RECLAIMING THE LAND

EVALUATING THE POTENTIAL OF UNDERUTILIZED SPACES IN URBAN REGENERATION

RISHABH UKIL

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Committee:

Manish Chalana (chair)
Kenneth Yocom

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ABSTRACT

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RISHABH UKIL

Chair of the Supervisory Committee:

Associate Professor Dr. Manish Chalana
Department of Urban Design & Planning

Development patterns in cities across the world in the 20th century have shown a propensity towards preparing cities more efficiently for automobiles. This has led to the enormous sprawl-like growth in urban areas, particularly in metropolitan areas in the United States, resulting in pockets of unused land in the urban fabric that have no overt function or purpose. These spaces are characterized by neglect and transition, resistant to stability and reincorporation, eludes classification and easily identifiable as marginal spaces. As such, transit-oriented developments (TODs) are becoming increasingly popular in the 21st century to counter the negative effects of sprawl and the subsequent creation of these residual and underutilized spaces. Understanding this issue of underutilized spaces and the apparent ability of TODs to reduce the creation of such spaces requires evaluating the success (or failure) of a transit route and its impact on the quality of life around it. This thesis highlights one such project: The Link Light Rail in Seattle, and analyzes how the development of the new transit route has affected projected urban regeneration in Rainier Valley located in south Seattle, it examines how the impact of TODs have influenced the creation of underutilized spaces. The choice of the neighborhood here is critical, as it is traditionally the poorer and more diverse section of the city who were projected to benefit most from the planned dense development around transit stops as well as faster connectivity to the downtown core. The outcomes of this thesis provide a spectrum of terms that classifies and categorizes underutilized spaces in the urban fabric and models how this framework that can be applied to a particular neighborhood. This is important because creation of these spaces are considered an indicator of healthy urban growth and dynamically evolving city like Seattle. Furthermore, development patterns are contextual and vary in different places, hence the thesis explores the future scenario of the impact of transit-oriented developments in Rainier Valley, particularly around the Mount Baker station.

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1. Alan Berger, Drosscape: Wasting Land in Urban America (New York City, NY: Princeton Architectural Press, 2006), 26.
2. Erick Villagomez, "Claiming Residual Spaces in the Heterogeneous City," in Insurgent Public Space: Guerrilla Urbanism and the Remaking of Contemporary Cities, ed. Jeffrey Hou (New York City, NY: Routledge, 2010), 81–95.
3. Berger, Drosscape: Wasting Land in Urban America, 239.

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1_INTRODUCTION

INTRODUCTION TO PROJECT

The idea of underutilized spaces has revolved around the notion of utility and usage, or lack thereof. These spaces are characterized by neglect and transition, resistant to stability and reincorporation, eludes classification and easily identifiable as marginal spaces.[1] The emerging theories on this topic has largely focused on this absence of activity, however, the discourse is not limited to one notion. The majority of work done into this topic have fed into the collective acceptance that these spaces exist in varying forms, ranging from a physical space to space that shows limited activity, usage or utility. The existing literature therefore underscores the difficulty in attaching an appropriate term to these spaces and points out the inherent complexity in identifying these spaces. However, much of the discourse suggest that the common thread to this topic lies in urban development patterns that has bred a deficiency in comprehensive planning of cities resulting in a fragmented urban form. It is easy to identify some of these spaces in a particular locale, but a comprehensive assessment can only be constructed if observed on a large-scale, which highlights the scattered fragmented nature of their existence. This thesis, therefore, attempts to highlight this large-scale issue through series of mapping explorations into some of these spaces, namely parking lots, vacant lots, spaces below elevated structures, triangular wedges of land and alleys. Some of these urban voids have a functional purpose, but as this research points out that much of these spaces are underutilized and hypothesizes that through better design strategies and stewardship their potential utility can be maximized to benefit the people interacting with it.

SCOPE OF PROJECT

The thesis has been divided into multiple sections to investigate the inherent problems associated with underutilized spaces. The extensive study conducted on the emerging theories on underutilized spaces not only lends credence to the value of this topic but also highlights the necessity for re-imaging how these spaces are designed in the future. In order to understand the scale and gravity of this issue at hand this thesis explores their presence in multiple sites in south Seattle. This has been substantiated by conducting similar design explorations on a smaller scale in a particular neighborhood around the Mount Baker light rail station.

SIGNIFICANCE OF THE STUDY

The study of underutilized spaces so far has been fragmented, much like their spatial existence. Even though there is a breadth of important literature on the topic that encompasses varied fields such as architecture, landscape architecture, urban planning, sociology, psychology among others, little effort has been given to construct a holistic study that brings together the different aspects associated with this thinking. This thesis investigates these different threads while at the same time examine these spaces on a spatial level to understand the importance of this issue. Additionally, consideration has been given to highlight the major challenges that are faced while designing for these spaces in order to evaluate the potential of these spaces to act as catalysts for change, or in other words for urban regeneration by adjusting and integrate these spaces into the urban fabric.

HYPOTHESIS

Underutilized spaces can become the solution for a city to reverse urban decay of form and fabric by fostering urban regeneration.

