actors might prosper, in the development of Garbatella Rome was looking to increase its economic prosperity and dominance over surrounding areas.

When Mussolini came to power in 1922, he scrapped the Rome master plan and with it ambitions for the industrial complex south of the city center (Etlin 1991, 145). Construction of Garbatella, well underway at this point, did not cease with the loss of its anticipated industrial worker population. Instead the ICP continued to develop Garbatella primarily as a housing district to serve a different working class population: those displaced by large scale urban renovations carried out in Rome’s dense urban core (Kostof 1973, 19). Mussolini not only razed central neighborhoods to uncover Roman ruins and
construct larger avenues; his government also untethered center city rent controls, causing frequent evictions of tenants no longer able to afford their rent. As the middle and lower classes left the center of Rome for the outskirts, Garbatella’s population went from 3,454 in 1922 up to 23,178 in 1926 (De Michelis 2009, 514-5). While Howard offered his Garden City as a chosen escape from urban life, Garbatella’s first inhabitants were leaving the urban center out of necessity, not choice.

The difference in financial structure between Garbatella and the Garden City manifests itself in the residential density of the two cities. As a solution to a post-World War I housing crisis, amplified by destruction of center city housing, Garbatella accommodated a much higher density of people than Howard’s philanthropic experiment. In Garden Cities, Howard suggested 5,500 housing plots for the city at an average lot size of 20 x 130 feet and roughly 475 square feet of housing for every inhabitant. Howard determined the number of housing lots and subsequent space provided them by calculating backwards from a desired level of revenue generated (Howard 1945, c1902, 54). With the influx of 19,724 new residents in Garbatella between 1922 and 1926, the new government expanded the planned boundaries of the neighborhood, accommodating on average 109 square feet of housing per person (De Michelis 2009, 515). The population increase forced Garbatella’s planners to adapt to a much higher density than the original design incorporated. As the neighborhood of Garbatella developed under Fascist rule, higher density apartment blocks were added to the plan, as well as public amenities, such as the church, hostels for temporary housing, public baths and a school (Figures 4-6).

Until 1922, the monarchy was positioning the suburb as a celebration of the value of the working classes and an opportunity to reward these classes with decent housing (Etlin 1991, 145). As Mussolini pursued his agenda to restore the monumentality of Ancient Rome, he continued evicting urban residents. The conscious application of Garden City principles in the continued construction of Garbatella supported a political agenda that displaced thousands of citizens (De Michelis 2009, 515). The neighborhood what Howard’s financial calculations and reinvested rent increase contribute to his Garden City proposal. While Howard adds the explicit disclaimer that the physical manifestation of his plan is “merely suggestive, and will probably be much departed from” (Howard 1945, c1902, 51), the planning of Garbatella followed proscriptive methodologies dictated by the ICP and the Roman Associazione Artistica that were then interpreted by the architects of the project (Etlin 1991, 145). The concrete decisions required by the actual construction of Garbatella test Howard’s hypothetical principals and prove that they can be achieved through means different than Howard’s financing scheme.

While Howard merely implies that the layout of his Garden City is malleable to accommodate the topography on which it rests (Howard 1945, c1902, 142), the architects of Garbatella address the topography of its site with explicit architectural and experiential aims in mind. Richard Etlin writes that Garbatella was “designed according to the principles of the reasoned picturesque, contextualism, and vernacular architecture as propounded by the Roman Associazione Artistica” (Etlin 1991, 145). This understanding of the reasoned picturesque to which Garbatella’s designers aspired promoted creative use of the hilly terrain (Figure 7). Etlin cites the ICP’s official published goals for Garbatella, stating that the neighborhood should “provide a varied and picturesque ensemble from different points of view” that would explicitly avoid the ‘monotonous aspect of the unending lines of hundreds of small houses of the same type’” (Etlin 1991, 147). To
fulfill the ICP’s social goal of providing quality housing for Rome’s working class, Gustavo Giovannoni and Innocenzo Sabbatini, the principal architects, planned winding streets through the area’s hills that would both connect and individuate the blocks and courtyards of the neighborhood. The terraced hills and curving streets created a neighborhood connected to but distinct from the major transportation hubs nearby, and the street plan also created multiple smaller communities within the overall area.

The attempt to elaborate and integrate private and community spaces carried into the design of the housing units in Garbatella as well, while in the Garden City plan Howard gives the physical planning of these spaces little thought. In Garbatella, Sabbatini stacked and arrayed the individual unit types in a variety of ways to create the picturesque views recommended by the Associazione Artistica and account for the terraced terrain (Etlin 1991, 147). The varied overall effect was not only a pleasing visual arrangement to meet the criteria of the Associazione (Figure 8); it also offered housing for a range of lower middle class budgets to achieve a limited mixture of incomes (Etlin 1991, 145).

Part of the ICP’s ideological mission was to create class parity by building mixed income neighborhoods (De Michelis 2009, 510). Giovannoni, who developed the layout, and Sabbatini, who designed many of the buildings, collaborated to create a variety of different types of housing that would fit into the frame of the neighborhood while providing options for a range of lower socioeconomic brackets. They created forty-four different housing configurations, varying the number of rooms and of common kitchens and laundries, and the ratios between private and shared space (De Michelis 2009, 511; Etlin 1991, 147). These configurations are mixed together in the overall layout, allowing integration of inhabitants of limited economic diversity. While the ICP commissioned the neighborhood to house working class citizens, the planning commission and designers made every effort to attract as broad a range of economic classes to the neighborhood as possible.

Like Garbatella, Howard intended the Garden City to be mixed income and developed the various proximities to different kinds of work and labor as a mechanism for attracting an economically diverse clientele. Although Howard does not claim to establish a definitive plan or layout for the Garden City model, his diagram for the physical plan of the city does encode certain spatial hierarchies (Figure 9). Those houses belonging to the wealthiest of Garden City’s inhabitants would lie along the either the Crystal Palace and Central Park, or along the Grand Boulevard, fronting the broad green promenade and from both areas enjoying the quickest and easiest access to schools, shops, offices, and churches. As housing rings spread out from the Boulevard, their square footage diminishes along with the land value (Howard 1945, c1902, 54). Reinforcing class hierarchies through housing location is not at the forefront of Howard’s diagram, but...
this reinforcement is the diagram’s unconscious effect. While Howard uncritically recreates conventional housing hierarchies in his desire to attract the various professions required to make his city function financially, the planners of Garbatella consciously address class hierarchies through their mixed income neighborhood and housing plans.

Although shared facilities and cooperative spaces are an aspect of the Garden City proposal that Howard mentioned only parenthetically in his discussion of the overall housing scheme, most units within Garbatella’s housing blocks shared kitchens or laundry spaces or both (Howard 1945, c1902, 54). Whereas in Howard’s Garden City shared spaces do not implicate larger social structures but are more of a side note to the financial proposal, in Garbatella the shared spaces are a central tenet of the plan, both as a means to address an otherwise overcrowded area and a way to engender mixed social interactions and facilitate community development (Etlin 1991, 147). What Howard hoped to achieve through open markets, rent, and access to industry and goods, Garbatella’s designers achieved through careful arrangements of space.

Howard’s desire for economic feasibility structured the need for different landscapes in his plan, whereas in Garbatella the landscape design was driven by a social agenda. Howard’s plan distinguishes between productive landscapes and landscapes for leisure. At the city’s core was a central garden ringed by municipal buildings, a shopping arcade, and a larger ring dubbed the Central Park. Moving outward from the center are rings of housing, interrupted by the Grand Avenue, which Howard envisioned as additional city landscape populated by schools, offices, and churches (Figure 10). He argued that no citizen should be further than 600 yards from the central arcade and parks, while also claiming the importance of proximity between agricultural areas and the city (Howard 1945, c1902, 54). The largest ring of green space was 5,000 acres of agricultural land buffering the city and supplying its food (Figure 10). The central garden and park were meant to be landscapes for leisure and enjoyment, designed to entice citizens into the commercial hub of the city (Howard 1945, c1902, 54). The Grand Avenue and the Agricultural Estate were both productive landscapes, employing citizens as well as providing them with education, religion, and fresh produce. Proximity to these services, and the subsequent reduction in living costs, was one of Howard’s main incentives to attract citizens for his cities.

In Garbatella the landscapes for leisure and production were primarily integrated into the housing instead of separated out into distinct areas. From the outset, Garbatella’s housing was designed with a particular kind of access to individual green space that was simultaneously both pleasure garden and productive landscape for small-scale food production and outdoor laundry space (Figure 11-12). The aggregation of varied unit types was arranged to create small shared courtyards and gardens throughout the housing blocks, allowing immediate access from almost every home to semi-private gardens. In his site plan for the neighborhood, Giovannoni created more communal garden spaces in addition to the more private courtyard spaces. He achieved this by setting some of the housing aggregations back from the street while designing others close to the curb. The careful angling of these units, as well as their detailed massing, serves to enhance a multi-tiered hierarchy of garden spaces for both leisure and production for the inhabitants of Garbatella.

Howard offers a suggestion for a similar housing arrangement in his diagram. He writes, “that general observance of street line or harmonious departure from it are the chief points as to house building[...]the fullest measure of individual taste and preference is encouraged” (Howard 1945, c1902, 54). While he sees the potential for varied and layered form to exist in the Garden City layout, it is not the purpose of his proposal to outline how it might be done. The individuality in design must instead stem from the resources of the individual inhabitants. Howard also nods toward the potential of enhancing communal green space through adjustment and arrangement of facades fronting the Grand Avenue. In a rare moment of specifying design intent, he writes

“the houses fronting on Grand Avenue have departed [...] from the general plan of concentric rings, and, in order to ensure a longer line of frontage on Grand Avenue, are arranged in crescents – thus also to the eye yet further enlarging the already splendid width of Grand Avenue” (Howard 1945, c1902, 55).

This arrangement again privileges the wealthy able to live along the main park belt of the city by offering them further recourse to expand their views of the park.
Howard claims this will also expand the public space of the park, at least to visual perception.

For Howard, the beautiful landscape of the garden and park in the center of the city was separated from the housing, while the working landscape was the front yard of the rich and the productive landscape ringed the city to provide food and a buffer from other urban centers. In Garbatella the beautiful and the productive landscapes were combined, given space in the layout by means of shared service spaces and the extremely dense quarters in which the population of the neighborhood lived.

Whether Garbatella achieved the main objectives laid out by Howard in Garden Cities of To-Morrow depends on the interpretation of the text, and interpretations of Howard's proposal vary depending on the disciplinary bias of the interpreters. From the perspective of urban planning, Kermit Parsons' book From Garden City to Green City addresses how Howard's innovations have led to greenbelt planning, new urbanism, and eco-cities. John O. Simonds, a landscape architect, writes that Howard's "central tenet" is "that of interconnected satellites of various types within an open space frame" (Simonds 2002, 42). Robert Freestone, also an urban planner, argues that Howard's focus is the greenbelt area that buffers one city from the next (Freestone 2002, 71-2). Each extracts concepts from Howard critical to his discipline, over-simplifying the complexity of Howard's proposal as a comprehensive set of principles for city siting, infrastructure, and financial viability.

In his 1945 preface to Garden Cities of To-morrow, Frederic Osborn writes that Howard's Garden City model is most often appropriated in fragments and not as a whole (Osborn 1945, c1902, 20). A group may promote the presence of parks in cities, without the corresponding emphasis on industry, or promote walkable human scale neighborhoods without addressing the proximity of transportation or employment opportunity. While Howard does address the importance of green space buffering one city from another, the connectivity of his cities through infrastructure, and many of the ideas that would become new urbanist, his vision for the Garden City cannot be simplified to one central tenet.

Howard repeatedly states that a healthy city is his main objective. In the Garden City this health manifests itself in both physical and financial form. Parks and garden space, proximity to work, proximity to food production, and connectivity between cities shape the physical city diagramed in Garden Cities of To-morrow. Howard designed these proximities, landscape uses, and infrastructural mandates to serve the financial health of the city by promoting attractive commercial areas, access to jobs, industrial growth, and robust trade. For Howard this financial health lent pragmatic weight to his proposal; it was through a viable financial model that his city might come to be.

Garbatella’s commissioners explicitly claimed Howard’s ideas of healthy open space in order to mitigate the political damage done by the renovations of downtown Rome. While following his mandates for industrial and infrastructural site context, the neighborhood’s creators followed almost none of Howard’s economic mandates. The land was purchased, not by philanthropists, but by the city, and offered at fixed rents. The rent was not funneled back into municipal projects, but rather returned to the city to repay the initial financial outlay for land and development. No nearby agriculture supplied rent from the agricultural estate, and the planned financial engine of industry was forestalled by Mussolini’s rise to power. And yet, Garbatella offered Rome’s displaced working classes clean streets, increased land value at low cost, gardens both public and semi-private, access to other amenities, and well designed housing. While the physical plan of Howard’s city is the least prescriptive part of his text, the realization of his overall objectives through physical design, most notably the multipurpose planning of its landscapes, gives Garbatella the community health Howard sought to achieve for the Garden City. It is this type of physical planning that ultimately might be the most enduring method through which Howard’s aims can be achieved.

References


Howard, Ebenezer. Garden Cities of Tomorrow.


Figure 12: Semi-Private Courtyards
Sunset Muni Stop, San Francisco, California. Source: Katharine Pan, 2010
Detroit

The name is unique to itself, having been appropriated from the original French détroit—meaning, “of the strait.” Thus, worldwide, when the word “Detroit” (dɪˈtrɔɪt) is spoken, it can refer to only one place. And Detroit is known worldwide. It is famous, mostly, for its failure.

It has been known for other things: the mighty American automotive industry, and Motown, for instance. But these are glories past. The retreating auto industry has left the region gasping for employment and identity. Motown moved to L.A. The most noteworthy feature of contemporary Detroit is its decline. A 60-year exodus of over a million residents has left the city in an unparalleled state of abandonment. The abandonment is widespread, but for many, life goes on. The tattered remnants of the city reveal an astonishing diversity of character. Vibrant and tenacious neighborhoods dot eerily desolate expanses of urban wilderness and industrial wastelands, loosely strung together by an intangible historical force. The strange meta-landscape and the emotions it evokes are difficult to describe to those unfamiliar with the city. The remnants of Detroit are often dilapidated and depressing. Occasionally, they are heartbreakingly beautiful.

Detroit is not unique in its post-industrial struggle with urban blight—many cities have dealt with their respective crises. Detroit, however, is peerless in the extent of decline since its mid-century peak. Popular narratives regarding Detroit tend to be subjective or anecdotal. Various narratives distribute blame of Detroit’s collapse in various ways, but a common thread is that Detroit was once a great city, and had the potential to remain a great city, but then something went wrong. There is plenty of blame to spread around: racism, classism, over-dependence on a single industry, labor relations, the failure of The Great Society, etc. Such discussions have merit, but tend to feel incomplete. The summation of Detroit’s economic, political, and social history does not seem to adequately explain the resulting crisis.

The collapse of Detroit cannot be explained solely as the sum of its parts, and was not a result of external forces. Detroit’s fall was built in to its ascension. Moreover, the qualities of the city that preordained its failure were generally the same qualities that allowed its initial success. In happier times, Detroit was glowingly referred to as “the Paris of the Midwest,” “the Arsenal of Democracy,” and “the Motor City.” That city was a decoy - a temporary facade. The benevolent planners and engineers of the early cityscape believed they were constructing a model city. In reality, they were creating a non-city, comprised of non-places as would be described by French anthropologist Marc Augé decades later. Hidden beneath the sparkling surface of the Motor City was the city it was destined to be: the failed metropolis, the murder capital, the city in ruins.

Non-Place: “The Real Measure of Our Time”

In his 1995 book, Non-Places: Introduction to an Anthropology of Supermodernity, French anthropologist Marc Augé introduced the concept of “non-place” as distinct from anthropological place. Anthropological places, what we think of as real places, are “relational, historical, and concerned with identity,” and are formed by social constructs of “language, local references and the unformulated rules of living know how” (Augé 1995).

One way to conceptualize this is to consider anthropological space as one-dimensional. Space, in this sense, is essentially a calculation of the area available for human activity to take place. Place is the result of two additional dimensions on this anthropological space. The second dimension of place is time. A space can be drastically different places at different times: this can be easily observed by walking a downtown street during daytime activity, and again when it has been deserted late at night. The third dimension of anthropological space is difficult to measure: it is essentially the interaction between people and place, embodied by the psychological idea of human affect. This construct is shown in Figure 1.

Augé employed the concept of non-place to attempt to describe the spaces in which the activities of contemporary western society take place, and why such spaces are historically unique. Augé writes that “if a place can be defined as relational, historical, and concerned with identity, then a space which cannot be defined as relational, historical, or concerned with identity will be a non-place.”
non-place) certainly impacts its human inhabitants; but the place itself is subject to the affective projections of the individual users. Non-place can be, and usually is, a combination of objective and subjective non-place. Non-place is also linked to the economic environment:

“Within the non-place, the forces of global corporate capital have found an amiable place to both invest and reduce human life to maximize and optimize its power. A highly commodified lifestyle is offered as a means out” (Sharma 2009).

In the late nineteenth and early twentieth centuries, utilizing the region’s untapped natural resources, Detroit’s accumulating capital sought to enshrine itself in a modernist utopia of industry and infrastructure. Factories, high-rise offices, and shopping centers multiplied and expanded, serving and served by throngs of plentiful migrant labor. The city was not built to be home to people—it was constructed to house and serve the growing industrial-capitalist economy. Concurrent to the physical construction, within it and around it, a shadow network of non-places quietly crystallized into an invisible non-city, the primary purpose of which was to subject the residents of Detroit to the service of the economy. “The non-place is the opposite of utopia: it does not contain any organic society” (Augé 1995). The extent of the infiltration of the dystopic non-city into the city was such that many residents were unable to escape non-place. Some spent their entire lives in this parallel world, becoming bare life.

Augé laments that such non-places “are the real measure of our time” (Augé 1995).

The Nature of Non-Place

Considering the dehumanizing effect of non-place, it is crucial to consider this comment on Augé’s work:

“It is not the non-place that displaces the local or creates asocial facelessness inasmuch as the theorist of such places erases the local in these accounts of non-place. This condemnation of place is endemic of a specific type of gaze into non-place... What is forgotten in such conclusions is that the experiences of alienation are a direct result of certain people’s labor and also by the consumptive and cultural practices enacted by the customers—and theorists alike” (Sharma 2009).

In other words, in measuring, observing, and criticizing non-places, theorists often fall in to the trap of subjugating the spaces to their personal biases. Augé himself qualified that the non-place “never exists in pure form.” The affective characteristics of a place (or

The City of Non-Place

During the industrial revolution, the natural resources of the Great Lakes area (fish, game, lumber,
Henry Ford revolutionized the automotive industry. It is cliché to state that he changed the world—but it is accurate. Ford’s Model-T was produced with a new manufacturing process: an assembly line. The efficient mechanized labor of the assembly line enabled the Model-T to be mass-produced and affordable to the American middle-class. The automobile—specified by Augé as a prototypical example of a non-place—was suddenly available to the majority of Americans. The symbiotic birth of these remarkable innovations (the Model-T and the assembly line) is saturated with irony; the assembly line not only has in itself the defining qualities of non-place, but its primary function was to discretize and export units of non-place (automobiles) for public consumption – non-place had achieved self-replication technology! As the economy and society developed, automobile ownership quickly transitioned from novelty to necessity. Automobiles and assembly line technology streamed out of Detroit and around the globe.