CRITICAL STANCE

Cities, whether organically developed or intentionally planned develop a sense of urban form and fabric that is unique from one another and the people who inhabit those cities contributes to the quality of life. Cities are in a constant state of flux, constantly evolving and ever driven by the technology and economics of the era. Many cities in the 21st century are, however, fragmented, as evident from their disjointed urban fabric, particularly those in the North American continent. These intentionally planned cities are a product of decades of 20th century urbanism driven by the economics of the automobile industry that has directly contributed to the sprawling horizontal growth of these urban areas. However, the automobile is no more a powerful symbol of wealth and prosperity, not just in America, but also all over the world in the 21st century.[2]

Historical and empirical studies have concluded that urban sprawl and the disconnect between urban areas in the United States have been largely due to the hunger for more space and privacy and driven by a lifestyle where the 'car' assumed a key role in the urban development and quality of life. The price of automobile urbanism on the environment has been massive. One such impact has been the creation of multitude of meaningless pockets of space that are sometimes vacant, unused, or underutilized, thereby creating voids in the fabric of the land. A wide body of literature has been spent deciphering the causes behind the creation of these spaces. Although not conclusive, existing literature points out that these spaces are characteristically diverse, often hidden in plain sight and usually as an after-thought of established urban development practices. Transit-oriented developments have gained currency in the 21st century as a means of curbing sprawl, reducing traffic congestion and expanding housing choices. Although critics would consider this as social engineering, in truth it widens the choices of where we live, work, shop and play as well as how we travel. Nevertheless, TODs provide a viable alternative to not just develop but also adaptively re-use the existing infrastructure and foster socio-economic development and community building in the contemporary society.

As stated, this thesis hypothesizes that these underutilized spaces can become the solution for a city to reverse decades of urban decay of form and fabric by accepting these spaces as potential sites of urban regeneration. Developments surrounding a transit core have shown that not only can density and multiple land-use be concentrated in a small land area, but if replicated can create a network of similarly concentrated developments that can contribute to the economic progress of the larger region and reduce impacts on the environment while at the same time reduce auto-dependency and act as a counter-measure of urban sprawl.[3] However, blatant activation of underutilized spaces is not the solution; it would only invite a temporary beautification of a place leaving it susceptible to future marginalization. Without a coordinated and regulatory land-use policy, expanding existing transit infrastructure will have a limited influence on the population, probably exacerbate the problem of underutilized spaces and yield considerably fewer environmental, social and economic benefits. Hence, it is my intention to integrate these disaggregated spaces into the urban fabric and assign meaningful functions with a view towards social engineering. Hence, the purpose of this thesis is to investigate whether a conceptual design framework can be constructed for the possible integration of underutilized spaces through transit-oriented developments.

METHODOLOGY

The methodology applied for this project was varied in both scope and tools used to obtain the necessary information and produce the final design typologies. The methods included mapping of underutilized spaces in the study area(s) using Geographic Information System (GIS) software and orthographic imagery, review of public reports, masterplans and zoning ordinances, identifying specific demographic data for the study area and supplemented with case studies and design solutions incorporated from precedent studies (Fig. 1.1).

LITERATURE REVIEW

The literature review has been borrowed from a wide variety of literature across different disciplines that are not always considered related to each other. This has been divided into two major sections. Firstly, emerging theories on vacant land and underutilized in the context of rapid urbanization has been discussed along with commentary on what it means to live around them for a social perspective. Secondly, transit-oriented developments have been explored through the lens of acting as a counter-measure to this sprawl-like growth and a potential development strategy through which these underutilized spaces can be used for urban regeneration.