After World War II, industrialized societies refocused their concentration on lifting their populations out of poverty. Newly famous Detroit, “the Arsenal of Democracy,” provided an obvious template. By 1950, this birthplace of Fordism had become a modern metropolis of nearly 2 million residents, with another 1.5 million residing in the surrounding metro area. Fordism offered a blueprint for putting Keynesian economic theory into action. The incorporation of mechanized control and unskilled labor into the production process drastically reduced production costs. The relatively high wages paid to the workers empowered them as consumers of the commodified products of their own labor. This positive feedback loop resulted in skyrocketing production and consumption. At one point, the Model-T accounted for over half of U.S. car sales, many of them purchased by Ford assembly line workers.

The Fordist system was superficially simple but internally complex. The system’s obvious function was to “organize mass production through a blend of scientific management and machine-dictated pace of work” (Pizzolato 2004). When coupled with Keynesian demand-side economics, economic growth was possible at unprecedented rates. To successfully implement Fordism on a societal scale, a paradigm emerged that “the state had to take on institutional powers to organize redistribution; corporations had to constantly innovate to keep a high productivity and accept the system of redistribution; organized labour had to cooperate in keeping in check the...
labour force, whose reliable performance was the most important component” (Pizzolato 2004, 420). This vast maintenance structure was needed, primarily, because even highly paid laborers were often restless and unhappy, and thus prone to be disruptive and unproductive.

The assembly line laborer works in a state of exception. The system requires that the laborer seamlessly integrate into the industrial production machine. The pace of the work is dictated by the system. The task is monotonous, repetitive, and thoughtless. That the assembly line is a non-place as defined by Augé is obvious; the laborer “is relieved of his usual determinants. He becomes no more than what he does or experiences” (Augé 1995).

Fordist theory and practice spread. Automation in various industries increased productivity and drove unprecedented industrial and economic growth. A key tenet of Fordism spread across America and the world: The most essential function of a society is the enabling of the optimization of economic growth and accumulation of material wealth. As [non-place] assembly line production spread throughout and beyond the auto industry, Keynesian-Fordist society pulled the tendrils of non-place outside of the factory walls and into the surrounding cities. Societies co-evolved to serve the economy. The United States, a young nation with vast natural resources and room to grow, was quickest to adopt this modus operandi. Though never officially criminalized in the U.S., it has become widely considered despicable and disgraceful to contribute nothing to the economy.

As the birthplace of Fordism, Detroit was at the forefront of this industrial and societal revolution. Migration to the area was historically driven by fulfilling industry's need for labor. As labor's value increased, it became more than a reason to relocate—it became a reason to live. Migrants stayed and built families. The perceived promise of escape from non-place through accumulation of material wealth enabled much of the labor market to tolerate the increasingly non-human aspects of labor and daily life.

As the Fordist economic growth machine developed, society evolved such that serving the economy became an abstract motivation. A unique pride underlies such statements as: “My father worked for 30 years on the assembly line.” It is a pride that unconsciously acknowledges the state of exception that must be tolerated in this particular service to the economy. The implied heroism is comparable to references of employment that are more physically demanding (“My father was a carpenter...”), more mentally demanding (“My father was an engineer...”), or even more dangerous (“My father was a police officer...”). The factory worker, in his tolerance of non-place in service of the economy, commands a unique respect in American society, and in Detroit especially.

The Inherent Instability of Accumulating Non-Place

The dehumanizing effect of non-place is unavoidable in modern life, and tolerable to somewhat remarkable extents. It is unsustainable, however, to live an entire life in non-place, in a perpetual state of exception. Detroit's industrial upbringing (objective non-place), coupled with a diverse and unassimilated population of migrants (subjective non-place) likely resulted in the highest concentration of non-place ever amassed. Detroit's inertial growth continued for about a decade after the end of World War II, peaking near two million residents of the city-proper. In 1955, a Ford executive claimed that the city had the “highest standard of living in the world” (Sugrue 1996, 130), and he may have been right—but by then, the population had already begun to leave the city-proper for the rapidly expanding suburbs.

Racial tension is likely the most common culprit in popular narratives of Detroit's “white flight.” Racial tension was certainly a factor in the eventual exodus of the city's white population, but this view does not adequately explain the timeline of white outmigration, with its beginnings around 1950. At this time, the black population was relatively small at 16%. Additionally, it was almost entirely crowded into segregated ghettos. Formal and informal segregation had actually kept the city so divided that even the increasing number of economically successful blacks were unable to relocate out of dilapidated ghetto neighborhoods (Thompson 2001, 16). In the 1950s, the overwhelming majority of the white population of Detroit-proper still resided in all-white neighborhoods and sent their children to all-white schools. It is difficult to attribute the initial flight to racial tension.

Another explanation is that industry left the city, and the population followed employment opportunity. In this narrative, blame is placed on corrupt city government and high taxes for chasing business and the auto industry out of town. There may be elements of truth to this explanation, but again, this does not wholly correlate to the timeline. The local economy was moderately tied to the fate of the auto industry, but was more diversified than current perceptions would indicate. Many of the large auto plants were located outside of the city limits throughout the early 20th century. This did lead to growth outside the city.
proper, but industrial, commercial, and residential growth continued within the city limits regardless. The initial white flight did not correlate to any significant outsourcing of employment. The original urban sprawl was a residential phenomenon, one of classic bedroom communities. Many of the pioneer suburbanites initially commuted back to the city to work.

As a supplementary explanation for the initial outmigration, it is worth considering the repellant force of non-place. As discussed, it is plausible that by 1950, industrialized Detroit had amassed the highest concentration of non-place in human history. The city was built for industry, not people. It was built for capitalism, not community. Under these conditions, neither community nor capitalism can succeed.

Non-place is partially subjective, however, and much of the population had truly come to think of Detroit as their home. The Fordist growth machine had provided the [white] Detroit population with the accoutrements of modern life: automobiles, televisions, and an infrastructure to optimize their roles as producers and consumers of the expanding economy. For some of the population, however, finding a place to feel at home was difficult. The city still had some characteristics of a temporary camp, in that a person could consider himself surrounded by others. 1950's Detroit remained ethnically divided, even among its whites. In addition to black and Jewish ghettos, there were Polish, German, Greek, Irish, and other ethnic neighborhoods. Churches, bars, and social institutions were often ethnically distinct even when neighborhoods were not. A German family was likely to be aware of the other German families on the block, as well as which families were not German (Zunz 2000). In this environment, a significant percentage of the population found themselves unwelcome and uncomfortable—residing in a neighborhood of non-space. For these people, unable to leave the employment opportunities in the area, the allure of the expanding suburbs is understandable. Away from the “hustle and bustle” of city life, they could have their own place. A large house surrounded by a large yard, surrounded by fields and parks and open space. If they had to work in a factory, at least they could relax at home.

The Keynesian-Fordist society was willfully complicit in the relocation of the middle class to the suburbs. Federally funded highways rolled out of the city to the surrounding suburbs where federally backed home-loans fueled a decades-long boom in residential construction. Considering that the genesis of Detroit's white flight preceded racial struggles and capital flight, the repellant forces of non-place and allure of consumerist escape are perhaps the best explanation of the initial out-migration of Detroit. Unfortunately, urban sprawl incorporates a multiplier effect. The initial population seepage precipitated into a full urban crisis.
By 1960, the city population had already retracted some, but Detroit remained the nation’s 5th largest city with about 1,700,000 residents, about 30% of whom were black (McGraw 2000, 289). By 1960, blacks were only beginning to see a glimmer of the equality they had hoped for upon leaving the South. For the black population, the non-place characterization of most of the city may as well have been official. Segregation was institutionalized in multiple ways and informal in most of the remaining aspects. Real-estate agents who showed homes to blacks in white neighborhoods were threatened and harassed. Conservative white activists worked to maintain segregation. Crosses were burned(Sugrue 1996, 249-258). It was made very clear to black Detroiters that segregated white neighborhoods were no place for them—non-place for them. Leaving the city was not a viable option; the suburbs were even more hostile.

Regardless of oppressive segregation, many blacks were able to settle comfortably into segregated neighborhoods, and were able to make a home of anthropogenic place within the larger matrix of non-place. Detroit had even become a center of African American culture. Yet the black community was often under siege. Urban renewal and slum-clearing programs in the 1940's alone displaced over 6,000 black residents, precipitating a race riot in 1943 that led to the Detroit Housing Commission adopting a policy of formal residential segregation (Thompson 2001, 16-17). Many of the neighborhoods that escaped those programs were razed by the highways that sliced through the city to accommodate suburban commuters. By 1970, over 20,000 homes had been demolished for the construction of freeways (Woodford 2001, 164). Highway construction displaced mostly blacks, but also decimated established and vibrant Mexican and Chinese neighborhoods (Lin and Suzuki n.d.). For many Detroiter, it must have seemed as though there was a vast conspiracy to force them to live their entire lives in non-place—to become bare life. Detroit professor, attorney, and poet Harold Norris is quoted as saying in 1951, “the city is creating refugees... There will be a price to pay for this inhumane eviction policy” (Thompson 2001, 18).

Racial tensions grew as displaced blacks moved into historically white areas, replacing the out-migrating whites. Many whites felt that they were losing the city (Clemens 2005). Economic hardship and racial tension amplified the surrounding matrix of non-space and precipitated an unsustainable social situation. The social change movement in the United States of the 1960’s and 1970’s had an especially militant nature in Detroit. Some have attributed this to the concentration of the black population or to “new-left” conspiracies (Spreen and Holloway 2005).

As a competing theory, the era should be considered with regard to the concentration of non-space and the active reduction of the population to bare life. The auto industry (and other industries) further automated production lines to reduce the reliance on human labor. In Detroit, capital investment began to follow the white population out of the city-proper. In 1960, black unemployment in Detroit was 18.2%; the overall city rate was 7.6%. Blacks who did obtain employment were usually given the most undesirable jobs and shifts, and were subjected to extensive mandatory overtime (Sugrue 1996, 143-152). Jobs on the line required minimal thought and training due to their repetitive monotony. The auto companies fired thousands of employees per week, creating a “rotating and permanent pool of insecure job seekers” (Georgakas and Surkin 1998, 28). A profitable venture on its own, the United Autoworkers Union (UAW) was essentially complicit in many of the discriminatory and dehumanizing working conditions (Pizzolato 2004).

As the 1960’s progressed, regardless of various mitigation efforts by Detroit city leaders, social tension continued to build. Segregation and discrimination in housing and employment strained race relations in the city. White flight accelerated. Joblessness grew. The city’s tax base began to shrink, resulting in disinvestment from infrastructure, education, and social programs. As the actively maintained places of the city disappeared, non-place crept in to the voids. Detroit’s residents increasingly found themselves in a state of exception. Growing crime rates were targeted with an interventionist police force, which was 95% white and notoriously racist (Spreen and Holloway 2005, 80). Police departments in the suburbs were worse, sometimes officially tasked with harassment of black interlopers. White Congressman John Dingell requested FBI protection in the wake of his support of civil rights legislation, saying that he had no confidence in the police (Spreen and Holloway 2005, 52).

The Riot

In 1967, a massive riot erupted from the black ghettos of Detroit. The riot of 1967 is generally considered within the context of the civil rights movement and similar race riots in American cities such as Los Angeles and Cleveland. Less-often referenced is the similarity of Detroit’s discontent and militancy to de-industrializing cities around the world—though the foreign locations were devoid of racial strife (Pizzolato 2004). In fact, though the overwhelming majority of rioters were blacks,
the police and fire departments often found themselves battling entrenched snipers, most of whom were white Appalachian migrants (Georgakas and Surkin 1998, 30).

The 1967 riot is often seen as having sealed Detroit's fate. Many of the city's whites no longer felt safe in the city, and could no longer feel at home. Subjective non-place in the white population skyrocketed overnight. White flight and capital flight accelerated. Within a decade, Detroit had become a majority black city. A new set of city leaders emerged to run the now shrinking city of non-place (Clemens 2005). The legacy costs of maintaining an aging metropolis with a fraction of the previous revenue were insurmountable. Infrastructure crumbled. Schools and social institutions faltered. Soon, the desegregation of inner-ring suburbs allowed middle class blacks to leave the city. The decline was unstoppable.

Missing from popular narratives regarding Detroit's decline is the multiplying effect that sociological dissonance associated with non-space had on the more tangible forces at work. In 1967, the year of the riot, over 1.5 million people were Detroit residents. Yet, due to the omnipresent dehumanizing influence of non-place, very few of them regarded the city as their home—they left as soon as they could. Many people were likely no more at home in the suburbs. Some probably were. Non-place lends itself to subjectivity—there are those who never find a home, and those who can find a home wherever they are. This is the power of human affect.

Today

The legacy of the former Fordist metropolis still haunts Detroit. The specter of the non-city is omnipresent. Over 700,000 people still live in the city; many of these residents are residuals of super-scaled non-place. Unable to leave, unhappy to stay, a significant fraction of the city's population is hopeless, helpless, and defeated. The crime rate and murder rate are near the top of American cities. Drug abuse is common. Regardless of the massive structural, functional, and aesthetic blight left behind by the former metropolis, it is this blight on the human condition that will be most difficult for Detroit to overcome.

Detroit continues to suffer, but there is cause for optimism. The city has appeared to stabilize within the last few years. The population is still trickling outwards as deindustrialization continues, but has maintained a core of dedicated residents. Most importantly, the city leaders appear to realize that the path to sustainability includes accepting that Detroit is not destined to recapture its former industrial glory (MacDonald 2010). This evolution of thought in urban planning complements the theory presented in this paper: Keynesian-Fordism produced an unsustainable amount of non-place in the ascension of the city of Detroit. If a community is to grow, it must grow organically. If you build it, non-place will come.

One of the few positive aspects of the residential exodus is that when the unhappy residents left the city, subjective non-place left with them. When examined through the lens of accumulated non-place, Detroit may be in the best position in its history to build a better future. Vibrant, organic communities are sprouting within the ruins of the former metropolis. Many residents have the opportunity and resources to leave, but they stay, regardless of difficulties associated with living in the midst of an urban crisis. They have made Detroit their home - their place.

In 1805, the young American city of Detroit burnt to the ground. A Catholic Priest, Father Gabriel Richard, gave Detroit the motto that remains until this day: “Speramus meliora; resurget cineribus.”

“We hope for better days ahead; it will rise from the ashes.”
References


The Spectacle Park
Emergence of a Sixth Urban Park Typology

Lauren Williams

In May of 2004, Blair Kamin, the Pulitzer Prize winning architectural critic, published an article in Architectural Record entitled “Will Chicago’s long-awaited Millennium Park be fine art or spectacle? Perhaps a little of both” (61). There are many examples to suggest that the question he posed towards Chicago’s $470 million addition could as easily have been directed at many other urban public parks that opened during the last decade in the United States (Lindke 35). Evidence suggests that a new park typology has recently emerged that responds to both a contemporary public whose expectations and engagement with open space has dramatically changed over the past century, as well as to the adaptation of cities to a new post-industrial reality. The following article challenges Galen Cranz and Michael Boland’s assertion that five urban park typologies presently exist by suggesting that a sixth model for urban parks, termed here the Spectacle Park, should also be considered. This new park typology will be defined through the examination of two cities, Chicago and Seattle, which retain prominent examples of early twentieth century urban public park design that can be compared to contemporary parks representative of the sixth model.

A New Type of Urban Park
In “Defining the Sustainable Park: A Fifth Model for Urban Parks,” Cranz and Boland outline five types of public park design predominant within the United States from 1850 to 2004. These are described as the Pleasure Ground (1850-1900), the Reform Park (1900-1930), the Recreation Facility (1930-1965), the Open Space System (1965-?), and the Sustainable Park (1990-present) (Cranz and Boland 103). This essay examines parks classified by the Pleasure Ground typology to provide a comparative method for understanding how society’s perceptions of public open space have evolved to dramatically alter the design of public parks from the cultivated, pastoral landscapes of a century ago to today’s highly programmed and entertaining environments. Pleasure Ground Parks arguably remain the most iconic and admired form of American park design, as evidenced by the continued preservation of such prominent examples as Central Park, Garfield Park, and Boston Commons. Therefore, it is appropriate to contrast the most enduring model of park design, the Pleasure Ground, against the emerging Spectacle Park.

Spectacle is defined as “something exhibited to view as unusual, notable, or entertaining; especially: an eye-catching or dramatic public display” (Merriam-Webster). It represents the most appropriate way to describe the emerging sixth urban park typology. Since the mid-1990s, many prominent urban public parks have emerged, each demonstrating such an elevated level of entertainment and self-consciousness that none of Cranz and Boland’s existing five park typologies comfortably apply.

The Spectacle Park represents a distinct category because of its embrace of provocative art installations, highly programmed spaces, rigid circulation patterns, a superficial relationship to nature, stimulation that is
constant during day and night and throughout changing seasons, and complex public-private funding arrangements. In a majority of cases, Spectacle Parks provide a jolt of adrenaline to cities, boosting tourism and urban revitalization. Mary Eysenbach, Director of the City Parks Forum at the American Planning Association, observed: “just like Central Park defines an area of Manhattan, Millennium Park is creating an identity for [Chicago’s] downtown” (Vaira 168).

The hyper-stimulated character typical of Spectacle Parks is the outcome of an American public that engages urban parks much differently than at the turn of the 20th century. Repeated engagement with parkland is less common because Americans have less time for recreation, but more ways to spend their free time. Parks now compete with increases in travel opportunities, organized sporting events, and the ubiquitous consumption of consumer electronics for the public’s limited leisure time. In addition, the rise of suburban sprawl typically defined by large single-family lots has reduced population in urban centers and made repeated contact with nature seem less important. This can be attributed to the prevalence of low-density suburban residential housing with large back yards that reduces the need for families to seek parkland for play space for children, pet owners to visit public parks with their four-legged companions, and people to utilize these open spaces for group cookouts and gatherings.

As Ray Oldenburg suggests in his book The Great Good Place, “A two-stop model [work and home] of daily routine is becoming fixed in our habits as the urban environment affords less opportunity for public relaxation” (9). As a result of these changing dynamics, new public parks are no longer regarded as serving as an antidote to urban life as they were during the Pleasure Ground period. Rather, their design characteristics seek to brand the parks in order to encourage attendance and generate both national and international media attention for the respective city. The role of the urban public park has changed to necessitate experiences that provoke a response, engage the senses, provide multiple choices for stimulation, and, most importantly, entertain. The Spectacle Park exists as a destination park for entertainment rather than a respite for repeated psychological reflection within the landscape.

Pleasure Ground: An Enduring Urban Park Typology

Near the turn of the twentieth century, Chicago and Seattle served as prominent settings for exploring the expanding role and formation of public open space. Noted landscape architects and designers such as Frederick Law Olmsted, the Olmsted Brothers, and William Le Baron Jenney were each influential in defining the size, location, spatial characteristics, and function of parks in one or both of these two cities. In both cases, formal public open space was the result of great prosperity and recognition by civic leaders that public parks were needed to relieve the stresses of urban life. Garfield Park, in Chicago, (then called Central Park), and Volunteer Park, in Seattle, are both representative models of the Pleasure Ground park typology. Each resulted from civic initiatives intended to enhance public life and to generate greater prominence for each city on the national and international stages.

Garfield Park and Volunteer Park reflect very similar development characteristics. Both were constructed on greenfield sites near the edges of urban expansion. This was likely because civic leaders adhered to contemporary design trends related to the Parks Movement and existing relationships between the parks’ designers. For example, William Le Baron Jenney completed a plan for Garfield Park [Figure A] in 1870 after Chicago’s West Park Commissioners determined that they could not afford to hire the renowned firm of Olmsted & Vaux (Bachrach and Nathan 8). However, Jenney had previously worked at Olmsted & Vaux on their design for Riverside, an early suburb of Chicago. Thus, Jenney’s plan for Garfield Park exhibits the same Pleasure Ground design aesthetic popularized by Frederick Law Olmsted. Only forty acres of the proposed 185-acre site was originally constructed in the 1880s (Bachrach and Nathan 9). By the mid-1930s, the remaining 145 acres of parkland were finally completed,
though with some modifications to the original master plan.

Volunteer Park in Seattle is also a representative example of the Pleasure Ground park typology [Figure B]. Although the site became parkland in 1887, it was not until 1909 that it acquired its enduring Pleasure Ground characteristics. It was at this time that the Olmsted Brothers completed a plan for the 48-acre site (Seattle Parks and Recreation). Led by John Charles Olmsted, the design embraces many of the planning and design principles that his father established. In Greenscapes: Olmsted's Pacific Northwest, Joan Hockaday notes that “the city and the Olmsted Brothers maintained a constant vision from start to finish during the site's early years. The park remains today as one of Seattle's best examples of early 20th century professional landscape planning and design” (47).

Spectacle Park: An Emerging Urban Park Typology

At the onset of the 21st century, Chicago and Seattle once again served as prominent settings for innovations surrounding the role and form of contemporary parks. In 2004 and 2007, respectively, Millennium Park opened in Chicago and Olympic Sculpture Park opened in Seattle. Advocates hoped these public parks would remedy center-city blight and serve as catalysts for urban revitalization efforts. In both cases, designers were encouraged to prepare ambitious creative designs to garner national and international recognition.

The designers for each park responded by creating provocative designs that challenged the conventions of urban public park aesthetics. As a result, these parks are different from any others already existing within either city or around the globe. Chicago and Seattle have established a new definition for the role and form of urban public parks in cities. As has been noted in the case of Seattle, “the extraordinary intersection of art and urban design at the Olympic Sculpture Park offers a new model for the relationship between art and architecture” (Leers 61).

Millennium Park encompasses 24.5 acres of some of the most compelling real estate within the city. Situated between the Art Institute of Chicago, Michigan Avenue, and Grant Park, it maintains stunning views towards the Chicago skyline and Lake Michigan (Freeman 95). The 8.5-acre Olympic Sculpture Park is very similar in this regard, due to its position in the center of Seattle's downtown with views towards Elliott Bay, Puget Sound, and the Seattle skyline (Manfredi and Weiss, 11). The two parks are not only similarly situated, but both designs responded to the challenge posed by their respective cities to reclaim derelict post-industrial downtown land for public benefit. Millennium Park was constructed over a sunken rail yard and parking garage; Olympic Sculpture Park was built upon an abandoned industrial site with below-grade existing railroad infrastructure that required preservation. The challenges associated with each of these two park projects are representative of the typical obstacles facing parks classified by the sixth urban park model. Whereas parks such as Garfield Park and Volunteer Park were constructed on peripheral urban greenfields, Spectacle Parks are typically built on center-city brownfield sites. Thus, the Spectacle Park often serves a significant environmental role by greening former industrial lands, and can serve to energize a previously neglected urban district— not just the recreational and urban development goals of the previous century's Pleasure Grounds.

Given the tendency for Spectacle Parks to be located on degraded sites within an urban core, their size is typically a fraction of the acreage historically found within Pleasure Grounds. However, the comparatively small park size does not appear to reduce the number of programmatic elements within each space. Olympic Sculpture Park integrates an 18,000 sq. ft. Seattle Art Museum pavilion, numerous outdoor sculptures by celebrated artists, an amphitheater, a water feature, connection to the Elliott Bay shoreline, and diverse ecological environments, all while retaining existing highway and rail infrastructure on the site. [Figure C] In contrast, the Olmsted Brothers’ plan for Volunteer Park provided a similar number of features, but spread throughout a 48-acre landscape. The included chart demonstrates the contrast between size and amenities within the parks outlined in this article. [Figure D] This highlights that programmatic expectations for
Spectacle Parks greatly exceed those historically found within the Pleasure Ground typology, when size is taken into consideration.

This tendency is only further reinforced when one compares the plan for Millennium Park against the plan for Garfield Park. While the size of Millennium Park is double that of Olympic Sculpture Park; the programmatic elements located within this Spectacle Park are similar, yet double or triple in size. The design for Millennium Park is divided into a series of outdoor rooms that each features different programmatic content. Millennium Park boasts multiple provocative sculptural pieces by renowned artists such as Anish Kapoor and Jaume Plensa, a Frank Gehry-designed amphitheater, a restaurant, café, and numerous other amenities all constructed atop the existing railroad infrastructure and expanded public parking. [Figure E]

The park also provides connectivity via sculptural bridges to both Lake Michigan and the Art Institute of Chicago. Characteristic of Spectacle Parks, Millennium Park has been designed to acknowledge the changing seasons and times of use through incorporation of an area for outdoor ice skating and an evocative lighting scheme. The Spectacle Park tries to appeal to people from all age groups, including teenagers and twenty-somethings typically forgotten in urban park design, through an extensive array of programmatic options. In contrast, William Le Baron Jenney’s 1870 plan for the 185-acre Garfield Park focused on older adults with children and the elderly by proposing family-oriented passive park amenities. However, the Spectacle Park’s influence may be extending to Pleasure Grounds, as evidenced by Garfield Park’s recent exhibition of art created by the renowned sculptor Niki de Saint Phalle that attracted visitors from a wide age range.

Pleasure Ground parks were typically designed with multiple circulation options to promote leisurely exploration in vast park settings; whereas Spectacle Parks provide more limited circulation, at a smaller scale, directed toward specific attractions. In the design of both Volunteer Park and Garfield Park, the programmatic elements are dispersed throughout expansive sites and set amongst natural vegetation. Both Pleasure Ground Parks discussed in this article have a curvilinear path system that the designers used to create prominent views and provide a sense of enclosure. The Spectacle Parks leave much less to the imagination of visitors, as a consequence of their comparatively small land area. Techniques including elevation changes and landscape screening are used in both parks to create an element of surprise. However, the density of programmatic elements found in Spectacle Parks necessarily limits freedom to explore. Neither Millennium Park nor Olympic Sculpture Park provides the same sense of enclosure or potential for aimless wandering that is found within Volunteer Park or Garfield Park. This compression makes park visitors as much a part of the spectacle as the programmatic elements themselves. The sculptural art fountain by Jaume Plensa, located in Millennium Park, provides a fitting example of this situation. On any warm Chicago day, park visitors can be seen lingering on the walls adjacent to the fountain to watch the dozens of children and occasional adults interacting with the contemporary water display. [Figure F]

**Conclusion**

While the design of Spectacle Parks such as Millennium Park and Olympic Sculpture Park are arguably elegant and have garnered much attention within the international design community; time will prove the true test of their success at responding to America’s changing engagement with its urban public parks. In the case of

![Figure E: Aerial view of Millennium Park demonstrating the numerous options for entertainment](image)

![Figure D: Chart contrasting size and amenities of parks](chart)
Olympic Sculpture Park, “its success as a public space will depend above all on its ability to eventually become a common, almost anonymous space - an urban path that we mostly take for granted” (Zardini 49). Both parks can only hope that they will be embraced as fully by city residents and tourists alike to ensure their preservation well into the future, as have parks such as Central Park and Boston Commons. Their transformative impact on their respective urban centers suggests that they may have begun to garner the necessary admiration. As hoped for by early park advocates, both Millennium Park and Olympic Sculpture Park have successfully served as catalysts to jumpstart revitalization efforts in the urban areas that surround them. This presents a strong argument for Spectacle Parks to serve as a new model for the adaptation of abandoned industrial urban landscapes into venues for public benefit. The transformation of blighted post-industrial sites, commonly found along waterfronts, into verdant, engaging park spaces has the potential to position cities for a more prosperous future as has been demonstrated in both Chicago and Seattle.

This aspect, in combination with evidence presented above, highlights the unique characteristics present within the Spectacle Park and identifies why parks such as Millennium Park and Olympic Sculpture Park warrant a new typological classification. Spectacle Parks respond to an American public that no longer seeks respite in urban public parks, but rather views these spaces as venues for entertainment. The admiration and attention that Spectacle Parks have already garnered over their short life spans suggests that they have the potential to make a lasting impact upon the urban environment. However, the question remains whether this sixth urban park typology is as enduring as the Pleasure Ground typology or merely a trend that only lasts for another decade or two.

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Figure C: ASLA 2007 Professional Awards, http://www.asla.org/

Figure E: Greenroofs.org. http://www.greenroofs.org/washington/index.php?page=millenium

Figure F – View of Jaume Plensa’s Crown Fountain

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Analysis of the Maximization of LEED Points for the Construction of a Mid-Rise Apartment Complex

Andrew Fang, Nathan Niese, Lindsay Sharpe, & Morgane Tréanton

Introduction and Background

Currently, the leading method of green building certification is the Leadership in Energy and Environmental Design (LEED) rating system. The LEED system was developed by the U.S. Green Building Council (USGBC) in 1998 as “a consensus-based, market-driven building rating system designed to accelerate the adoption of green building practices” by creating widely accepted and regimented performance criteria. The main aim of the LEED certification process is to promote design and construction habits that increase profitability; improve occupant health and well-being; and reduce the negative environmental impacts of building site selection, energy and material usage, and environmental air quality (USGBC 2010a).

A total of eight LEED Rating Systems exist, covering almost all building and construction types. The most commonly implemented system is LEED for New Construction (LEED NC), which serves as the basis for this analysis. LEED NC “addresses design and construction activities” for both new commercial, institutional and residential buildings, as well as major renovations of these existing buildings (GBCI 2010). The LEED NC program awards credits on a 100-point scale and ensures that buildings are strategically designed to improve performance across the following categories:

- Sustainable sites (SS)
- Water efficiency (WE)
- Energy and atmosphere (EA)
- Materials and resources (MR)
- Indoor environmental quality (EQ)

Eight prerequisites must be satisfied to qualify for a LEED certification, and a possible ten bonus points can be achieved through innovation in design and regional priority credits (USGBC 2010b). An individual credit can earn multiple points, and not every credit is applicable to each project.

LEED projects can earn a Certified, Silver, Gold, or Platinum distinction depending on the number of sustainable attributes implemented (Table 1). Although the structure for earning points is relatively simple to comprehend, achieving a desired number of points requires creativity, integration, and analysis. This is especially true of the Gold and Platinum distinctions, which require significant effort and ingenuity from project designers to push the boundaries of sustainable building design and lead market transformation (Matthiessen and Morris 2004).

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Table 1: LEED for New Construction Rating Points System

Proponents of the LEED framework note that the system is straightforward, delivers a market-respected metric, and appeals to human nature (Cassidy 2003). These qualities have led to the widespread adoption of LEED as the industry standard. To further simplify sustainable construction, the USGBC offers extensive LEED training programs, an Accredited Professional exam, templates, and technical support. The system permits flexibility in the design options used to achieve each credit, employs regional credits to adapt to site-specific needs, and values the fact that various building types require particular rating systems. The underlying theory behind the LEED system is that architects, engineers, and developers are expected to adopt a more adaptive approach to building design.

While the LEED system encourages holistic design and represents an evolution of systems thinking concepts, detractors note that the philosophy does not always translate to practice. At present, the LEED rating system is undergoing its third revision. This indicates both adaptability towards trends in technology use and potential system flaws. For example, credit weighting is new to the latest revision and is an attempt to rebalance credits and ensure Energy & Atmosphere (EA) credits are pursued. Evidence that highly sustainable measures, many of which are encapsulated in the EA credits, are not often pursued uncovers an unfortunate mismatch. Behavioral and implementation issues surrounding the efforts of
designers and developers tend to relegate the LEED certification process to a point-grabbing game, rather than the way to encourage sustainable building design that its developers had intended.

**Problem Statement**

This analysis attempts to address the three following questions: How does a developer determine what LEED standard to achieve? Which credits are worth the capital investment? What is going too far? This analysis takes the perspective of a developer who wants to build a new LEED-rated mid-rise apartment building due to the fact that renters are typically willing to pay a higher price if they are living in a “green building.” The developer faces a two-headed question: how many credits should be obtained, and which specific credits are economically, structurally, legally, and aesthetically feasible?

This analysis takes a systems approach that consists of establishing an objective function that is governed by a set of constraint equations. The objective function, below, maximizes the number of LEED credits earned for a new multi-family residence.

$$\text{Max } z = \sum_{i=1}^{\text{# of credits}} W_i \times X_i$$

$W_i$ is the weight of each credit. For example, a bicycle storage credit can earn the owner one point, $W_i = 1$, while a fuel efficient vehicles credit can earn the owner three points, $W_i = 3$. In this equation, $X_i$ is the binary choice of whether the owner pursues the credit or not. If the owner selects the credit, $X_i = 1$, and if the owner does not select the credit, then $X_i = 0$.

**Methods**

The building model is based on a recently constructed apartment complex named Zaragon Place located on East University Avenue in Ann Arbor, Michigan. This 60,000-square foot building is comprised of 8 stories and 70 bedroom units, accommodating 196 people when fully occupied. Additionally, the building has 5,400 square feet of roof space and is oriented to the west. While this building has not actually pursued LEED certification, it is advertised as a “green” building and is therefore being used as the model for this analysis.

Cost is one of the main factors constraining the objective function. Capital costs for “going green,” operation and maintenance costs (O&M), and life cycle costs per credit are presented in dollars per square foot to maintain a consistent basis.

The first constraint on the system has to do with LEED’s eight prerequisites. Each LEED category has at least one prerequisite that needs to be fulfilled and is represented by the following equation:

$$X_{SS1} + X_{WR1} + X_{WR2} + X_{EA1} ... > 8$$

Because owners have a limited sum of money to spend on a project, build cost premium must constrain the objective function. So, it is essential that the sum of the capital costs for “going green” is less than or equal to a percentage of the total build cost. Based on historical evidence, this study assumes that a 6% build cost premium serves as an adequate constraint. The build cost premium constraint can be represented by the following equation:

$$\sum \text{Capital costs} \leq 6\% \text{ building cost}$$

Owners are more likely to pay for green improvements that positively influence the economic profile of the project. A rent premium is the increased rent that the owner can charge renters for living in a green building. In addition to reducing a building’s burden on the environment, green residences improve physical and mental health and enhance productivity (Heerwagen 2000). According to the USGBC, rent premiums are, on average, 3% higher than market rates (USGBC 2010c). Such statistics translate monetarily to the following equation and are discounted over 20 years:

$$\sum \text{Capital costs} \leq 3\% \text{ rent premium}$$

Another driver of the owner’s decision-making process includes a temporal element, which is often expressed in terms of the payback period. The capital cost for “going green” has to at least break even with the savings from the O&M cost after 20 years. The constraint is illustrated below:

$$\text{Capital cost} + \sum_{i=1}^{20} \text{O&M costs} \leq 0$$

Lastly, limitations exist in pursuing certain combinations of credits, which are referred to as synergies. For example, the owner can obtain a LEED point for foregoing parking (Credit SS4.3), but another credit will give the owner a point for installing charging stations for electric vehicles in the parking lot (Credit SS4.4). The owner cannot earn both credits at the same time, which can be represented by the subsequent equation:

$$\text{SS4.3} + \text{SS4.4} \leq 1$$

When developing these constraints and analysis, the following series of assumptions were made:

- A majority of the building’s envelope and layout is fixed. This analysis therefore looks at smaller changes, such as whether the roof should be vegetated, covered by solar panels, or made of highly reflective material.
The costs of the building have life cycle considerations. These costs include the initial capital costs for “going green” as well as O&M costs.

Utility prices remain constant over the full life cycle. This is based on Energy Information Administration’s Short-Term Energy Outlook 2010.

A discount factor of 6% is chosen based upon a historical average of “Nominal Interest Rates on Treasury Notes and Bonds of Specified Maturities” published in the OMB Circular 94 to assess the net present value (NPV) of O&M costs over the full life cycle of the building.

The occupancy rate for the building will remain 100% for the 20-year span. The prime campus location, in addition to the fact that green buildings typically have a 3.5% higher occupancy rate than non-green buildings, leads to the full occupancy assumption (USGBC 2010c).

Soft costs, or those related to additional documentation, commissioning, and green design, are designated $1.50 per square foot. A report by Davis Langdon outlines that soft costs typically range from $1.00-$2.00 per square foot (Matthiessen and Morris 2004).

No Innovation in Design credits are pursued. Such credits are difficult to quantify, too variable in nature, and subject to interpretation.

Individual credit rules and cost data were sourced from several key publications. The LEED 2009 for New Construction and Major Renovations Rating System (USGBC 2010b) served as the foundation of the authors’ interpretations. The report details the rules for each LEED credit and outlines the available points for each credit. Credits that the owner would not be able to earn were identified and excluded, such as brownfield redevelopment.

The cost per square foot for each remaining credit was elicited from three main reports: 1) GSA: LEED Cost Study Final Report (Steven Winter Associates, Inc. 2004), 2) LEED Cost Evaluation Study (IHS 2006), and 3) The Cost of LEED: A Report on Cost Expectations to Meet LEED 2009 for New Construction and Major Renovations (Building Green, LLC 2010).