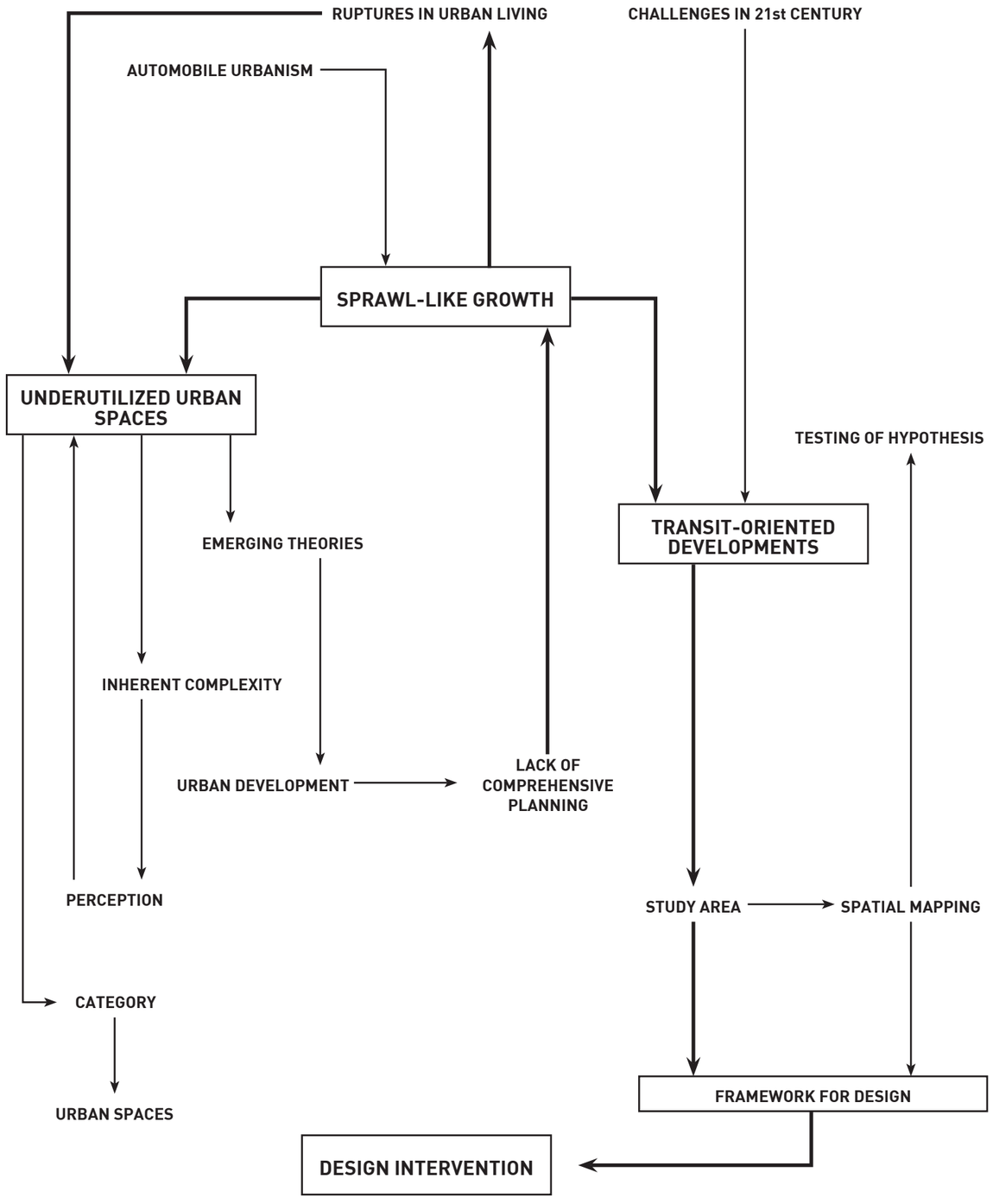

Figure 1.1 - The Process of Research for this thesis

LIMITATIONS

The purpose of this thesis is to investigate the reasons behind the creation of underutilized spaces and to classify them based on urban spaces. The research is geared towards developing a framework for planning and urban design that looks how these spaces can be used as potential sites for urban regeneration. These solutions presented are contextual and are not necessarily expected to exhibit similar patterns in locations other than the area of study. However, the solutions are not exact designs, rather is a contextual design scaffold that allows specific solutions to be adapted into these sites. Furthermore, the proposals have been constructed through field observations of the choices of people in the neighborhood studied. In addition, spatial analysis and demographic studies done on a temporal scale has been limited to a shorter study period.

ENDNOTES

1. Alan Berger, *Drosscape: Wasting Land in Urban America* (New York City, NY: Princeton Architectural Press, 2006), 26.
2. Dolores Hayden and Jim Wark, *A Field Guide to Sprawl* (New York City, NY: W.W. Norton & Co., 2004), 11–17.
3. Keith A. Ratner and Andrew R. Goetz, "The Reshaping of Land Use and Urban Form in Denver through Transit-Oriented Development," *Cities* 30 (February 2013): 31–46.

2_METHODOLOGY

This chapter explains the methodology that has been applied for this thesis research including the systematic review approach undertaken for the literature review section, the selection of the study area as well as gathering of data and information on planning and policies.

This research is presented as an inquiry into fragmented pockets of underutilized spaces in the urban realm and whether it is possible to integrate them back into the existing urban fabric. This work is built upon a series of existing literature on urban design and meta-analytical studies in urban planning, primarily in the North American and European context, to understand why and how these underutilized spaces were created, what is their role in urban development and where can these integrations take place. Preliminary inquiry into the existing literature on underutilized spaces, geo-spatial analysis and statistical analysis on similar spaces suggest that even though these spaces exist the literature has emanated multiple perspectives from both scholars and researchers in different parts of the world. Due to the lack of concise commentary on this topic, this thesis take a systematic review approach by collecting and critically analyzing similar literature on this topic (and similar topics), research studies and papers. This approach provides the possibility of stitching together the common threads from these seemingly disparate commentaries on this aspect of urban design. It should be noted here that this systematic review approach has been conducted on existing literature in the North American context that has been contrasted with similar approaches taken into this topic in other parts of the world. This approach is inherently biased and introduces studies, research and literature that are not closely linked, yet allows for a creation of framework to identify and coalesce some of these disparate conclusions into one generalized conclusion (Fig. 2.1).