The cost per square foot for each credit mentioned previously is the foundation of our study. Initial capital costs and O&M costs over 20 years were separately calculated from the reports or estimated when data was unavailable or conflicting. From there, a life cycle cost was obtained using the following equation.

\[ \text{Life cycle cost} = \text{Capital cost} + \text{O&M cost} \]

Using Microsoft Excel Solver, a general-purpose modeling program that optimizes an objective function with given constraints, the number of credits that the developer should pursue is determined. Table 2, below, serves as a sample illustration of the variable inputs and outputs to the model. The column titled “Credit Name” represents the individual i’s in the objective function. Each

<table>
<thead>
<tr>
<th>Credit</th>
<th>Credit Title</th>
<th>Yes/No</th>
<th>Credit Total Capital Cost</th>
<th>O&amp;M Renter* ($)</th>
<th>O&amp;M Owner** ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS4.2</td>
<td>Bicycle Storage</td>
<td>Yes</td>
<td>$0.01</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>SS4.3</td>
<td>Fuel-Efficient Vehicles</td>
<td>Yes</td>
<td>$0.05</td>
<td>$0.00</td>
<td>$0.46</td>
</tr>
<tr>
<td>SS4.4</td>
<td>Parking Capacity</td>
<td>No</td>
<td>($1.50)</td>
<td>$8.82</td>
<td>$8.82</td>
</tr>
<tr>
<td>SS5.1</td>
<td>Protect or Restore Habitat</td>
<td>Yes</td>
<td>$0.67</td>
<td>$0.02</td>
<td>$0.02</td>
</tr>
<tr>
<td>SS5.2</td>
<td>Maximize Open Space</td>
<td>No</td>
<td>$0.73</td>
<td>$0.02</td>
<td>$0.02</td>
</tr>
</tbody>
</table>

* O&M Renter- Operation and maintenance cost when renter pays utilities
** O&M Owner- Operation and maintenance cost when owner pays utilities

Table 2: Sample Optimization Model

Figure 1: Capital Cost Curve
credit has an associated weight ($W_i$) and assigned cost data (Capital Cost and O&M Cost columns), which are inputs to the objective and constraint functions. Optimization seeks to maximize the number of total points pursued, represented in the table as the sum of the points in the “Total Earned” column.

Build cost premium, rent premium, payback period, and synergies constrain this maximization based upon the costs of credits chosen. Subject to these constraints, Excel Solver determines if a credit is earned, $X_i$. Earning an individual credit is a binary Yes/No choice, represented by a ‘1’ for ‘Yes’ and a ‘0’ for a ‘No’ selection. Multiplying the individual weight of the credit, $W_i$, by the individual binary choice, $X_i$, is represented by the “Total Earned” column, which is maximized by the program.

Results

Using the data collection methods mentioned above, costs for each credit were sorted by LEED category in order to develop a Capital Cost Curve (Fig. 1). In Figure 1, the most expensive credit is EQ8.1 – Daylight and Views. This is likely due to the building model’s floor plan and shape; significant additions would need to be made to achieve the necessary amount of lighting. The least expensive credit is SS4.4 – Alternative Transportation/Parking Capacity. The negative capital cost reflects the savings that the owner gains by not building a parking structure. Also of note is the exponential shape of the cost per credit for the energy reduction section (green bars). While the Energy Performance credits increase linearly from 12% to 48% in increments of 2%, it becomes more expensive to achieve an extra 2% energy reduction as the building becomes more energy efficient.

O&M costs were calculated as the NPV of each credit over a 20-year lifetime. Once again in the O&M Cost Curves, the SS4.4 – Alternative Transportation/
Parking Capacity credit stands out. This time, it is the most expensive credit due to the lost revenue that the owner incurs by not having a parking structure. In Figure 2, the owner is paying utilities and can therefore reap the benefits of increases in water and energy efficiency.

The Life Cycle Cost Curves aggregate the Capital and O&M Cost Curves to determine a value for each credit over the lifetime of the building. This was done for two different scenarios: when the owner pays utilities and when the renter pays utilities. When the renter pays utilities (Fig. 3), the Life Cycle Cost Curve will look almost the same as the Capital Cost Curve; the main difference is the now positive cost of the SS4.4 credit. However, when the owner pays utilities (Fig. 4), the water and energy efficiency credits now become savings for the owner. This encourages the owner to pursue these credits fervently to try to achieve the maximum overall savings. When the owner cannot incur savings on these water and energy credits, he/she would likely choose to maximize the amount of points per dollar spent instead.

In Figure 5, the Cost Abatement Curve is sorted from least to most expensive credit. When the owner pays utilities, his efficiency savings on certain credits may allow him to pay back premiums on other more expensive credits. However, when the renters pay utilities, the owner must make up his premiums by increasing the rent. The cost abatement curve exposes the un-optimized credits the designer would choose to pursue. Moving from left to right, the designer selects the lowest cost credits until the constraints are satisfied. However, because the credits are un-weighted, the designer is not maximizing “bang for buck”. These calculations determine that the un-optimized scenario results in a LEED Silver distinction when a 3% rent premium is applied. The 59-point LEED Silver rating serves as the baseline case for the study.

Optimization reveals that strategically pursuing
credits can result in a LEED Gold distinction under the same rent premium conditions. Out of a potential 110 available LEED points, the optimized building design earns 69 points and is eligible for a mid-range Gold distinction. A significant percentage of available credits in Sustainable Sites and Indoor Environmental Quality are obtained, as well as all credits available under Water Efficiency. Most Sustainable Sites credits are achieved as the result of a downtown site location, while Indoor Environmental Quality and Water Efficiency points are noted for low or non-existent premiums. Water Efficiency and other Energy and Atmosphere credits make even more financial sense if the owner is responsible for the utilities him/herself. The results also outline a manageable payback period of eight years, marked by an approximately $260,000 capital investment for the green features. Build cost and rent premium served as the two economic binding constraints, while payback period was a non-binding constraint.

A basic sensitivity analysis was performed on the rent premium constraint. Certainly, a sensitivity analysis could have been performed on any of the other binding constraints such as the credit cost per square foot or utility costs. Table 3, below, summarizes sensitivity results for the rent premium constraint.

Sensitivity analysis demonstrates the law of diminishing returns. As the table illustrates, increasingly higher rent premiums yield less and less in the way of total LEED points. As optimization approaches LEED Platinum level, high-cost credits are all that remain, which leads to an increasingly higher ceiling for each additional LEED point. Where economic changes are noticed is in the reduced payback period. The owner must determine if apartments remain affordable and desirable at these higher rent premiums, balancing issues of occupancy rate and mortgage financing.

Table 3: Summary of Sensitivity Analysis

<table>
<thead>
<tr>
<th>Premium</th>
<th>2% Rent Premium</th>
<th>3% Rent Premium</th>
<th>4% Rent Premium</th>
<th>5% Rent Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites (26)</td>
<td>19</td>
<td>24</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Water Efficiency (10)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Energy &amp; Atmosphere (5)</td>
<td>17</td>
<td>14</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Materials &amp; Resources (14)</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Indoor Environmental Quality (15)</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Regional Priority (4)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>LEED Points</td>
<td>68</td>
<td>79</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Payback Period</td>
<td>19 yr</td>
<td>10 yr</td>
<td>8 yr</td>
<td>11 yr</td>
</tr>
<tr>
<td>Build Cost Premium ($/SF)</td>
<td>$1.46</td>
<td>$2.79</td>
<td>$4.37</td>
<td>$5.82</td>
</tr>
</tbody>
</table>

Conclusion

Initial efforts of the study focused on identifying credit costs. The underlying reason behind the wide range of costs presented above bears some discussion. High-cost credits are typically pursued based on a number of factors related to spatial arrangement, equipment costs, labor-intensiveness, or design complexity (Matthiessen and Morris 2004). Equipment and materials such as photovoltaics and green roofs require large utilization of outdoor space. Certified wood and high-efficiency chillers are more expensive than conventional products, are difficult to acquire, and may necessitate rental of expensive construction equipment. Construction waste management and reuse plans involve additional planning. Installing ventilated flooring or daylight sensitive shades and lighting can be mechanically intricate and difficult to construct. When determining which high-cost credits to pursue, the importance of incorporating certain sustainable measures against the bottom line, such as environmental footprint, uniqueness, risk, desired image, and marketability must be considered (Cassidy 2006).

This study can assist developers by providing a framework to determine which LEED credits will add the most value to their project. It promotes the idea that developers should consider at least becoming LEED Certified for future construction projects, due to the feasibility of achieving a Silver rating. It also emphasizes that when renters pay for utilities, the developer doesn’t realize the many added benefits of pursuing efficiency measures. Therefore, if a developer is serious about pursuing LEED certification, he/she should pay for utilities in order to reap the benefits of pursuing the more expensive energy and water efficiency credits.

While developers normally focus on up-front costs in their evaluation of which LEED credits to pursue, this study attempted a more thorough analysis by examining some facets that may have been overlooked. For example, the life cycle costs of each credit were considered in addition to the capital costs in order to incorporate the costs and savings that accrue over the lifetime of the building through O&M. Additionally, synergies between credits were considered because the interaction between credits can have a big impact on both the number of credits that are physically feasible and the overall efficacy of each credit in making the building more sustainable. Most importantly, for the purpose of maximizing LEED points, consideration of the weighting factor on each credit was essential in determining which credits provided the most long-term “bang for the buck.” The inclusion of synergies and the weighting of the credits greatly enhance the ability to determine how to maximize the number of LEED points a building can achieve.

However, the LEED program can still be construed as a double-edged sword. On one hand, LEED draws upon
the competitive nature of mankind, daring architects, engineers, and developers to innovate to the best of their abilities. A complex, multi-faceted problem is converted into a tangible game with clearly established rules and intricate strategies (Matthiessen and Morris 2004). On the other hand, sustainable design and development cannot be fully appreciated if viewed only through the lens of gamesmanship. An appreciation for synergies, the extension of system boundaries to include infrastructure planning, and an understanding of design flexibility and uncertainty are required for projects to truly be considered “sustainable.” Creativity, foresight, integration, and flexibility should be increasingly valued commodities in building design.

One thing that LEED is lacking is an attention to holistic building design. A great deal of design work and flashy marketing can highlight the energy savings of many green features, yet the same savings might be accomplished by re-orienting the building from west-facing to south-facing. No points are awarded for building orientation, which showcases the limitations of the LEED program to advocate for holistic design. Optimizing LEED credits further relegates green building to a point-grabbing game. It is understood that the presented analysis does not provide full coverage of the design-build-LEED nexus, but provides some food for thought. For example, efforts in this study did not include an analysis of local or regional incentives. Many governments provide tax incentives for LEED buildings. A city such as Portland provides significant monetary benefits to buildings that achieve Platinum status, and the city of Boston mandates that all new buildings at least achieve LEED certification. While this policy in Boston removes the potential for a market advantage, it ensures that future construction projects incorporate more sustainable practices.

Furthermore, Regional Priority Credits, new to the LEED 2009 rating system, were not considered during this evaluation. These credits are ZIP code-dependent and are earned through bonus points (maximum of four) if the developer pursues the credits that the local USGBC chapters deem as priorities for their geographic area. Regional credits allow cities to highlight specific urban needs that they believe would improve the community as a whole. For example, the six Regional Priority Credits for Ann Arbor, MI are: 1) Building Reuse, 2) Brownfield Redevelopment, 3) Access to Public Transportation, 4) Bicycle Storage & Changing Rooms, 5) Stormwater Design (Quality Control), and 6) Heat Island Effect (Roof)

While LEED needs to be adjusted to achieve more holistic building design, regional incentives and Regional Priority Credits enable cities to encourage sustainable development and emphasize the improvements they would most like to see integrated into their communities. Cities are path-dependent; future development strategies will depend on what is already present in the built environment.

It is, therefore, important to include the principles of sustainable development in today’s construction projects. Because LEED requires developers to address these principles as they plan their buildings, it is one tool that can help cities decrease their overall environmental footprint and encourage future sustainable urban development.

### References


In 2009 Round Rock, Texas, was the second fastest growing city in the United States, in large part due to the Dell Corporation Headquarters site just south of town. This project critiques the status quo - sprawling suburban company town - and aims to re-imagine the city of Round Rock as a denser, more diversified urban proposition through reclaiming the wasted space of the suburban lawn and leveraging the variety and fertility of the city’s current soil types.

The project began with an analysis of Ebenezer Howard’s 1901 Garden City plan. While we recognize Howard’s entirely self-sustaining city proposal to be an unreachable ideal, we sought to apply his understanding of productive added value feedback loops within the city structure to Round Rock. We argue that farming the fertile suburban lawns of the city could not only provide some portion of the city’s food, but also diversify the city’s Dell subsistent economy while simultaneously creating more community-oriented productive public space.

If Round Rock, like Garden City, produced all its own food, it would need an area 12.8 times its current size.
To implement the new suburban agriculture of Round Rock, we designed a series of land use protocols based on soil class, primary crop type, and single family housing lot arrangement. These protocols aim to maximize tractor pattern efficiency in plowing crops, as well as provide flexibility, multiple use options, and financial incentives for individual land owners.

**SUGGESTED LAND USE ARRANGEMENT**

1. Cultivate, at a minimum, 25% of the open space of your lot.
2. The first cultivated percentage should be along the short side of your lot that is not adjacent to the street.
3. The cultivated swath should have a minimum width of 15'.

**CROP RECOMMENDATIONS:**

1. The first and second 25% increment of your lot cultivated should be the highest yield crop for your soil type.
2. The first two 25% increments in cultivation should be plowable crops consistent with your soil type capacity.
3. Crop recommendation 1 does not apply if the primary crop is pecans, as they are not a plowable crop.
4. You may choose any crop consistent with your soil type for the final 50% of open lot space.

**ADJACENCY RECOMMENDATIONS:**

1. The second 25% increment in cultivation should maximize adjacency with already planted crops.
2. The second 50% of cultivation may be located on lot at your discretion.

**PROFIT SHARING STRUCTURE:**

1. 50% of profit will go toward future investment.
2. 50% of profit is kept by the land owner.
This project aimed to diversify Round Rock’s Dell-dependent economy. We performed detailed budget analyses based on soil type and primary crop location, and from these calculations found that reclaiming the suburban lawn as productive space for Round Rock would add almost nine million dollars to Round Rock’s annual economy.
In order to maximize economic growth, crop yield, and land use efficiency, we charted the typical growing seeds of local crops. We found that a winter planting of nitrogen-fixing clover would replenish nutrients in the soil and open potentials for beekeeping and dairy cow grazing.

To support the new agricultural economy, we located a number of crop infrastructure nodes on vacant parcels throughout the city at areas of highest crop concentration.
Crop Infrastructure Node
Building Diagram: Tower + Base

TRACTOR & COW STORAGE
Functions:
- Houses 600+ dairy cows
- Automated milking area for 100+ cows & milk storage facilities
- Storage for 7 tractors
- 6% sloped ramps required for cattle accessibility

TRACTOR Protocols
- Turning radius of 9.8’
- Speed = X miles per hour maximum
- Storage spaces needed: 7 for x ft² area of plowable land
- Width of tractor paths = 7-10’ (varies based on type of crop and attachments)

BASE Wm Area
- 6 ft of space needed for each lane
- Total space per lane = 60 x 6/12 x 6 = 9,000 sq ft per lane

Total Dairy Cow Stalls = 650
Stalls house cows and integrate systems for more effective waste remediation

Total Tractor Storage Spaces = 7
Tractor storage areas are based on overall dimensions and turning radius

Base Dimensions:
- Overall Length = 50’
- Overall Width = 52’
- Overall Height = 26’

Slope:
- 2% – 6% maximum for cow access in and out

Ramp Elevation:
- 52” max height
- Each level holds 19 days of feed or 30 days total

Grain Storage & Elevator:
- Holds at least 1,000,000 lb (4,536 kg)
- Each level holds 19 days of feed

TOWER:
Functions:
- Minimize lower for ease accessibility
- Houses 1000+ lactating cows (maximum) for breeding functions
- 6.5% slope for dumping and filtering of expressed cow honey
- Grain storage also centrally located within tower for cattle feed of all ‘Tower elevation’
As Round Rock continues to grow, we found that appropriating the space of the suburban lawn for a new agricultural economy creates added value resources loops in the city for both local food production and cash crop distribution. In addition to economic gain, the repatterning of Round Rock based on soil type, land use, and tractor protocols, as well as new crop production infrastructure, produces new types of community public space for the residential neighborhoods of the city.
Safety, Mode Share, and Segregated Bicycle Infrastructure

Melinda Morang

Introduction

Automobile use in cities leads to a variety of undesirable effects, including carbon dioxide emissions, noise pollution, accidents, and congestion. Cycling, which lessens or eliminates these problems, offers a viable alternative to automobile travel, especially in cities, where about half of all trips are shorter than three miles (Pucher, Komanoff, & Schimek 1999). Cities are increasingly interested in encouraging this cheaper, cleaner, quieter form of transportation.

Despite its benefits, cycle mode share in much of the developed world remains very low. Cycle trips make up only about 1% of trips in the United States (Pucher & Beuhler 2007). The reason for this low mode share may be that utilitarian cycling is not part of the prevailing cultural norms in some cities (Dill & Voros 2007; Pucher, Komanoff, & Schimek 1999), that physical factors such as the climate, topography, or infrastructure are inappropriate for cycling (Dill & Voros 2007), or that people perceive cycling as unsafe (Dill & Voros 2007; Pucher, Komanoff, & Schimek 1999). However, some European cities have managed to achieve a high cycle mode share even while their populations enjoy automobile ownership levels as high as the United States. For example, Amsterdam’s bicycle mode share was 37% in 2005, and bike trips in Copenhagen in the same year encompassed 20% of all trips (Pucher & Beuhler 2007).

According to Pucher & Beuhler (2007; 2009), the cities that enjoy a high cycling mode share employ a portfolio of strategies to encourage cycling. They have dense, mixed-use development, safe and ample bicycle parking, good integration with public transit, training programs for school children, priority traffic signals at intersections, good law enforcement, and policies to restrict or inconvenience automobile use in certain areas of the city. Overall, these cities have made strong commitments to encourage and support cycling and have backed those commitments with sufficient policies and funds.

According to Pucher & Beuhler (2007; 2009), an essential piece of the portfolio to encourage cycling is for cities to provide bicycle infrastructure such as cycle paths and lanes. Separating cyclists from motor traffic makes cycling safer and easier, and it encourages more people to ride, specifically those who do not feel safe riding in traffic. However, there is some controversy surrounding this strategy. Although segregation from motor traffic is employed to some extent in all the high mode share cities examined by Pucher & Beuhler, there is disagreement in the literature about whether segregation is really appropriate. It is unclear if separate cycle infrastructure actually increases cycle mode share. Furthermore, some people claim that separate bikeways actually decrease cyclist safety (Forester 1994; 2001). These are generally the proponents of “vehicular cycling,” in which cyclists ride in traffic and obey all normal rules for motorized traffic. Others, however, claim that segregation is absolutely necessary because cycling and motor traffic are simply incompatible (Godefrooij 2003).

Are separated bikeways truly more dangerous than cycling in traffic? Do bikeways encourage cycling, thereby increasing cycling mode share? This paper will examine these questions through a review of the literature.

Safety and Cycle Infrastructure

First, we will examine the issue of safety. Do separated cycle facilities increase cyclist safety as many people believe, or do they actually make cycling less safe as the vehicular cycling advocates claim?