THE PROBLEM

Initial investigation into these kind of spaces reveals two aspects. Firstly, it is hard to classify these spaces into smaller categories that are distinct from each other. Secondly, assigning a common definition to these spaces has proven to be a major challenge, not just from a theoretical and utilitarian standpoint, but also under legal parameters. To address the aspects of categorization this research extracts information from the works of urban planner Erick Villagomez in *Claiming residual spaces in the heterogeneous city (2010).* Although this research uses the term 'underutilized' predominantly (including in the title), literature suggests that a wide variety have been used to denote these spaces. Hence, a comprehensive summary of terms used has been done as part of this project, which has led to the conclusion that 'underutilized' is the most appropriate term, particularly for this thesis. This investigation has been supported by the emerging theories on vacant (or underutilized) lands through the works of Spanish urban planning professor Ignasi de Solà-Morales Rubió (terrain vague), American landscape architecture and urban planning professor Alan Berger (drosscape), American architect/ artist Gordon Matta-Clark (liminal space and in-between space) as well as art projects in Europe that explore these possibilities in absence (Table 2.1).

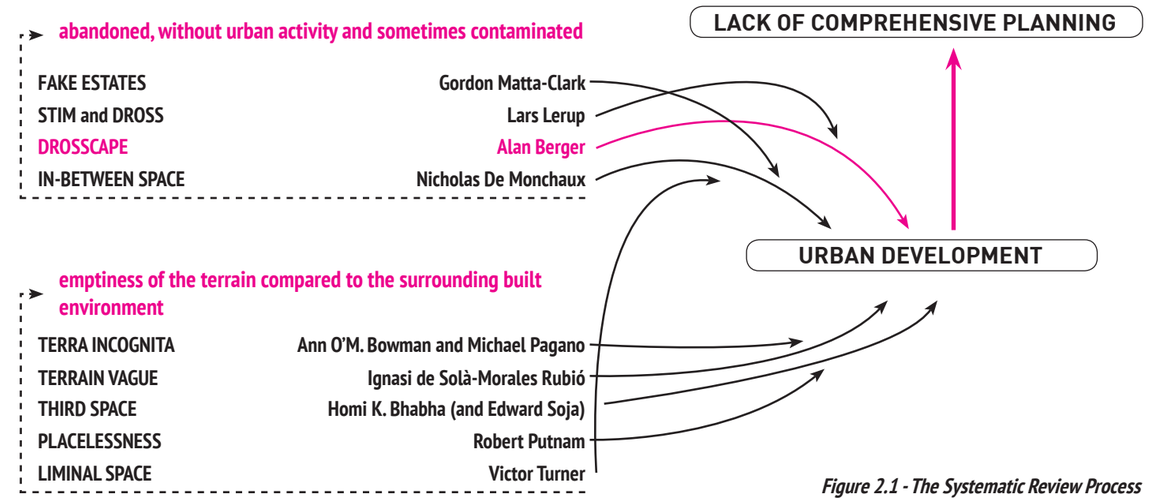

Figure 2.1 - The Systematic Review Process

TABLE 2.1 - List of works examined to discuss the problem of underutilized spaces

Author(s)	Year	Book Title/Book Section
Ignasi de Solà-Morales Rubió	1995	Terrain Vague
Lars Lerup	2000	After The City
Ann O'M. Bowman & Michael Pagano	2004	Terra Incognita: Vacant Land and Urban Strategies
Alan Berger	2006	Drosscape: Wasting Land in Urban America
Erick Villagomez	2010	Claiming Residual Spaces in the Heterogeneous City
Marieluise Jonas and Heike Rahmann	2014	Tokyo Void: Possibilities in Absence
Nicholas de Monchaux	2016	Local Code: 3659 Proposals about Data, Design, and the Nature of Cities

TABLE 2.2 - List of works examined to discuss the probable causes behind the creation of underutilized spaces

Author(s)	Year	Book Title/Book Section
Lewis Mumford	1961	The City in History: Its Origins, Its Transformations, and Its Prospects
Edmund Norwood Bacon	1976	Design of Cities
Kenneth Terry Jackson	1985	Crabgrass Frontier: The Suburbanization of the United States
Roger Trancik	1986	Finding Lost Space: Theories of Urban Design
Spiro Konstantine Kostof	1991	The City Shaped: Urban Patterns and Meanings Through History
Robert Rowthorn & R. Ramanaswamy	1997	Deindustrialization: Its Causes and Implications
Oliver Gillham & Alex S. MacLean	2002	The Limitless City: A Primer on the Urban Sprawl Debate
Diane Harris	2002	Making Your Private World: Modern Landscape Architecture and House Beautiful,
Dolores Hayden & Jim Wark	2004	A Field Guide to Sprawl
Lance Brown, David Dixon & Oliver Gillham	2014	Urban Design For An Urban Century: Shaping More Livable, Equitable & Resilient Cities

TABLE 2.3 - List of works examined to discuss the potential of TODs as a probable solution

Author(s)	Year	Journal Title
Arthur C. Nelson & David Allen	1997	If You Build Them, Commuters Will Use Them
Carmen Hass-Klau & Graham Crampton	2002	Future of Urban Transport: Learning from Success and Weakness - Light Rail
Robert Cervero et al	2003	Coping with Complexity in America's Urban Transport Sector
Carmen Hass-Klau et al	2004	Economic Impact of Light Rail: The Results of 15 Urban Areas
Reid Ewing & Robert Cervero	2010	Travel and the Built Environment: A Meta-Analysis
Robert Cervero & Cathleen Sullivan	2011	Green TODs: Marrying Transit-Oriented Development and Green Urbanism
John Pucher, Ralph Buehler & Mark Seinen	2011	Bicycling Renaissance in North America?
Sutapa Bhattacharjee & Andrew R. Goetz	2012	Impact of Light Rail on Traffic Congestion in Denver
Daniel Chatman et al	2012	Evaluating the Economic Impacts of Light Rail by Measuring Home Appreciation
Shin S. Lee & Martyn L. Senior	2013	Do Light Rail Services Discourage Car Ownership and Use?
Keith A. Ratner & Andrew R. Goetz	2013	The Reshaping of Land Use and Urban Form in Denver through TOD
Reid Ewing et al	2015	Varying Influences of the Built Environment on Household Travel
Reid Ewing & Robert Cervero	2017	Does Compact Development Make People Drive Less?' The Answer Is Yes.

THE PROBABLE CAUSE

Although not conclusive but using the systematic review approach has shed light on probable causes behind the creation of these underutilized spaces. One of the chief causes found was the urban development pattern in the 20th century, which in the North American context has been identified as urban sprawl or suburbanization – as a product of the American dream and the hunger for space and privacy. It was found that the public policy geared towards development along transportation networks, although logical, involved construction of miles of highways for the use of cars. Commentary on this topic has predominantly suggested that automobile urbanism and/or urban sprawl along with de-industrialization has led to decentralized, discontinuous and segregated cities leaving behind fragmented pockets of void spaces. However, a different school of thought has also suggested that some of these spaces have been a resultant of planning policies that has contributed towards the conversion of these spaces from being used to underused (Table 2.2).

THE PROBABLE SOLUTION

This project identifies the inherent challenges in re-integrating underutilized spaces into the urban fabric, or in other words questions whether this integrating is even possible. This leads us into the choosing an area of study where this hypothesis can be tested. Comparable systematic review approach provides an understanding of the shift away from automobile urbanism into alternative modes of transportation and development around transit. Although there is no conclusive evidence suggesting a correlation between transit-oriented developments (TODs) and functionality of underutilized spaces, this thesis has narrowed down to a study area surrounding a transit to understand whether the contemporary urban development of TODs are contributing to creation of more underutilized spaces or through integrated land-use development mitigating (or even absorbing) these spaces. This question has been heavily investigated through existing literature and statistical analysis on light rail transit in the United States and similar case studies around the world (Table 2.3).

SELECTION OF STUDY AREA

Selection of the study area is critical and factors that has been molded in the selection criteria has evolved from understanding the city size and population for conducting this study.

- A city with a considerable population (less than a million) but not a mega-city and not too dense. This is important because urban sprawl is defined as low-density horizontal growth, hence a city like Los Angeles (~ 4 million) would be more appropriate for this study than New York (~ 8 million)
- Population density should be low (about 10,000/sq mi), as a dense city would usually have mass rail transit in the form of subway, like New York (~ 28,000/sq mi) where chances of finding a considerable stock of underutilized space would be low.

Careful consideration has been given to identifying a specific area that best fits the different components of this research, namely as follows (Fig. 2.2):

- An area that is served by some form of rail transit
- An area that is located in the inner suburb or outer suburb of a city, not too far from the downtown, but not in the commuter zone
- An area with a higher percentage of underutilized space in terms of spatial extent

Although these criteria are loosely based on the systematic review of existing literature and research, this framework for selection allows the possibility of choosing a study area where the hypothesis can be tested. There are 14 cities where light rail systems are in operation in the US, as of 2017. Two of these cities, Seattle and Portland also have an established streetcar system that is operational primarily in the downtown areas.[1] Although primarily selected for logistic reasons for taking site-level data collection and analysis, Seattle coincidentally meets all the different criteria laid out above. It should also be noted that Seattle is currently one of the fastest growing city in the nation; hence, a study of this topic would ideally provide a manual for future developments around light rail systems in the city, and beyond.[2]