Proponents of separated cycle facilities state that keeping cyclists and motor vehicles separate protects both parties from conflicts with one another, especially when motor traffic is heavy or traveling at high speeds. Cyclists are much more vulnerable than motorists, and heavy or quickly-moving traffic can cause stress and limit cyclists’ freedom to maneuver (Godefrooij 2003). Those cycling in traffic must possess great awareness and a high level of skill to remain safe (Godefrooij 2003).

However, separated cycle facilities present problems as well. Most accidents occur at intersections, and cyclists on separated facilities still have to cross traffic at intersections. Thus, they remain unprotected where they are most vulnerable. Additionally, when cyclists are separated from traffic, it is more difficult for motorists...
and cyclists to see one another. Consequently, they may be less aware of one another, thus increasing the likelihood of conflicts (Godefrooij 2003; Haake 2009). Furthermore, requiring cyclists to stay in separated facilities on the side of the road makes it especially difficult and dangerous for them to make left turns at intersections because they have to cross all traffic lanes in order to do so. Finally, cyclists in separated facilities encounter more problems with pedestrians, especially those stepping off of buses into the bike lanes or paths (Haake 2009).

Vehicular cycling has been proposed by some, most notably John Forester and Bjorn Haake, as a solution to these problems. By placing cyclists in traffic with motorists and requiring them to follow the same set of rules, both parties benefit from good communication with other vehicles based on a standard set of principles, better visibility to one another, and better overall predictability of behavior (Haake 2009). According to Forester and Haake, separated cycle infrastructure is dangerous and should not be used. Instead, everyone should practice vehicular cycling.

Unfortunately, although these two authors are very vocal in expressing their opinions, the evidence they present is largely anecdotal and unscientific. As an example, consider Forester’s condemnation of sidepaths based on a single test in which he used himself as a subject (2001). He spent an afternoon riding on a new sidepath in Palo Alto, CA. He claims to have encountered more dangerous situations in one day riding the sidepath than he had in many years riding in traffic on that same stretch of road. He condemns all separated cycle facilities based on this single test, or at least presents this test as evidence of his conviction instead of conducting or presenting any convincing scientific studies. He neglects to consider that his particular sidepath may have been poorly designed in the first place or that the drivers in the area may not have been overly accustomed to cyclists (Forester 2001). Other claims by Forester (1994; 2001) and Haake (2009) are similarly lacking in rigor. Thus, in order to assess the relationship between cycle facilities and safety, we must look elsewhere.

Pucher & Beuhler (2007) claim that separated cycle facilities increase cyclist safety. The countries with the lowest accident rates have the highest cycling mode share, and all of those countries make extensive use of separated cycle facilities. Thus, separated cycle facilities increase safety, and, furthermore, a higher mode share or larger number of cyclists also increases safety (Pucher & Beuhler 2007). A comparison of accident statistics shows that cyclist fatalities are over five times more likely in the United States than in the Netherlands, even though American cyclists are much more likely to wear helmets (Pucher & Beuhler 2007). Unfortunately, the causal relationships in their arguments are questionable, and we learn little more from their claim than we do from Forester and Haake.

There have been many studies assessing cyclist safety and cycle infrastructure. A meta-analysis of these studies found that the number of accidents increased after separated cycle facilities were installed on roads (Elvik, Høye, Vaa, & Sørensen 2009). However, the authors of this analysis point out a flaw in many of the studies they review. Most did not take into account the number of cyclists but simply reported an increase in the total number of accidents. Thus, the increase in accidents could reflect an increase in the total number of cyclists rather than an increase in the number of accidents per cyclist.

A study commissioned by the Municipality of Copenhagen (Jensen, Rosenkilde, & Jensen 2007; Jensen 2008) did account for an increase in the number of cyclists. The study found an overall 10% increase in crashes and injuries after cycle facilities (cycle tracks and lanes, colored crossings at intersections, and raised exits) were installed (Jensen, Rosenkilde, & Jensen 2007). Accidents at intersections increased by 18% (Jensen 2008). In addition to conflicts with turning vehicles, there were more instances of bicycles hitting one another from behind and bicyclists hitting pedestrians.

The authors attributed some of the increase in crashes to a motor vehicle parking problem. After cycle infrastructure was installed on the main roads, cars could no longer park there and instead had to turn onto side roads in order to park. This lead to a huge increase in turning vehicles that crossed the cycle tracks, resulting in increased conflicts between cyclists and motor vehicles (Jensen 2008). This suggests that perhaps these cycle facilities are not inherently flawed but simply suffer from unforeseen circumstances that could be fixed or avoided in the future.

The authors also found that accident rates varied for different types of intersections and cycle facilities, suggesting that some designs are safer than others.
Berkeley, California. Photo: Joel Batterman, 2010
hand, good cycle infrastructure could be a sign that cyclists designed with precisely this goal in mind. On the other
Forester (2001) claims that the US Bikeway Standards are infrastructure suited to their own needs (Godefrooij 2003). Motor traffic rather than to really provide them with good designed to keep cyclists from restricting the flow of motor vehicles (Forester & Beuhler 2009). Furthermore, segregation and give the message that cyclists are somehow inferior to restricting the free movement of cyclists (Godefrooij 2003). According to the Dutch design manual road space in the safest and most effective way possible (Godefrooij 2003). According to the Dutch design manual, integrating cyclists with traffic is only appropriate on road stretches with low speeds and traffic volumes. In these areas, overtaking maneuvers will be infrequent, and cyclists will not significantly slow down traffic (Godefrooij 2003). A greater degree of separation is needed with higher motor traffic volumes and speeds. Godefrooij (2003) attempts to quantify this relationship, although he notes that existing research of cyclist safety on roads of varying speed and traffic volume is very limited. His criteria are largely based on “practical experience and common sense” (Godefrooij 2003, p. 495).

Integration and segregation might each be appropriate in certain circumstances because of safety and practicality, but each comes with tradeoffs. The type of infrastructure that is appropriate for a particular road depends on budget constraints, available space, and roadway traffic conditions (Pucher & Beuhler 2009). Planners must balance the needs of both sets of roadway users in order to allocate the available road space in the safest and most effective way possible (Godefrooij 2003). According to the Dutch design manual, integrating cyclists with traffic is only appropriate on road stretches with low speeds and traffic volumes. In these areas, overtaking maneuvers will be infrequent, and cyclists will not significantly slow down traffic (Godefrooij 2003). A greater degree of separation is needed with higher motor traffic volumes and speeds. Godefrooij (2003) attempts to quantify this relationship, although he notes that existing research of cyclist safety on roads of varying speed and traffic volume is very limited. His criteria are largely based on “practical experience and common sense” (Godefrooij 2003, p. 495).

Integration and segregation might each be appropriate in certain circumstances because of safety and practicality, but each comes with tradeoffs. Separating cyclists from traffic might reduce conflicts, but it can also restrict the free movement of cyclists (Godefrooij 2003) and give the message that cyclists are somehow inferior to motor vehicles (Forester 1994). Furthermore, segregation can be seen as a sort of “banishment” from the roadway designed to keep cyclists from restricting the free flow of motor traffic rather than to really provide them with good infrastructure suited to their own needs (Godefrooij 2003). Forester (2001) claims that the US Bikeway Standards are designed with precisely this goal in mind. On the other hand, good cycle infrastructure could be a sign that cyclists are respected (Pucher, Komanoff, & Schimek 1999) and a demonstration of a municipality’s commitment to supporting cycling as a viable mode of transportation.

Perceived safety
People’s decisions to cycle do not necessarily correspond to objective measures of safety but instead reflect their perception of safety (Dill & Voros 2007). Thus, regardless of whether or not separated cycle infrastructure actually creates safer conditions, if people believe that cycling on separated facilities is safer than cycling in traffic, they are more likely to feel safe and comfortable. If they feel safe and comfortable, they are more likely to cycle. Many studies show that this is, indeed, the case. People feel safer riding separate from traffic (Elvik et al. 2009; Heinen, Van Wee, & Maat 2010; Jensen, Rosenkilde, & Jensen 2007; Pucher, Komanoff, & Schimek 1999). Vehicular cycling requires a high level of awareness and skill (Godefrooij 2003). Not all cyclists possess these qualities, or even if they do, they may prefer the less stressful and more relaxed cycling experience that separated facilities allow. In other words, all but the most serious of cyclists may be discouraged from cycling if separated facilities are not provided. The elderly and children, especially, may not be well-suited to vehicular cycling because they tend to be slower, less skilled, and less aware (Pucher & Beuhler 2009). Mandating vehicular cycling, according to Pucher & Beuhler (2009), precludes many classes of people from cycling, thus creating a situation of social injustice. Cycling should be for everyone, they argue, and not everyone is comfortable with or capable of vehicular cycling. Forester (2001), however, counters this argument by claiming that nearly everyone can be trained to cycle properly in traffic. Vehicular cycling rules are the same as the rules for motorists, and the special cycling techniques are not difficult. Even children can learn to ride safely in traffic. Haake (2009) further points out that it is cheaper to train cyclists to ride in traffic than to build and maintain cycle facilities. Those who are trained feel much more comfortable riding in traffic. Pucher & Beuhler (2009) hold to their argument, however, even though bicycle education programs are a standard part of school curricula in the high-mode-share European cities they survey. It should also be noted that both Forester and Haake are professional cyclist trainers. They undoubtedly understand the nuances of their profession, but they may be biased by their professional interests. Regardless of whether cyclists ride in the road or on separate paths, it seems reasonable to
assert that more and better cyclist (and motorist) education will increase safety and comfort levels.

Our discussion of perceived safety and cyclist skill level suggests one possible explanation for the increase in accidents after the installation of cycle facilities. If cycle facilities truly encourage cyclists who are less experienced and less comfortable, then those people are probably more likely to have accidents anyway. Thus, we would expect to see an increase in accidents when those people join the regular fleet of cyclists.

**Cycle Infrastructure and Mode Share**

Do separated cycle facilities truly encourage more people to cycle, either because of an increase in perceived safety or for some other reason?

Several studies show that places with high cycle mode share employ separated cycle infrastructure. Several European cities of various sizes with very high mode share have included separated bicycle infrastructure as integral parts of their plans (Pucher & Beuhler 2007). A regression study based on census data showed that a higher cycle mode share is correlated with more cycle infrastructure in 43 of the largest US cities (Dill & Carr 2003). A study in Portland, OR, in which 166 frequent cyclists were given GPS units to record their routes for a period of time, revealed that 50% of the miles traveled were on streets with cycle infrastructure even though only 8% of Portland streets are equipped with such infrastructure (Dill, 2009). This would seem to indicate that cyclists prefer to use this infrastructure. However, none of these studies shows the causal relationship between cycle infrastructure and mode share. It is conceivable that cycle infrastructure was not the cause of the high mode share but was instead built in order to support an already large number of cyclists. In the case of the Portland study, the city could have placed the infrastructure on the routes that most cyclists chose to take in the first place. Forester (2001), in his relentless quest to devalue cycle infrastructure, points to this causal difficulty as a fundamental flaw in the arguments of cycle infrastructure proponents.

Some studies, however, have attempted to overcome this causal fallacy. A longitudinal study of Minneapolis and St. Paul, MN, showed that new cycle facilities significantly increased the amount of cycling, especially when cyclists were provided facilities for crossing bridges (Barnes, Thompson, & Krizek 2005). Similarly, a before-and-after study of cycle-facility-equipped roads in Denmark showed that cycle and moped traffic increased 20% while motor traffic decreased 10% (Jensen 2008). It is unclear in either of these studies if the changes truly reflect a change in mode choice. They could simply indicate route choice changes by both cyclists and motorists. Or, the increase in cyclists could be induced demand, new trips that would not have occurred otherwise. It should also be noted that these facilities were built in areas that already had relatively high cycle mode share.

**The Overall Benefits of Cycling**

Cities wish to increase cycle mode share because of the external benefits of substituting automobile trips with cycle trips. Cycling produces far less noise and pollution (Jensen 2008), reduces congestion (Heinen, Van Wee, & Maat 2010), and improves public health by increasing physical activity (Heinen, Van Wee, & Maat 2010; Jensen 2008). If installing separated cycle infrastructure significantly increases cycle mode share, it is possible that the external benefits of this increase could outweigh the cost of an increase in accident rates.

Salensminde (2004) conducted a cost-benefit analysis of implementing cycle and walking tracks in three Norwegian cities. He considered reduced traffic congestion, increased feelings of security, reductions in school bus transport, better health, reduced pollution, reduced infrastructure costs, and reduced parking costs as benefits. Although he purposefully used low estimates for the benefits and high estimates for costs of installation, the analyses still resulted in net benefits. Unfortunately, because many of these benefits are uncertain and difficult to quantify, it is hard to know how much to trust the results.
Furthermore, the author did not consider any changes in accident rates in his study, so the study is of limited use in our current investigation. However, it provides a reasonable model for further studies to follow assuming that changes in accident rates can be estimated with any reasonable level of accuracy. If his assumptions are reasonable, and if accurate estimates of accident increases could be obtained, we could determine if the external benefits outweigh the costs.

Conclusion

Are separated cycle facilities safer than vehicular cycling, or do they actually decrease safety? Do they encourage cycling and increase cycle mode share? Our review of the literature has revealed no conclusive answers to any of these questions. Evidence supporting all sides of these issues is weak, uncertain, or non-existent.

As Pucher & Beuhler (2007) point out, cycle infrastructure is only one part of the portfolio of strategies employed to encourage cycling and increase cycle mode share. The lack of conclusiveness of the mode share studies we examined likely reflects the fact that cycle infrastructure alone does not encourage cycling. A comprehensive strategy demonstrating a strong local commitment and cultural willingness is needed for a high mode share.

Similarly, it is likely that the presence or lack of cycle infrastructure is not the sole factor determining safety. Other factors may play equal or larger roles. It seems reasonable to conclude that the design of cycle infrastructure plays an important role in cyclist safety. Good designs will undoubtedly be safer than bad designs. Furthermore, although his attempt at quantifying the relationship might be dubious, Godefrooij’s assertion (2003) that different types of infrastructure are appropriate in different types of road conditions seems far more reasonable than arguments asserting that cycle infrastructure is always good or always bad. Examining these relationships would be a good topic for further empirical research. It is also reasonable to conclude that good education for both cyclists and motorists will increase safety, whether cyclists ride in traffic or separate from it. Each group must be trained to understand and respect the other and to safely utilize whatever facilities are provided.

In conclusion, the questions of whether or not separate cycle infrastructure leads to greater cyclist safety and whether or not providing it increases cyclist mode share are not conclusively answered in the reviewed literature. Because there is great variation in cycle infrastructure and the context in which it is placed, this lack of conclusiveness is not entirely surprising. It would be unwise to advocate for either separated cycle facilities or vehicular cycling without specifying particular conditions or context, and those seeking to increase cycling levels should keep in mind that infrastructure is only one part of the more comprehensive strategy that is needed.

References


As fossil fuel prices become increasingly volatile and evidence of global climate change mounts, governments at the local, state, and national levels have adopted policies to encourage alternative energy investment. At the same time, urban neighborhoods in Rustbelt cities have continued to grapple with the environmental and economic effects of their industrial legacies.

Southwest Detroit is representative of an industrial landscape in a post-industrial society. According to the Detroit Free Press, the area is home to three of the ten most polluted zip codes in Michigan (Lam 2010). Air quality in the area has failed to meet Federal Clean Air Standards for several of the last six years (Michigan Departments of Environmental Quality and Natural Resources 2008, 7). Home to the western end of the Ambassador Bridge—the busiest freight crossing point on the U.S.-Canadian border—Southwest Detroit experiences constant traffic and noise from freight trucks, as well as unsafe diesel fume concentrations. Compounding the area’s environmental concerns, an even larger bridge (the Detroit River International Crossing or DRIC) is proposed to run through Southwest Detroit’s Delray neighborhood in the years ahead.

In light of the State of Michigan’s goal to develop a green jobs sector through the promotion of wind energy, we explore the incorporation of a wind energy component that might mitigate some of the DRIC project’s negative impacts in Southwest Detroit. Michigan is among the top fifteen states for wind energy generation potential and is the second best state for such projects in the Midwest region (Kavanaugh 2008). Before recommending that significant energy and resources be diverted toward attracting and developing wind energy, it was necessary to assess the applicability of these statewide statistics to the unique urban industrial setting of Southwest Detroit. This paper outlines the process of developing and siting wind energy projects and specifically relates that process to Southwest Detroit. It appraises the most feasible options for developing wind energy projects in Southwest Detroit and begins with a classification of Southwest Detroit into three site types: the DRIC bridge, vacant industrial sites along the Detroit River, and vacant land in residential areas. This allowed us to consider each class according to the turbine technology it can accommodate, the wind resource that it would require, the regulations that would enable or prohibit turbine installation, and the most promising sources of financing. We concluded that industrial land along the waterfront offers the most promising site type for wind energy investment due to its relatively unobstructed wind exposure and its ability to accommodate property-line setbacks as suggested in the Michigan Land Use Guidelines for Siting Wind Energy Systems (Klepinger 2007).

Wind Turbine Basics

Wind turbines convert the kinetic (moving) energy in the wind into electrical energy. Wind generates kinetic energy in the form of rotating blades, which is transferred to the generator and converted into electricity. To operate efficiently and safely, wind turbines must respond to changing wind conditions. The on-board anemometer and wind vane keep track of wind speed and direction, respectively. When conditions are suitable, the computers activate the yaw components to rotate the nacelle assembly so that the attached blades face the wind directly. The brake is then released and the computers adjust the pitch on the blade to generate maximum aerodynamic lift. The lift creates torque to turn the rotor, low-speed shaft, gearbox, and high-speed shaft. The process is similar to that which occurs when one blows air toward a pinwheel to make it spin around.

As the blades and rotor spin, alternating current electricity is generated and transmitted via large cables that are housed inside the tower. Larger generators produce more electricity and require greater force to turn the rotor; hence, taller towers are required to access faster moving wind, and bigger blades are needed to produce sufficient torque. Conversely, smaller generators produce less electricity and require less force to turn, calling for smaller tower heights and blade lengths.

Wind Turbines in Southwest Detroit

Several necessary conditions must be met for wind energy to be feasible in Southwest Detroit. The most fundamental condition is the presence of an adequate wind resource. Wind turbines operate most efficiently in smooth, steady winds. Turbulent wind flow is unsteady,
characterized by rapid changes in direction, velocity, and pressure. Local obstructions, such as a house, can create turbulence that compromises turbine performance. For example, a house 8 meters in height can create a pocket of turbulence 160 meters long and 16 meters high (see figure 1). Even if regional wind data indicates that an area has adequate wind resources, turbulence pockets may render certain urban sites unsuitable for wind development.