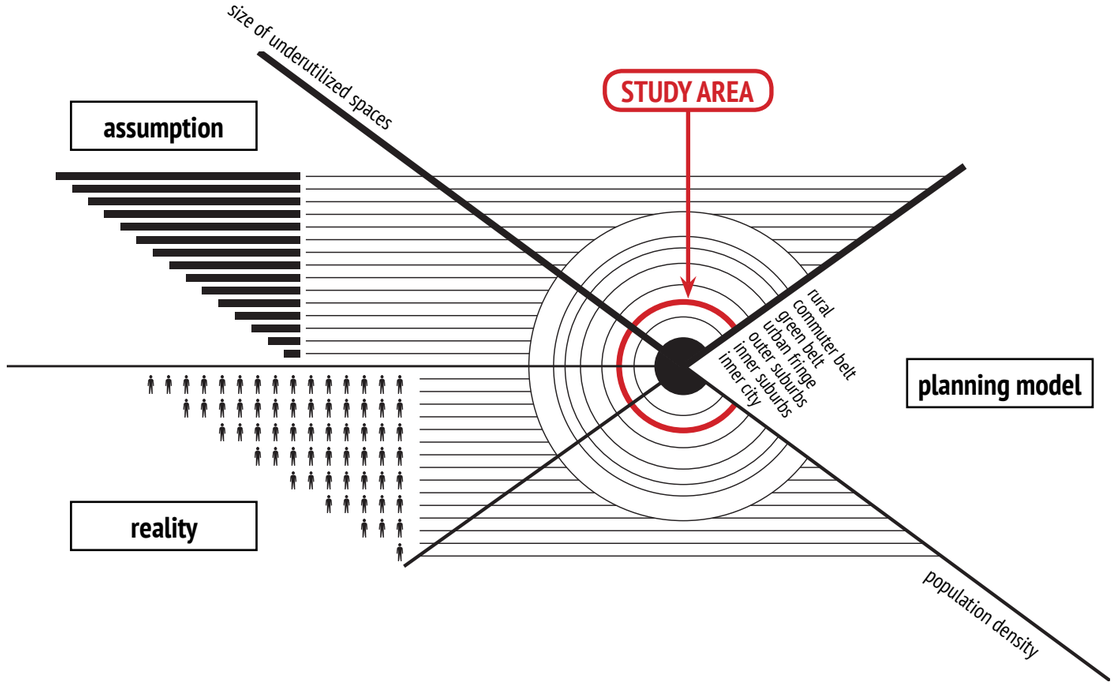

Figure 2.2 - Planning Model of Cities and Selection of Study Area

SELECTION OF SITE EXTENT

Planners and researchers have used transit catchment areas to predictions about transit ridership and impacts to prescribe regulations. The ½-mile distance has been commonly used for this purpose, which is loosely based on the distance people are willing to walk to transit.[3] This evidence is less clear for prescribing land use policies. However, this varies based on the purpose of the study. Robert Cervero, professor of planning at University of California at Berkeley, reports that people living within the ½-mile circle are four time more likely to use transit than those living between ½ mile and 3 miles.[4] Studies are also dependent upon people's willingness to walk, which varies based on purpose, gender, land use, safety, and weather and even on a person. Meta-analysis studies on data collected on 832 heavy rail, 589 light rail and 36 bus rapid transit stations from 20 American agencies by Cervero along with Erick Guerra, professor of planning at University of California at Berkeley indicates that a ¼ mile radial band acts as a good catchment area for predicting transit impacts as a function of jobs and a ½ mile radial band for predicting impacts as a function of population.[5]

Although the research mentioned here discuss the impacts on a ¼, ½ and 3-mile radius, this study builds on these previous works and effectively conducts a similar analysis to understand the quantity and quality of underutilized spaces in these two different radial bands.

- ¼ mile radius – zone of direct impact [A],
- ½ mile radius – zone of indirect impact [B]

Dividing the study area into two distinct bands allows the possibility to understand spatially the impact of underutilized and correlate that with land use features.

IDENTIFYING THE DRIVERS OF CHANGE

Although performing a temporal analysis of underutilized space would ideally provide one with a documentation of the function of these individual spaces as it was planned, the drivers of change examines what has been changing around these spaces in the neighborhood. This is critical because the drivers of change provide an understanding of the neighborhood on a temporal scale, which can then be used to understand what needs to be altered for the integration of these spaces into the urban fabric. This is a quantitative portion of the study to understand the social variables such as population, demographics, income range, and land use characteristics, etc. both historical and planned. These data have been obtained from United States Census Bureau, United States Bureau of Labor Statistics and have been discussed at length in subsequent sections along with projections obtained from the Migration Policy Institute, Martin Prosperity Institute and City-data.com.

This method of survey in a neighborhood (or set of neighborhoods) is critical to understanding the temporal nature and usage of underutilized spaces, which will throw light onto how humans react with these spaces. This takes us back to that location to understand what has changed around them and what have been the drivers of change for that particular area. A wide variety of trends or social variables can be considered for such an approach (Table 2.4).

This approach towards understanding the social variables in conjunction with the study of spatial analysis for a neighborhood (or set of neighborhoods) over a period not only allows the research to derive conclusions regarding what has contributed towards the creation and existence of underutilized spaces but also hints at possible future trajectories and provides some answers as to what can be done to integrate them back into the urban fabric. Additionally, it could provide guidelines that can be incorporated into future design initiatives.

TABLE 2.4 - Social trends and variables

Population density	**Land use / land cover**
Demographics	**Green space**
Region of origin	**Public/ private space**
Occupation	**Essential amenities**
Income range	**Recreational amenities**
Wealth and assets	**Social amenities**
Economic activities	

STUDIES ON MULTIPLE SCALAR LEVELS

This research has been conducted through studies on multiple scalar levels. This is because some of these underutilized spaces are small and invisible, while others are large and visible, but seen from above they form a disjointed network of scattered voids among the built (and used) masses of human intervention. Therefore, this research has been divided into spatial analysis on neighborhood, parcel and site levels to understand the scale of the problem at hand (Fig. 2.3).

The final area of study chosen is the Rainier Valley neighborhood in south Seattle and the reasons have been elucidated in the subsequent paragraphs. The Rainier Valley neighborhood in south Seattle is divided into multiple smaller neighborhoods, almost all of which have been served by the Rainier Avenue S and Martin Luther King Jr Way S as the major thoroughfares. Since 2009, this area has been served by Central Line branch of the Link Light Rail running along the western boundaries of the Rainier Valley neighborhood and almost entirely on or parallel to the Martin Luther King Jr Way S. Additionally, the light rail has 4 stops in this predominantly N-S linearly arranged cluster of neighborhoods – Mount Baker, Columbia City, Othello and Rainier Beach (Fig. 2.4).

The Rainier valley neighborhood lies approximately 3 miles at its northern end and about 10 miles from its southern tip from downtown Seattle, thus meeting the criteria of lying in the inner suburb-outer suburb zone (Fig. 2.4).

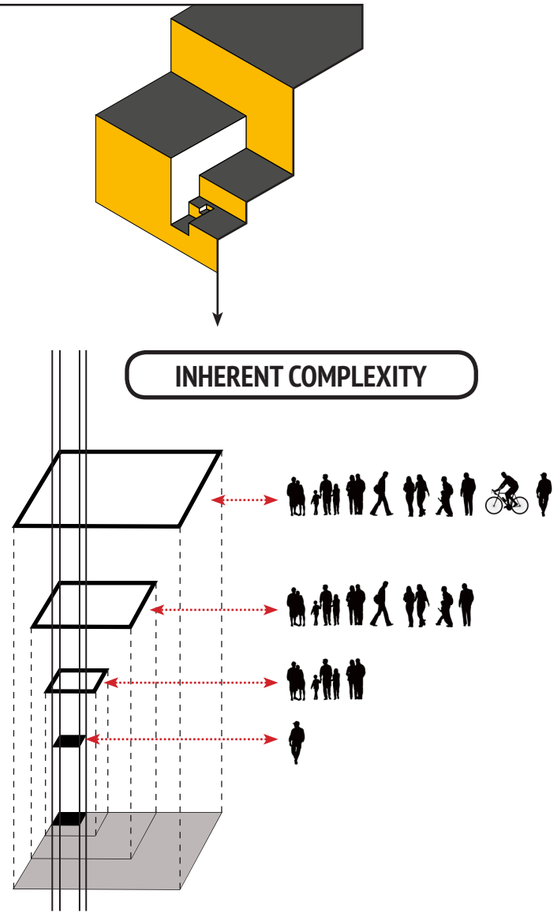

Figure 2.3 - Complexity associated with studies on underutilized spaces

Preliminary analysis (Google Earth) and street-level observation indicates that there are considerable quantity of underutilized spaces surrounding each of these four stations, with the highest being around Mount Baker station. Preliminary observations have been substantiated through extensive spatial mapping of the Rainier Valley neighborhood, particularly around the light rail stations using geographical data obtained from the City of Seattle and King County GIS databases. The mapping exercise has been conducted in a ¼ mile and ½ mile radius around the four stations (as shown in Fig. 2.4) and separate maps have been produced for different categories of underutilized spaces, namely vacant lots, triangular wedges, alleys and parking lots that have been discussed at greater length in later sections *(see Chapter 5)*.

Linking these observations with existing literature on categories of underutilized spaces *(see Chapter 3)*, Mount Baker has been chosen as the study area, the site having the both the spatial potential to test the hypothesis as well as socio-economic opportunities to sustain the change *(see Chapter 4)*.

> *landscapes that are characterized by neglect and transition, resistant to stability and reincorporation, eludes classification and easily identifiable as marginal spaces*
> **Alan Berger**