The direction of wind and the position of wind turbines relative to local obstructions are important to siting wind turbines. Turbulence will not adversely affect a wind turbine that is located upwind from an obstruction as severely as it will affect a turbine located downwind. On a given site, it is important to determine the prevailing wind direction relative to local obstructions before investing in wind turbines. In addition, the area of a site is not by itself an indication that the site is large enough to accommodate wind turbines. A site must be large enough to accommodate a wind turbine that can reach above whatever turbulence pockets may exist. A very large site may be inadequate for turbine sitting if it is adjacent to a tall obstruction. Sites that are free of obstructions are particularly promising as potential wind turbine locations. Portions of Southwest Detroit that fall along the Detroit riverfront are free of local obstructions to the east and southeast. If wind typically blows from these directions, these sites may be attractive locations for turbines.

Wind speeds are another factor that impact wind turbine siting. Wind speeds increase exponentially with height, so wind maps at a height of 80 meters may not reflect the wind resource available at the height of small, residential wind turbines. Residential turbines tend to reach a height of 30 meters or less, so a prevailing wind speed of 6 m/s at a height of 80 meters may correspond to speeds of 2 m/s or less at the height of residential turbines (California Energy Commission). This, in addition to the prevalence of local obstructions in residential areas, limits the potential for small, residential wind energy generation in Southwest Detroit.

Currently, wind data for Detroit is available only at the regional level. Data collection is ongoing at several sites in and around the City, such as the Chrysler Proving Grounds in Washtenaw County, where the Washtenaw Wind Project has collected wind data at heights between 50 meters and 80 meters (Washtenaw County). However, for the reasons outlined above, this data does not necessarily reflect the wind resources at residential sites in Southwest Detroit. To determine whether those resources are adequate for wind power production, they must be measured directly.

The first step in determining the feasibility of wind power in Southwest Detroit is conducting detailed wind surveys of the area’s riverfront industrial sites with respect to wind direction, velocity, and turbulence using anemometers. Several states, including Michigan, have anemometer loan programs to encourage wind mapping (San Francisco Urban Wind Power Task Force 2009, 6). Because wind patterns vary according to the season, it typically takes at least 12 months to gather sufficient data on a site to accurately determine whether it can support wind power (San Francisco Urban Wind Power Task Force 2009, 6). The National Renewable Energy Laboratory (NREL) compiles wind data and creates wind resource maps and other guides. The NREL produced the first wind atlas maps in 1979 and 1980 using data from the Pacific Northwest Laboratory. Recently, the NREL produced 12 regional wind resource atlases using data from approximately 3,200 stations in the United States. Ideally, wind data would be collected at either the 10-meter (33 feet) or 50-meter (164 feet) level. In actuality, this is rarely the case. To overcome this limitation, researchers use the relationship between height and wind speed to adjust for discrepancies in the heights of collection stations. The atlases map the geographical variation in wind power density rather than wind velocity. Power density is a function of both wind speed and density. As a result, the atlases reflect the combined effect of both wind characteristics on power generation. The Wind Energy Resource Atlas presents macro-level wind data. While we could not conduct a site-specific wind study, an attempt was made to use data from

![Figure 1: Turbulence Pocket Around a House with a Small Turbine](image1)

![Figure 2: Areas of Class 2 Wind Resource and Potential Siting of Large Wind Turbines Along the Detroit River. Source: Kristin Baja and Julie Schneider](image2)
local weather stations to generate wind resource maps for the Southwest Detroit. Because stations report data on wind direction as well as velocity, we generated micro-level maps report both measurements.

The Department of Energy (DOE) rates a region's wind power generation potential in terms of wind classes. Classes range from 1 (Poor) to 7 (Superb). In terms of wind class, the Lower Peninsula can be divided into four areas: offshore, the coast, the northern half of the Lower Peninsula, and southern half of the Lower Peninsula. Areas offshore have wind class ratings of 3 (Fair) or higher. Offshore areas along the coast of Lake Michigan and the northern coast of Lake Huron have the highest ratings at 6 (Outstanding). These ratings drop quickly as wind travels inland. Just 100 meters inland, the wind power class along every coast drops to 3 and then 2 (Marginal).

The northern half of the Lower Peninsula has a fairly uniform rating of poor. Though there are small pockets of marginal wind along the western coast, as a whole this area has the poorest wind resource potential. Wind resources are more varied in the southern half of the Lower Peninsula. Large areas are only marginal or poor. Urban areas tend to be poor. For example, the regions surrounding Detroit, Grand Rapids, Lansing, Kalamazoo, Ann Arbor, and Jackson are all within or adjacent to areas with poor wind resources. The largest such area surrounds Detroit.

Nearly all of Southwest Detroit is considered to have a poor wind resource. Only small patches in the southern and northern areas along the Detroit River are marginal. Prevailing wind patterns in Southwest Detroit are from the west throughout the year. The U.S. Department of Energy (DOE) and the NREL have each issued recommendations for turbine siting. The DOE recommends Class 4 or higher at the 50-meter height and 3 or higher at the 80-meter height. Meanwhile the NREL recommends that wind power classes of 3 or higher are suitable for most wind energy applications, and that areas of Class 2 may have potential for wind power development at a height of 80 meters.

If velocity rather than power class is used to determine the potential for wind power development, the NREL suggests that wind speeds of 6.5 m/s are necessary to power 80-meter commercial turbines. For residential wind power development, many turbine manufacturers suggest wind speeds of at least 5.3 to 5.6 m/s. NREL maps suggest that there are few, if any, suitable locations for wind energy generation within the area. Meanwhile, our study suggests that the area is suitable for wind energy development. Both studies suggest that the most suitable areas for wind energy development are in the southwest, especially along the Detroit River. The NREL power class rating is marginal along the river at the 50-meter height, but because velocities increase with height, it is possible that the wind resource is better at the 80-meter height, the standard height of commercial wind turbines. Neither the NREL maps nor our personal wind study provide conclusive evidence that wind energy generation is feasible on specific sites in Southwest Detroit. They do suggest that if the Southwest Detroit community pursues wind energy in the area, its first step should be to conduct wind studies of sites along the waterfront.

Based on local wind resources, large-scale turbines at heights around 80 meters are the most feasible option for wind energy in Southwest Detroit. While towers at such heights may surmount the problem of marginal wind speeds in the neighborhood, they also conflict with Detroit’s Zoning Code and raise significant concerns about safety, aesthetics, and environmental protection (National Renewable Energy Laboratory 2007).

Siting Considerations

A stand-alone wind ordinance or a zoning code amendment is the best method to assure that dimensional restrictions (e.g., height limits) and use restrictions do not prevent wind energy projects in Southwest Detroit. Many issues besides dimensional restrictions such as aesthetics, engineering standards, setbacks, shadow flicker, and noise also pertain to the siting of wind turbines, and should also be included in any legislative changes to the zoning or municipal code. While height and use restrictions will frame the discussion of zoning code changes below, subsequent sections of this chapter address the importance of other siting factors that a wind-specific zoning code amendment or a stand-alone wind ordinance must address.

The State of Michigan has not enacted statutory law that prescribes siting conditions for wind energy systems. However, the Energy Office of the Michigan Department of Labor and Economic Growth has developed model guidelines—the Michigan Siting Guidelines for Wind Energy Systems—to inform the adoption of local wind...
ordinances (Energy Office, Michigan DELEG 2007). Although the State guidelines offer important insight into the safety and technical concerns associated with wind energy system siting, the Energy Office does not have legal authority to regulate wind energy systems. This “hands off” approach to physical siting requirements is likely to continue into the foreseeable future; the Michigan Public Service Commission just issued a report concluding that “these matters should be decided at the local level where feasible so that the needs of local citizens can be appropriately considered. No evidence presented to the Commission suggests that a one-size-fits-all approach would work for the entire State” (Isiogu, Martinez and White 2010, 2). The City of Detroit does not have a local wind energy systems ordinance or wind-specific zoning regulation. In Detroit, existing zoning code provisions addressing height, setback, noise, and use parameters for general structures also apply to wind energy generation systems (Klepinger 2007, 1).

As currently written in Article XIII of the Detroit zoning code, the dimensional restrictions on most parcels in Southwest Detroit preclude the erection of wind turbines (Detroit Municipal Code 2008, §61-13). If Southwest Detroit chooses to pursue wind energy projects, it will have to pursue one of the following zoning procedures to overcome legal barriers in the zoning code:

1) Make variance applications on a per-project basis
2) Petition for passage of a stand-alone wind energy ordinance or wind-specific amendment to the zoning code
3) Petition for passage of a minor amendment to the zoning code that would apply existing antenna provisions to wind energy systems

Because of the proximity of residential and industrial districts in Southwest Detroit, there is not one site type alternative that would result in wind turbines being sited at significant distances from dwelling units. The community of Southwest Detroit will have to decide the conditions that would make it acceptable for the placement of turbines—large or small—within 1,000 feet of residential dwellings. Before the adoption of any local zoning or municipal code amendments, or before a particular wind energy project is sited, community input meetings should be held to facilitate this process. In particular, issues of turbine noise, viewed degradation, and shadow flicker should be explicitly addressed. Ironically, although the proximity of residential and industrial uses in the Southwest Detroit complicates the siting process, the rugged industrial landscape may make residents more amenable to turbine towers that are no more imposing than existing smokestacks and offer potential reductions to residents’ energy cost without the pollution associated with factories.

The most common quality of life concerns that arise during the approval process for wind turbine projects relate to the impacts that turbines might impose on adjacent property, especially shadow flicker and noise. Shadow flicker is the phenomenon of alternating shadow patterns caused by the rotation of wind turbine blades between a property and the sun. This phenomenon is especially disturbing when shadows are cast through windows at a dwelling (Energy Office, Michigan DELEG 2007, 2). Noise produced by wind turbines—either mechanical from the internal gear mechanisms or aerodynamic from blades passing through air—should not be a major concern since the highest average noise levels attributable to turbines experienced in homes will be no more than 55 decibels. This noise level will be barely if at all noticeable; the noise accompanying a home computer or an electric fan is louder. The industrial uses already present in Southwest Detroit contribute ambient sound levels higher than those produced by large turbines.

One of the primary considerations that should be taken into account before selecting a site for wind energy development is whether and to what degree a project might negatively impact the surrounding environment or ecological systems. At a very basic level, a site should be inventoried to account for any wetland, forested area, or other natural features. However, after an initial inventory that might eliminate particular sites due to obvious visible environmental constraints, all wind energy projects must take care to undertake any required or recommended environmental assessment procedures and permitting processes.

A significant regulatory consideration for any wind energy project is whether an Environmental Assessment (EA) is required pursuant to the National Environmental Policy Act (NEPA) (NEPA 1970, §4321-4347). Since 1970 when NEPA was signed into law, the environmental impact of all actions undertaken by federal agencies—including private projects that require federal agency action—must be determined prior to any decision-making on such actions (NEPA 1970, §4332(2)). If a project requires NEPA review, then the federal and state agencies involved in that project must conduct an initial Environmental Assessment. If a significant environmental
impact is likely, then a more in-depth Environmental Impact Statement (EIS) is necessary. Additionally, although federal agencies are responsible for conducting NEPA review and preparing required EA and EIS documents, the wind energy project developer should support the investigative process by conducting environmental studies of the project and providing documents and data to the appropriate federal agency (American Wind Energy Association 2008, 4-7). As a result, the NEPA review process could significantly increase the completion time for wind energy projects in Southwest Detroit.

If Southwest Detroit chooses to pursue the most feasible alternative for wind energy development in the area—large-scale wind turbines on vacant industrial sites—it is likely to trigger a NEPA review. Large-scale turbine projects always have a high potential of impacting migratory birds, and ignorance is not an excuse to avoid liability for the unpermitted incidental taking of endangered species. Therefore, consultation with the FWS with respect to the Endangered Species Act and the Migratory Bird Treaty Act is always recommended (American Wind Energy Association 2008).

The authorities with electric regulation jurisdiction over a wind energy project depend on the energy generation capacity of the project, the ownership structure of the project, and the identity of the intended end-users of the electricity generated by the project. Regardless of the size or type of a wind energy project, some degree of federal or state energy regulation is unavoidable. In general, the level of regulatory involvement is directly proportional to the size/generation capacity of the wind energy project and to the amount of the electricity generated that will be sold on the grid.

Three regulatory authorities may have jurisdiction to impose energy related regulations on potential wind projects in Southwest Detroit:

1) The United States Federal Energy Regulatory Commission
2) The Michigan Public Service Commission
3) The Midwest Independent Transmission System Operator

The United States Federal Energy Regulatory Commission (FERC) either directly or indirectly regulates all electricity generation in the United States, including all wind energy generation systems, regardless of size. FERC does not regulate retail electricity sales to consumers (US FERC). Instead, FERC ensures the safe operation/construction of electricity generating devices, promulgates orders that regulate the nation's electricity transmission systems, and “regulates the transmission and wholesale sales of electricity in interstate commerce” (US FERC). In May of 2005, FERC issued its Small Generator Interconnection Standards that apply to all electric generation systems with a production capacity of less than 20 MW. FERC standards regulate any electric utility company that deals in interstate commerce and provides electricity to the public (US FERC 2006, 1). These standards become relevant to Southwest Detroit in that they require all electric utility companies to provide standard interconnection procedures for wind turbines to connect to the grid and for the utility to grant interconnection in a non-discriminatory manner if those standards are met. These standards have been implemented to ensure power quality, generation safety, and consistency of electrical inspections (Varnado 2009). Because the total generating capacity of wind projects in Southwest Detroit would likely be less than 20 MW, FERC interconnection standards would apply. This means that as long as a wind project meets utility-specified safety and reliability standards, any wind energy project described in the site type alternatives in this study will be allowed to interconnect with the electric grid in Southwest Detroit. Interconnectivity issues will not become roadblocks to achieving the economic and social goals that the Southwest Detroit community stakeholders set out for a wind energy generation project in the neighborhood.

While FERC regulation applies only to electric utilities that deal in interstate commerce, at the state level, the Michigan Public Service Commission (MPSC) is responsible for rate, safety, and interconnection regulation. The MPSC regulates all privately owned electric utility companies, all alternative electric providers, and all electric distribution cooperatives. The only electric utilities in Michigan that are not rate-regulated by the MPSC are those that are municipally owned.

Besides regulating rates for privately owned utility companies in the State, the MPSC also sets forth policy standards that dictate the types of interconnection services and net-metering programs that commercial utilities must offer to non-utility energy generators such as large turbine wind farms, individual sites with large turbines, and small turbine on-site wind generators. While FERC Order 2006 requires the adoption of standard interconnection agreements by every commercial utility participating in interstate commerce, MPSC has gone further to regulate the specific interconnection services and policies that all commercial electric utility companies doing business in Michigan must adhere to. These

“The community of Southwest Detroit will have to decide the conditions that would make it acceptable for the placement of turbines—large or small—within 1,000 feet of residential dwellings.”
interconnection standards play a central role in making distributed generation economically viable in the State. MPSC defines distributed generation as “any small scale electric generation that is located at or near the point of end use. It may be interconnected with a local utility company’s distribution system or not” (MPSC). The small residential wind turbines considered in this study fall under MPSC’s definition of distributed generation. Large turbines developed at the vacant industrial site type along the Detroit River also qualify as distributed generation if the power they generate is used within the neighborhoods of Southwest Detroit.

The final regulatory authority with possible jurisdiction over wind energy projects in Southwest Detroit is the Michigan Independent Transmission System Operator (MISO). MISO is one of several non-profit regional transmission organizations authorized by the Federal Energy Regulatory Commission in 1996 as a method to provide non-discriminatory access to transmission (US FERC 2010). The issue of non-discriminatory access is especially important in power pools where demand is very near the level of supply capacity, and where agreements that favor transmission to certain utilities over others can lead to major power disruptions. Such was the case with the California power crisis of the mid 1990s, which led to FERC’s promulgation of Orders 888/889 requiring non-discriminatory access to transmission in 1996 (OASIS 1996, ¶ 61,078, at p. 61,078). MISO regulation will not affect small-wind projects that provide electricity on-site. However, any project that seeks to install large-scale turbines to distribute electricity commercially through the grid to either customers in the neighborhood or elsewhere will require applications to MISO. Since a non-profit organization like Southeast Detroit Environmental Vision (SDEV) would need to partner with a private utility for such a project, the private utility would handle such regulatory requirements. Although this step of the development process will add a bit of time before a project can begin operation, SDEV or other Southwest Detroit stakeholders do not need to take MISO oversight into account when making a decision about what path to take with respect to the future of wind energy generation in the neighborhood.

Conclusions

After assessing the feasibility of wind energy projects for three alternative site types in Southwest Detroit, we found that installing large wind turbines on vacant industrial sites along the Detroit River is the most promising method for integrating wind energy into the area. In pursuing wind energy generation projects within the community, we recommend Southwest Detroit take the following actions:

1) As a community, determine/identify a vision for the environmental, economic, and social benefits that wind energy projects should bring to the community.

   Given the considerable effort it will take to successfully implement a neighborhood wind energy plan, Southwest Detroit residents and stakeholders must decide the benefits they wish to receive as the result of attracting wind turbines to the area. During this process, residents should be aware that wind energy development is not a foregone conclusion. The decision to not pursue wind energy would be a reasonable outcome of the visioning process. We recommend community engagement strategies such as focus groups to facilitate community involvement in determining a vision for wind energy in Southwest Detroit.

2) Conduct thorough studies of wind conditions on specific vacant industrial sites along the Detroit River to ensure that economically viable energy generation is possible.

   The average wind speed at a height of 264 feet (80 meters) in Southwest Detroit is 6 m/s. Wind speeds of 6.5 m/s and greater are generally considered suitable for wind development. Therefore, the use of anemometers at potential locations is needed to determine the site-specific wind resource. If average wind speeds at a height of 264 feet are not at least 6.5 m/s, an alternative location should be studied. If average wind speeds are below 6.5 m/s throughout the area, Southwest Detroit should not pursue wind energy.

3) Secure the passage of municipal legislation to provide consistent procedures for the approval of large-scale wind turbines, while addressing environmental, safety, and aesthetic concerns.

   Detroit has neither adopted nor considered a local wind energy systems ordinance or zoning amendment. Existing zoning code provisions that address height,
setback, noise, and use parameters for general structures in Detroit would apply to any proposed wind energy project in the City. Based on wind resource availability, the most feasible option for installing wind energy projects in Southwest Detroit involves the construction of turbine towers reaching heights of at least 264 feet (80 meters). Towers built to such heights conflict with Detroit’s existing zoning code. This conflict would require every developer to apply for a variance for project approval—a process that is unpredictable and often drives developers to invest their money elsewhere. To create an environment attractive to wind energy developers and to ensure that each turbine project meets the safety, aesthetic, and environmental standards of area residents, Southwest Detroit should pursue the passage of a stand-alone wind ordinance or a wind-specific amendment to the zoning code.

4) **Determine a financing scheme that will allow Southwest Detroit to attract an appropriate industrial, commercial, or institutional partner to develop large-scale turbine projects that will deliver mutual benefits to the partnering entity and the community.**

There are four general methods that Southwest Detroit may employ to finance such a project: loans, tax credits, grants, and tax increment financing. Among available grants, Michigan’s Low Income Energy Efficiency Fund (LIEEF) grants are particularly suitable for financing wind energy projects. LIEEF grants provide funds for efforts that provide conservation and efficiency measures to decrease energy costs for low-income persons. Many Southwest Detroit residents are low-income persons, and a wind energy project in Southwest Detroit has the potential to lower their energy costs.

This feasibility study can serve as a starting point for a discussion among community residents about the potential for wind energy projects in the neighborhood. Wind turbines and wind energy projects come in a variety of shapes and sizes. Every turbine design, blade configuration, and generation capacity brings with it specific benefits and costs. The generation capacity and design of a specific turbine determines the site conditions that are most appropriate for its installation. Because of the wide variety of available turbine technologies and their related siting considerations, the development of large-scale turbines on vacant industrial sites along the Detroit River is the most viable wind energy option in Southwest Detroit.

References


Light Rail Transit on Woodward Avenue in Detroit, Michigan
An analysis of two proposed alignments

Kevin Burns McCoy

Introduction
Over the past several decades, many U.S. cities have built light rail transit (LRT) systems connecting downtown centers with city and suburban neighborhoods (Garrett 2004). New LRT systems can represent a significant increase in service over traditional city bus networks because these electric train systems feature a smoother ride and typically operate at faster speeds. However, not all LRT systems are created equal: specific characteristics such as stop spacing and right-of-way (ROW) separation are strongly related to station accessibility and operating speeds (Vuchic 2007). Furthermore, new rapid transit developments have the potential to shift scarce transit dollars away from low-income and transit-dependent populations in central cities in order to attract new suburban customers, as was found to be the case in Los Angeles (Eng 2009). Planners must take care to design systems for both efficiency and equity, so that unjust transfers of services do not occur.

The Federal Transit Administration (FTA) recently committed to fund a light rail transit system on Woodward Avenue in Detroit, Michigan. The Woodward Light Rail project is the result of an unlikely coalition between the Detroit Department of Transportation (DDOT) and a consortium of private businesspeople who had originally planned to build their own streetcar system entirely with private money. The project, now in the environmental impact assessment phase, is considering two rail alignment options for the section between Downtown and the northern city limits. Option A would operate in a separated ROW in the center of the street (see Figure 1), while Option B would operate at the curbside, mixed in traffic for a portion of the alignment (see Figure 2). This paper examines the differences between the two proposed alignments and the efficacy of the project concept as a whole, finding that the project will serve broad public interests and that Option A will provide the best combination of safety, speed, and cost.

Background
On August 2nd, 2010, U.S. Secretary of Transportation Ray LaHood announced that the Federal Transit Administration would help fund a new LRT system on Woodward Avenue in Detroit, Michigan (Shea 2010a). The line will be the City’s first modern rapid transit system outside of Downtown (the previous attempt 30 years before produced only a 3-mile downtown circulator, the Detroit People Mover), running almost the complete length of Woodward Avenue from Downtown to the State Fair Grounds near the city limits (9.3 miles). As currently planned, the LRT line will not extend north into neighboring suburbs, much to the chagrin of regional rail transit advocates (Shea 2010a, Shea 2010c).

Prior to Secretary LaHood’s announcement,
there were two competing plans for the development of a Woodward LRT line: one by a consortium of wealthy business owners and foundations known as M1-Rail, and a second by DDOT. M1 had intended to build a 3.4-mile “streetcar-style” system running at curbside from Downtown to Detroit’s New Center district, where it would connect to Amtrak service and a proposed commuter line to Ann Arbor, Michigan (Shea 2010b, Shea 2008). The M1 consortium planned to build the line using only private funds in order to bypass the lengthy federal funding process (Shea 2010b). M1’s plan called for thirteen stops: five Downtown, and eight between Downtown and the New Center district (Shea 2008).

DDOT had a competing plan for more extensive LRT service on Woodward, extending from Downtown through the New Center and onward to the State Fair Grounds. The DDOT plan called for LRT service running in a dedicated median outside of downtown, and only five stops between Downtown and the New Center district (DDOT 2007). After much negotiation, and a special congressional approval to use the $125 million private investment as part of the local match required to qualify for federal funding, DDOT and M1 merged their plans under FTA guidance (Shea 2010c). The merged plan will consider both options (curbside, and median-running) for the Woodward LRT mainline alignment (Woodward Avenue Light Rail Transit Project 2010). The required environmental impact study is currently in progress, and part of this process is a decision as to which mainline option will be selected for the final design. Figures 3 and 4 show the two proposed LRT alignments, as identified in the project’s Scoping Booklet (Woodward Avenue Light Rail Transit Project 2010). The study is also considering multiple downtown alignments, but this analysis focuses only on the portion of the alignment extending outward from Downtown.

Comparison of Mainline Options

There are two important differences between the services proposed under mainline Options A and B: stop spacing and traffic separation. Both options propose the same alignment from the State Fairgrounds to Grand Blvd. (New Center). However, the spacing of transit stops between Grand Blvd. and Ferndale/Markham (Downtown) is much shorter under Option B. Option B calls for seven stops with an average spacing of 550 meters, while Option A calls for only four stops with average spacing of 975 meters. Option B also requires that trains run at curbside, mixed with traffic south of the New Center station. Option A is identical to the alignment originally proposed by DDOT (DDOT 2007), while Option B appears to represent the planned alignment of the private M1 consortium. Although similar in most respects, the two proposals are different enough to result in significantly divergent outcomes. Option B will allow slightly more of the residents who live between New Center and Foxtown...
to access a stop within walking distance. However, Option A will provide greater safety for pedestrians and motorists, faster operating speeds, and lower operating costs.

**Walking Distance Coverage Area**

The closer stop spacing of Mainline Option B will result in a larger coverage area, but this will not translate to a significant gain in the number of residents who live within walking distance of an LRT stop. Transit agencies use a variety of distances to calculate the walking distance service area of a transit stop, with 600 meters and 800 meters (1/2 mile) being fairly common (O’Sullivan and Morrall 1996). Figure 5 shows that Option A provides good coverage for all properties directly abutting Woodward Avenue between New Center and Downtown (as shown by the shaded areas), but leaves some significant gaps between stations in the neighborhoods just a few hundred meters from Woodward. Option B, with closer stop spacing, expands the total area within walking distance of a transit stop as shown in Figure 6, but is less efficient because many coverage areas overlap significantly. The coverage gains of Option B as compared with Option A are minimal. As shown in Table 1, overlaying walking distance areas with 2000 census blocks reveals that, as compared with Option A, Option B would increase the number of residents within a 600-meter walking distance by only 5%, and by only 2% within an 800-meter walking distance. There also appears to be no substantive difference in basic population or household demographics in the additional areas covered by the Option B station alignment.

**Pedestrian and Motorist Safety**

Under Mainline Option B, transit vehicles would move to curbside south of the New Center station, resulting in slower operating speeds and reduced safety for both motorists and pedestrians. In its 1996 report, Integration of Light Rail into City Streets, the Transit Cooperative Research Program (TCRP) examined the crash statistics of ten North American LRT systems. The report concluded that:

“Median LRT operations in shared rights-of-way are preferable to side-aligned LRT operations. This alignment choice places the LRT tracks where road users most expect them, minimizes the impact on driveways and curb access, and provides recovery areas for errant pedestrians. Further, it readily allows left-turn lanes to be integrated into the overall right-of-way design. Side-aligned LRT operations in shared rights-of-way may result in diminished motorist and pedestrian expectancy, especially where minor cross streets are unsignalized and driveway access across the LRT is allowed. This type of side-aligned LRT operation creates an environment that may not be fully recognized by motorists and pedestrians and thus can contribute to confusion and accidents.” (Transit Cooperative Research Council 1996).

Another benefit of median-running LRT operation is that pedestrians boarding or alighting the transit vehicle need only cross half the roadway width and deal with traffic traveling in just one direction before reaching the sidewalk. In curbside operation, northbound passengers traveling to a destination on the west side of the street (and vice-versa) must cross the entire roadway width, including two sets of LRT tracks and multiple motor vehicle lanes traveling in both directions (Transit Cooperative Research Council 1996). The median-running LRT alignment (Option A) would also benefit non-transit-riding pedestrians when crossing Woodward, by providing refuge medians at station crossings.

**Operating Speed**

Either mainline option would result in significant gains in transit operating speed on Woodward compared with the existing bus service, but Option A provides the best performance. Average LRT operating speed is a function of stop spacing and the roadway speed limit (Vuchic 2007, 132-135). In general, systems with 400-meter stop spacing are limited to 30 KPH or lower operating speeds, 800-meter spaced systems to just over 40 KPH, and 1,200-meter spaced systems to around 55 KPH, assuming that speed limits allow (Vuchic 2007, 135). Trains operating mixed with traffic are further limited and generally do not exceed 20 KPH (Vuchic 2007, 311). With the close stop spacing of Option B, and assuming an average operating speed of 18 KPH when operating in mixed traffic, travel time from the State Fairgrounds to Foxtown would be 25 minutes, a 22% reduction when compared with the existing bus service. Option A is likely to result in faster operating speeds due to wider stop spacing and the more exclusive ROW. Total travel time from the State Fairgrounds to Foxtown for Option A would take only 18 minutes. This represents a further 28% reduction as compared with Option B and a 44% reduction as compared with the existing #53 bus service, which currently provides a scheduled 32-minute trip from the State Fairgrounds to Foxtown during normal weekday working hours (DDOT 2007).

**Operating Costs**

Mainline Option A is likely to result in lower operating costs than Option B. As transit vehicle speeds increase, fixed-route operating costs are likely to decrease because the same frequency of service can be achieved using fewer vehicles and drivers. In the case of Woodward Avenue, the current DDOT service operates on 8-minute headways for much of the day, requiring 12 buses and drivers operating concurrently. Mainline Option B would require approximately nine vehicles and drivers to maintain the same level of service, and Option A would require only six. The inverse relationship between speed and operating costs is a win-win for both transit riders and transit agencies. Furthermore, if LRT allows DDOT to reduce the cost of...
providing service on Woodward, it is possible that some of these funds, vehicles, and drivers could be redirected to other transit corridors where service is currently less frequent.

Implications

The City of Detroit is the only city in the U.S. of comparable size without a functional rapid transit system (Williams 2011). Yet, Detroit has high proportions of transit-dependent residents, and the area surrounding Woodward Avenue is no exception. In 2000, 35% of the residents living within 800 meters of Woodward Avenue were in poverty, and 42% of housing units in these same neighborhoods did not have a vehicle available at home (U.S. Census 2000). It is essential that planners and advocates for LRT consider the needs of the transit-dependent population first. At the very least, they must ensure that new transit developments aimed at attracting riders who currently have access to private vehicles (often called “choice riders”) do not come at the expense of those who rely heavily on transit. Happily, the Woodward Light Rail project meets these criteria because transit-dependent residents, nearby property owners, and suburban commuters can all benefit in both the short and long term.

Low-income and transit-dependent people living near Woodward Avenue stand to benefit somewhat from the Woodward Light Rail project in the short term because it represents an increase in service as compared to the current bus line. Those who are already using the bus will experience significantly reduced travel times, particularly under Mainline Option A. However, the LRT will be an incremental improvement over existing service, not a dramatic one. It is not likely to bring suburban job centers within easy reach or significantly expand access to distant services. This is especially true because the LRT system stops at the city limits (although riders will be able to transfer to the suburban bus system).

The long-term benefits to low-income and transit-dependent persons could be more significant if, as the system’s planners and benefactors hope, the LRT system is a catalyst for economic growth and reinvestment (DDOT 2007, 9.3). Detroit residents could see their transportation costs reduced through the benefits of proximity. Jobs, services, and other destinations that are currently distant or inaccessible via transit may locate along the Woodward corridor and significantly increase access to opportunities. This effect may not even be limited to Detroiters who live within walking distance of the transit line, because the existing bus network will link to
the LRT, and because some needed services are virtually absent within the 139-square mile city. Furthermore, if the system is extended into Oakland County, it will significantly expand access to suburban jobs and services. Because most of the matching funds required for federal funding will come from private sources, the Woodward LRT project largely avoids redistributing funds that could be used to strengthen the existing bus service that many Detroit residents rely on. In fact, as discussed above, the LRT could potentially improve bus service indirectly by freeing up drivers and vehicles formerly needed for the #53 bus service on Woodward.

The private M1 consortium has committed $125 million to the development of the Woodward LRT project (Shea 2008), and their generosity will be rewarded. While theirs is a philanthropic gift, it is important to remember that the wealthy businesspeople involved in the consortium also stand to benefit from a Woodward LRT line. Many of the public faces of the M1 consortium are major property owners along Woodward Avenue, including some of Detroit’s most prominent names (Shea 2008). Rail transit systems tend to have a significant positive effect on real estate values in close proximity. A 2002 study found that commercial land in a Santa Clara County, California business district increased in value by as much as 120% in less than ten years as a result of a rail transit investment (Cervero and Duncan 2002). It seems reasonable to expect that the businesspeople behind the M1 consortium will receive some return on their investment in the form of increased rents, profits from the sale of land, public prestige, and new development opportunities. Of the two mainline options, Option B would likely maximize the economic development potential of the land between the New Center and Downtown by providing closer access to more parcels along the line than Option A. This is likely why M1 pushed to include Option B in the scoping process under the combined plan. M1 would also benefit from an expansion of the LRT into the Oakland County suburbs. Much of the development potential of the LRT comes from providing middle-class Oakland County residents with more attractive ways to access the city, particularly for entertainment, events, and commuting to work.

Suburban residents who live close to Woodward Avenue will not gain substantially from the Woodward LRT project, but even they will receive some benefits. Both mainline options are consistent with the Regional Transit Coordinating Council plan for rapid transit in the Detroit region, which was adopted by Wayne, Oakland, and Macomb counties, as well as the City of Detroit in 2008 (Shea 2010a). Nevertheless, the plans currently under consideration for Woodward Avenue stop short of the Oakland County border. This is in part because the cost estimates for extending the LRT three miles further north to 11-Mile Road in Royal Oak exceed the estimates for the entire section currently under consideration, and no source of funding has been identified for the local match required to receive federal funding (Shea 2010c). Another barrier to expansion is that suburban residents’ property taxes do not contribute to DDOT’s operating budget, as Detroit residents’ taxes do (Shea 2010c). The problems associated with extending the Woodward line into Oakland County highlight the fractured nature of the region’s transit system, as well as the lack of a regional transit authority (Shea 2010a). Perhaps the development of LRT on Woodward could spur the necessary political will to form a more integrated system for providing transit service in

<table>
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<tr>
<th>Walking Distance</th>
<th>Total Population</th>
<th>White Population (% of total)</th>
<th>Minority Population (% of total)</th>
<th>Population of Residents 0-17 or 65+ years of Age</th>
<th>Total Households</th>
<th>Owner-Occupied Households (% of total)</th>
<th>Renter-Occupied Households (% of total)</th>
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<tr>
<td>600m Walk</td>
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<td>Mainline Option A</td>
<td>35140</td>
<td>5239 (15%)</td>
<td>29901 (85%)</td>
<td>12392 (15%)</td>
<td>15553</td>
<td>3170 (21%)</td>
<td>12183 (79%)</td>
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<tr>
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<td>36816</td>
<td>5606 (15%)</td>
<td>31210 (85%)</td>
<td>13570 (37%)</td>
<td>16287</td>
<td>3224 (20%)</td>
<td>13063 (80%)</td>
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<tr>
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<td>367</td>
<td>1209</td>
<td>367</td>
<td>934</td>
<td>54</td>
<td>880</td>
</tr>
<tr>
<td>Percentage increase within coverage area from A to B</td>
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<td>7%</td>
<td>4%</td>
<td>4%</td>
<td>6%</td>
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<td>7%</td>
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<tr>
<td>800m Walk</td>
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<td>Mainline Option A</td>
<td>47038</td>
<td>6412 (14%)</td>
<td>40626 (86%)</td>
<td>16143 (34%)</td>
<td>20631</td>
<td>4326 (21%)</td>
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<td>41419 (86%)</td>
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<td>2%</td>
<td>6%</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
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Table 1: Population and Household Statistics of Census Blocks Within Walking Distance of Proposed Transit Stops

Source: U.S. Bureau of the Census, 2000
the Detroit region. Regardless, suburban residents can still expect to gain from the Woodward LRT project. Suburban commuters will be able to park their cars at the State Fairgrounds station and ride the Woodward LRT downtown to avoid expensive parking fees and roadway congestion.

**Recommendation and Conclusion**

Of the two mainline options currently under review, Option A is the better choice. While Option B does provide slightly increased coverage of neighborhood areas, and shorter walking distances to stops may make real estate development more attractive, these benefits are rather small or uncertain. Option A is the better choice because it is superior for pedestrian and motorist safety, provides significantly decreased travel times, and has the greatest potential to lower transit operating costs. The Woodward LRT project will result in significant short and long-term benefits to the city and the region. Concerns about the redistribution of transit funding to benefit wealthy suburbanites are moot because the proposed LRT line will not extend into the suburbs, and because much of the local funding will come from private donors. The project has great potential to spur economic development along the corridor, which would confer benefits to both private landowners and to city residents, who will experience increased access to jobs and services. Although the planned LRT will not initially extend beyond the city’s borders, some suburban residents will still enjoy the benefits of park-and-ride access to the LRT system. It is also possible that desires to see the LRT system expanded could help foster the political will necessary to form a regional authority for transit service and to raise new revenues for financing regional transit investments. Furthermore, the Woodward Light Rail project could become a model for cooperation between local, state, federal, and private stakeholders.

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Missed Connection?
A Critical Evaluation of the Woodward Avenue Light Rail Project

Eric Seymour & Diana Flora

Introduction
In the past decade, light-rail transit has experienced a considerable rise in popularity as cities across the U.S. have entered into various stages of proposing, planning, and developing light-rail systems. Entirely new systems have recently opened in Charlotte and Phoenix, other new and existing systems are currently under construction in more than a dozen cities, and cities including Detroit are currently planning for new light-rail development. The momentum for these projects has in large part been fueled by the prospect of new development near rail stations, which would in turn increase municipal revenue through property- and sales-taxes, as well as by the desire to project the image of a world-class city in order to attract and retain talented residents (Patton 2008; Sutherland 2010). In cities with historically underserved residents, such as Detroit and Washington, light rail is also seen as a means for connecting transit-dependent residents to jobs, shopping, and other critical destinations.

In light of these claims, this article evaluates the proposed Woodward Light Rail Project and its potential impact on commercial and residential property values, including the possibility of gentrification, as well as the ability of the project to improve mobility for low-income, inner-city residents. This article considers the rail line in the context of recent discussions concerning appropriate planning interventions for so-called “shrinking cities,” of which Detroit is a paradigmatic instance, as well as the literature of urban entrepreneurialism and the urban growth machine (Harvey 1989; Logan and Molotch 2007). Taken in tandem, these theories contend that costly, large-scale, downtown development projects may not be the most effective means for serving the remaining residents of cities experiencing population loss and worsening neighborhood conditions, and may even serve to exacerbate existing inequalities. This article will base its evaluation of the Woodward Light Rail Project on a review of the literature examining the causes and consequences of light rail development in other U.S. cities. This article urges caution in the development and execution of rail transit in Detroit, as previous rail development projects have had mixed results. In particular, the plan needs to be realistic in its expectations and ensure that benefits are extended to lower-income neighborhoods along the corridor, not just private interests.

With the promise of private investment and federal funds in the initial planning and construction periods, light rail is an appealing option for metropolitan regions experiencing decline. Furthermore, promises of increased transit ridership, neighborhood revitalization, and bustling commercial corridors entice cities to invest in such large-scale projects, no matter the long-term costs (Black 2003; Flyvbjerg, Bruzelius, and Rothengatter 2003). This article seeks to determine whether the benefits of rail transit projects are realized in other cities, and to compare the variables affecting these outcomes to the potential results of rail development in Detroit. In particular, we consider property values, neighborhood effects, and mobility changes for the transit-dependent as key factors conditioning the success of the Detroit light rail project.

Background
Pending the favorable outcome of a federally-required Environmental Impact Statement (EIS) and the determination of a final path alignment, construction is anticipated to begin next year on Detroit’s Woodward Avenue light rail project. If completed according to plan, the rail line would run 9.3 miles from downtown Detroit to the city’s boundary at 8 Mile Road (see figure 1). The first phase of the light rail project, a 3.4-mile curbside loop from Hart Plaza in downtown Detroit to Grand Boulevard, would be principally financed by a consortium of private investors representing downtown business interests, collectively known as M1 Rail. This section of the rail line would run past major businesses, educational and medical facilities, and cultural and sporting destinations. Subsequent to the completion of the first phase, the City of Detroit plans to extend the rail line along Woodward Avenue to the Michigan State Fairgrounds at 8 Mile Road. The city began planning for a rapid transit system independently in 2006, when the Detroit Department of Transportation (DDOT) undertook an alternatives analysis required to compete for federal funding authorized under the Federal Transit Authority’s (FTA) New Starts Program. This analysis, known as the Detroit Transit Options for Growth Study
and services to more outward-orientated policies designed to foster and encourage local growth and economic development” (p. 2). Lending support to this change in urban governance, some scholars have maintained that urban policy should only be evaluated in terms of its success in attracting capital investment. Most notably, Peterson (1981) argues that “policies and programs can be said to be in the best interest of the cities whenever the policies maintain or enhance the economic position, social prestige, or political power of the city, taken as a whole” (p. 22). Within this framework, “developmental policies” take precedence over “redistributive polices,” which are directed toward the amelioration of the conditions of low-income residents (Peterson 1981, 132).

Many have taken exception to Peterson’s argument, finding that growth-oriented policies do not necessarily promote the public good. Indeed, “for many places and times, growth is at best a mixed blessing” (Logan and Molotch 1987, 85). Even in cases when these approaches are capable of stimulating economic development, in such instances it may be highly uneven in its distribution (Smith 2008). Similarly, Logan and Molotch (2007) argue that “for those who count, the city is a growth machine, one that can increase aggregate rents and trap related wealth for those in the right position to benefit” (p. 50). The inequitable character of growth-oriented strategies is well illustrated by the redevelopment of Baltimore’s Inner Harbor which has been widely touted as a template for urban revitalization. In an analysis of the degree and distribution of activity produced by this development, Levine (1987) finds that this type of heavily-underwritten downtown development serves to exacerbate income inequality, creating, in effect, a dual city. Similarly, in their examination of attempts to restructure Flint, Michigan through costly tourism development, Lord and Price (1992) conclude that “deindustrialization encourages local decision-makers to pursue growth solutions that are irrational and inappropriate, thus serving to exacerbate the problems faced by urban areas” (p. 155). While increasing the economic standing of a city and its residents is a worthwhile objective, this paper is concerned with the distribution of such benefits, if they are indeed realized.

Growth Politics in Shrinking Cities

In order to contend with population loss and economic decline resulting from suburbanization, deindustrialization, and global economic restructuring, shrinking cities in the U.S. have typically adopted growth-oriented strategies (Hollander et al. 2009). Famous instances include the redevelopment of Baltimore’s Inner Harbor, the failed AutoWorld theme park in Flint, and the heavily-subsidized People Mover in Detroit. Though U.S. cities historically have had a favorable orientation toward growth (Logan and Molotch 2007), the role of government in its production has been significantly altered in the wake of deindustrialization and decline. This shift in urban politics has been theorized as a change from a managerial to an entrepreneurial approach to governance (Hall and Hubbard 1998; Harvey 1989). According to Hall and Hubbard (1998), “this reorientation of urban government is characterized by a shift from the local provision of welfare and services to more outward-orientated policies designed to foster and encourage local growth and economic development” (p. 2). Lending support to this change in urban governance, some scholars have maintained that urban policy should only be evaluated in terms of its success in attracting capital investment. Most notably, Peterson (1981) argues that “policies and programs can be said to be in the best interest of the cities whenever the policies maintain or enhance the economic position, social prestige, or political power of the city, taken as a whole” (p. 22). Within this framework, “developmental policies” take precedence over “redistributive polices,” which are directed toward the amelioration of the conditions of low-income residents (Peterson 1981, 132).

Many have taken exception to Peterson’s argument, finding that growth-oriented policies do not necessarily promote the public good. Indeed, “for many places and times, growth is at best a mixed blessing” (Logan and Molotch 1987, 85). Even in cases when these approaches are capable of stimulating economic development, in such instances it may be highly uneven in its distribution (Smith 2008). Similarly, Logan and Molotch (2007) argue that “for those who count, the city is a growth machine, one that can increase aggregate rents and trap related wealth for those in the right position to benefit” (p. 50). The inequitable character of growth-oriented strategies is well illustrated by the redevelopment of Baltimore’s Inner Harbor which has been widely touted as a template for urban revitalization. In an analysis of the degree and distribution of activity produced by this development, Levine (1987) finds that this type of heavily-underwritten downtown development serves to exacerbate income inequality, creating, in effect, a dual city. Similarly, in their examination of attempts to restructure Flint, Michigan through costly tourism development, Lord and Price (1992) conclude that “deindustrialization encourages local decision-makers to pursue growth solutions that are irrational and inappropriate, thus serving to exacerbate the problems faced by urban areas” (p. 155). While increasing the economic standing of a city and its residents is a worthwhile objective, this paper is concerned with the distribution of such benefits, if they are indeed realized.

Transportation and Economic Development

Transportation long has been appropriated by pro-growth coalitions for the enhancement of property values, whether through the extension of canals, railroads, or the interstate highway system (Logan and Molotch 2007). Since the late 1970s, transit, and light rail in particular, has
emerged as a popular strategy for economic development and place promotion (Black 1993; Cervero 1984). While transit development must be able to defend itself in terms of its ability to meet the transportation needs of transit-dependent residents, in order to achieve political viability it must also be able to appeal across the political spectrum (Altschuler and Lubroff 2003). Influential members of the pro-growth coalition, which includes both private and public actors, are most likely to support transit when it promises to increase revenue from business activity, property values, and retail traffic. Among these objectives, scholars pay most attention to changes in property values precipitated by transit development. This section seeks to find whether economic benefits are realized, and if so, for whom.

Conventional urban economic theory maintains that property values are influenced by proximity to needed or desired destinations, especially employment (Alonso 1965). This is expressed in the familiar monocentric model of urban spatial structure, developed by Alonso, Mills, and Muth, which hypothesizes that utility-maximizing individuals are willing to pay to live closer to the Central Business District, as this is where employment is concentrated (Mieszkowski and Mills 1993). These theories maintain that transportation systems function to overcome the “friction of spaces” by increasing the accessibility of land to employment, increasing property values in areas served by transportation systems such as rail (Alonso 1965, 6). Thus, according to the logic of urban economics the accessibility benefits of transportation should be capitalized into the land value of transit-adjacent properties, particularly those near rail stations.

Research has found that rail transit generally has had a positive impact on commercial and retail properties along transit corridors and near stations. Using a hedonic model, Weinberger (2001) found that properties within 0.5 miles of transit stations command a premium relative to other properties in fast-growing Santa Clara County, CA. In their analysis of Santa Clara County, Cervero and Duncan (2002) found that proximity to transit stations increased the sales price of a typical commercial parcel within 0.5 miles of a transit station by 23 percent. Commercial properties realized even greater capitalization benefits; the sales price for a typical parcel within 0.25 miles of a commuter rail station were found to be 120 percent greater than non-proximal parcels. In an analysis of the joint development of transit stations and office buildings in Atlanta and Washington, DC, Cervero (1994) found that office buildings realized a premium of three dollars per square foot. In California, the Bay Area Rapid Transit (BART) system has also been shown to have realized gains for commercial properties as the system has matured (Cervero & Landis 1997).

In terms of residential property values, the results show a significant association between property values and proximity to transit, but they also find a number of factors that greatly affect the strength of this relationship. Debrezion, Pels, and Rietveld (2007) found that while residential property does not realize the same degree of capitalization from proximity to transit stations as commercial land, it is indeed positive. Their analysis did, however, show that proximity to commuter rail stations had a significantly higher impact on property values than did proximity to light rail. On the other hand, Gatzlaff and Smith (1993) found no significant impact on residential property values from transit development in low-income neighborhoods, but slight gains in high-income areas. As Hess and Almeida (2007) observe, this suggests that “studies are highly context-specific, with effects on land values realized unevenly across various neighborhood types” (p. 1047). In their analysis of the shrinking city of Buffalo, NY, Hess and Almeida (2007) found little capitalization of the light rail system into nearby properties, leading them to question the efficacy of rail transit systems as a means of economic revitalization.

Light Rail and Neighborhood Resident Outcomes

Not only may neighborhood residents fail to benefit from the economic development potential of light rail, but they may also fail to benefit from the rail system in terms of increased mobility. The politics of regional transportation development are incredibly contentious, and the likelihood of extending the Woodward corridor beyond the city limits is anything but assured. Buffalo’s light rail project illustrates the difficulties in realizing a cohesive regional transit system. The city’s 6.4-mile rail line was meant to link the downtown with the suburban state university and to revive its declining central business district (Teaford 1990). However, after protests from community activists and a complete redesign of the line, the Niagara Frontier Transportation Authority (NFTA) was able to construct only half of the intended 12.5-mile line at twice the anticipated cost of the entire project (Teaford 1990). The transit corridor currently experiences neither the enhanced mobility nor the economic development that local officials had expected.

As in the case of Buffalo, the Woodward Light
Rail Project may fail to reach its goal of connecting transit-dependent populations to suburban employment, which is desperately needed given the spatial separation between employment and low-wage earners (URS 2008). The spatial mismatch hypothesis (SMH) is one of the most extensively researched dimensions of the problematic relationship between geography and opportunity in metropolitan America. First advanced by John Kain in the 1960s, the SMH maintains that post-war patterns of employment decentralization and residential segregation have conspired to constrain the employment opportunities of lower-skilled inner-city minorities (Kain 1968). This spatial mismatch between the supply of low-skilled labor in the central city and the demand for low-skilled labor at the metropolitan level certainly plays a role in Detroit. As Grengs (2010) discusses, Detroit is a “classic case” of SMH, with “unusually high job sprawl accompanied by extreme residential segregation,” exacerbated by an inadequate regional transit system (p. 47). In Detroit, low-wage employment in the metro region is largely located at the periphery of the city limits and beyond (Grengs 2010). Though jobs are located outside of the city, federal funds support the project only up to 8 Mile, the northern boundary of Detroit (Shea 2010). Furthermore, there are larger obstacles that will inhibit light rail from reaching northward, including the need for a regional rapid transit authority and additional interest from private investors, as well as political will from county executives within the metropolitan area (Shea 2010). All of these factors reveal the difficulty of meeting the needs of the transit-dependent population in the short term.

A spatial mismatch also exists between the city and suburbs in terms of transit funding. As pointed out by Teaford (1990), per-trip subsidies are typically larger for suburban riders than those in the urban core. Webber (1976), commenting on the effects of the rail system in the San Francisco Bay Area found that by “being heavily subsidized and charging fares well under its actual costs, BART has appreciably reduced monetary commuting expenses for outlying suburbanites who work in the central cities. Thus, rather than deterring suburban sprawl, BART may instead be encouraging it” (p. 90). Additionally, Webber (1976) showed in his analysis of BART that the cost of the rail line disproportionately affects lower-income households, who pay a higher share of their income than upper-class residents throughout the region.

Not only may light rail projects fail to realize promised benefits of increased mobility, they may also have unintended negative consequences. The development of amenity-rich, transit-oriented developments along the rail corridor increases the potential for gentrification. Because this term has several different meanings, this paper adopts Kenney and Leonard’s (2001) definition of gentrification as “the process by which higher income households displace lower income residents of a neighborhood, changing its essential character and flavor”
This is perhaps the most comprehensive and useful formulation of gentrification as it takes both the social and economic dimensions of the process into consideration. Kahn (2007) specifically speaks of gentrification in transit-oriented developments as it occurred in 14 major US cities that invested in rail. In those cities that did experience gentrification, the “new urbanist lifestyle” attracted both high-income college graduates and improved retail (p. 170). This increase in average income and education does not necessarily correspond with an improvement in the quality of life of existing residents. Rather, significant increases in these indicators of neighborhood conditions point to the most significant adverse impact of gentrification – the displacement of lower-income residents through higher property values.

Pollack, Bluestone, and Billingham (2010) obtained similar results in their analysis of 42 newly transit-served neighborhoods in 12 metropolitan areas (those neighborhoods first served between 1990 and 2000). While they found that specific patterns of neighborhood change varied across study areas, their results show that a majority of newly transit-served neighborhoods experienced rising housing costs and incomes. In order to address the equity concerns of rail development, Pollack et al. (2010) focused their analysis on changes in neighborhood shares of people of color, low-income households, and renters, who together comprise the majority of “core transit riders” (p. 2). This group is not only heavily transit-dependent, but also necessary for the financial viability of light rail. For transit projects to be both equitable and financially viable, neighborhoods in which transit stops are located need to be both racially and economically diverse. The authors found that neighborhoods with a higher share of renters and low-income households prior to rail development experienced the most rapid rates of gentrification. In terms of changes in racial composition, the results were mixed; most neighborhoods showed consistent shares of minority households. Taken together, research in this area has demonstrated a proven need to be cognizant of equity concerns when developing rail in areas with disadvantaged, transit-dependent residents.

While it is difficult to perfectly predict neighborhood outcomes based on existing conditions, an examination of the spatial distribution of residential population, employment, and transit-dependent households is useful in finding the implications of existing literature in the context of Detroit. Figure 2 shows the distribution of Detroit’s residential population. As may be readily perceived, census tracts with the greatest population density reside at the periphery, suggesting that branch lines or bus service explicitly linked to the rail corridor would be needed to serve the city’s existing population. According to the American Community Survey, average population density is 13 percent lower in tracts within a quarter mile of the rail corridor than in the city taken as a whole (U.S. Census Bureau 2009). Given the lower density in proximity to the proposed rail corridor, gentrification may be less of an immediate concern given that the housing market may be more relaxed. In terms of transit-dependent households, however, the numbers are different. Citywide, the average share of households without access to private vehicles is 23 percent, but in census tracts within a quarter mile of the rail corridor the average share is 30 percent (see figure 3). While the numbers may be low in absolute terms, these statistics certainly show that a number of households stand to benefit from the placement of the corridor. As carless households also tend to be lower-income, care should be taken to ensure their ability to retain residency in their neighborhoods once they become transit-served. A final map (figure 4) shows the location of jobs in Detroit. As previously discussed, the majority of low-wage jobs exist beyond the city limits; however, the...
enormous concentration of all jobs in downtown Detroit clearly shows that the rail line constitutes a direct path to downtown employment, a great deal of which is office and managerial. Taken together, these maps show that the rail line would unambiguously serve downtown interests, but the degree to which neighborhood interests would also benefit is uncertain.

Implications and Recommendations
This review of previous cases in which rail transit has been used as a means to promote economic development and enhance mobility for transit-dependent, inner-city residents has revealed several important factors that need to be taken into consideration for the successful development of the Woodward Light Rail Project. In terms of economic development, case studies have shown significant promise for the capitalization of commercial and retail property near transit. However, the results are mixed for residential properties. As research has indicated, lower-income neighborhoods are less likely to benefit from the economic gains of rail transit than higher-income neighborhoods. This differential outcome suggests expectations of economic development need to be tempered for disadvantaged areas, and that other policies, in tandem with rail development, need to be implemented to provide urban neighborhoods with tangible benefits. This could take the form of targeting these areas with neighborhood development subsidies, such as Community Development Block Grant (CDBG) funds. While Detroit’s housing market is quite weak, the potential for gentrification remains in some of the neighborhoods currently experiencing transition along the Woodward corridor, such as Midtown and the New Center area.

The Woodward Light Rail Project and DDOT would benefit from re-evaluating their current goals to serve the transit-dependent population and to reduce auto dependency. Because of existing research around these topics, it is unlikely that a light rail project simply spanning Woodward Avenue would address such serious social issues. Taking into consideration the stated goals, along with potential operating and construction costs absorbed by the city, the project may not best serve the public interest. Furthermore, an inefficient rail line may siphon necessary city funds from more appropriate uses, such as expanding the current DDOT bus system, which spans the entire city, rather than targeting one commercial district. Flybjerg, Bruzelius and Rothengatter’s (2003) concept of the “performance paradox” is especially important in this context: “Cost overruns and lower-than-predicted revenues frequently place project viability at risk and redefine projects that were initially promoted as effective vehicles to economic growth as possible obstacles to such growth” (p. 3). Thus, the city needs to be realistic about the long-term financial obligations of light rail. While federal funding is likely to contribute the majority of capital expenses for the project, operating expenses could place the city in a precarious financial situation if ridership is below and construction costs are above projections. This was the case in Buffalo, Portland, and Sacramento, among other cities. In Buffalo, the actual ridership was 68 percent below the forecast, while capital expenses were 59 percent greater than expected (Black 1993).

In sum, the current proposal for the light rail project needs to be evaluated in terms of the degree to which it would benefit private interests over neighborhoods and transit-dependent city residents. The literature suggests that the benefits of such megaprojects are often exaggerated and may even further existing inequalities. In the context of a shrinking city, development needs to be targeted to best serve existing residents, and not pinned to the hopes of attracting an enormous influx of new residents. This has been attempted in the past, as in the case of Buffalo, and has failed. On the other hand, the city has the potential to entice residents to relocate to amenity-rich, transit-oriented developments. This would not only relieve the fiscal burdens of a city with an outsized infrastructure system, but it would also allow for the creation of vibrant urban neighborhoods capable of serving a range of incomes. Furthermore, this could also be the first step toward creating a positive relationship between politicians and community leaders, which is sorely needed in Detroit after decades of distrust.

References


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Detroit, Michigan. Photo: Lamar Lander, 2010
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2. A primary locus of social exchange, emblematic of a great diversity of cultures; A *marketplace of ideas.*