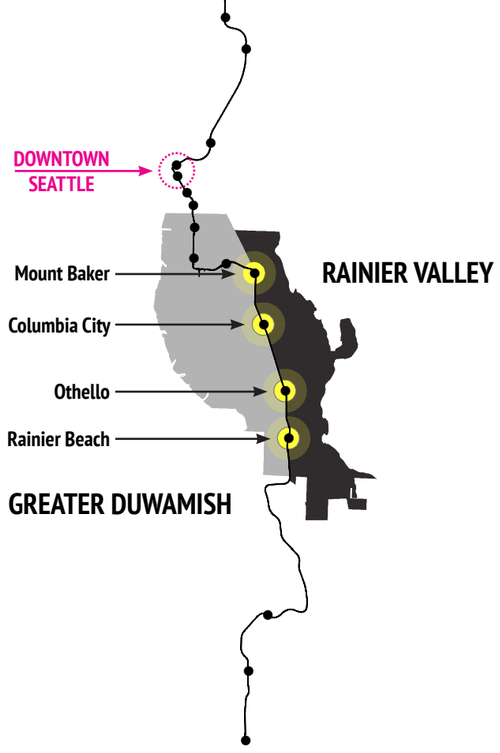

Figure 2.4 - Map of Link Light Rail through south Seattle

PLANNING & POLICY CONSIDERATIONS FOR RAINIER VALLEY

This research examines the existing planning ordinances and policies that have been planned for the Rainier Valley area with particular emphasis around the Mount Baker light rail station to assess what has been constructed historically and what the future holds for these neighborhoods. This not only sheds light on the spatial extent of underutilized spaces in relation to the existing policies but also provides an understanding as to planned future developments in the locality and how these spaces are being (or can be) incorporated in the larger scheme of things. Additionally, policies pertaining to the larger growth of the city of Seattle have also been considered to understand what measures are being taken for the Rainier Valley area pertaining to the existing population. The policies that have been studied for this purpose are shown on Table 2.5.

TABLE 2.5 - List of policies, guidelines and reports for Rainier Valley and Seattle

Author(s)	Year	Title of Policy/Guidelines/Reports
Department of Planning and Development	1999	North Rainier Neighborhood Plan
Department of Planning and Development	2009	North Rainier Hub Urban Village
Department of Planning and Development	2010	North Rainier Neighborhood Action Plan
Seattle Planning Commission	2010	Seattle Transit Communities: Integrating Neighborhoods with Transit
Department of Planning and Development	2011	Mount Baker Town Center: Urban Design Framework
Seattle Parks and Recreation	2011	An Assessment of Gaps in Seattle's Open Space Network
Talis Abolins	2014	Mount Baker Town Center: The 2014 Rezone and Transit Oriented Development
Office of Economic Development	2015	North Rainier Urban Village Assessment
Housing and Livability Agenda	2015	Housing Seattle: A Roadmap to an Affordable and Livable City
Office of Planning & Community Development	2016	Mount Baker Town Center: Neighborhood Design Guidelines
Office of Planning & Community Development	2016	Seattle 2035 Growth and Equity
Department of Ecology, State of Washington	2016	Mount Baker Properties Cleanup Site: Public Participation Plan
Seattle Parks and Recreation	2017	Development Plan and Gap Analysis
Race & Social Justice Initiative	2011	Racial Equity In Seattle: Race and Social Justice Initiative 3-Year Plan 2012-2014
Race & Social Justice Initiative	2014	Race and Social Justice Initiative: Vision & Strategy 2015-2017

REPRESENTATION OF INFORMATION

Representation techniques that reveal how landscapes and urbanization yield opportunities for re-conceptualizing underutilized spaces in the urban fabric lies at the core of this project. As Alan Berger rightly points out "measuring the dynamics of urbanization in order to see its effects on the landscape is a representation issue",[6] one wonders how to represent information, both spatial and data points, that would not only facilitate the process of understanding of the scale of the problem at hand but also allow for synthesis of collected information into a usable format. Berger's work highlights the importance of mapping locations of landscape-dependent activities that have systematically changed over the course of time through different processes one has the hope to obtain an understanding of each region's landscape geography in relation to wasted (or even underutilized) spaces. Representation is key for this project, especially to express the findings from a longitudinal study where an array of information (plan/section, empirical/visual, fixed/temporary, etc.) should be read simultaneously and in multiple views and scales. As Berger outlines, "Representational techniques provide the glue that enables the reader to cross-reference and derive new associations among disparate facets of urbanization over time. They add a time dimension".[7]

Erick Villagomez argues, "Cities have been – and always will be – dynamic entities".[8] This brings us into the question of how have they evolved in a particular location? This necessitates a longitudinal study of that particular area in order to identify and tabulate the various underutilized spaces through gathering of data and information of the following:

- Size or spatial extent (from maps)
- Ownership (from maps)
- Frequency of occurrence or being classified as underutilized (analysis based on maps)
- Usage (observations, photo analysis and/or time-lapse)
- Typologies (observations, photo analysis)
- Temporal quality (observations, photo analysis and time-lapse videos)
- Proximity to downtown core (from maps)
- Proximity to transit stop (from maps)

Synthesizing data gathered from various maps not only allows the possibility of including time linked to spatial data but also allows the opportunity to address complex relationships between spaces and the people living around them. The strength of mapping techniques lie in how one can hide some portions and reveal others, while overlaying and redrawing other portions, at the same time always drawing connections and conclusions of what they have been drawing. Noted landscape architect and theorist James Corner argues, "Mapping is neither secondary nor representational but doubly operative: digging, finding and exposing on the one hand, and relating, connecting and structuring on the other... Like a nomadic grazer, the exploratory mapper detours around the obvious so as to engage what remains hidden". [9]

LAYERING MULTIPLE MEDIA

The project wishes to formulate proposals that go beyond the basic settlement requirements imposed by the form of industrial dominance to achieve a new form of urbanity where the city is conceived as a pluralistic social project.[10] Tabulation and spatial analyses done on a city scale for these unused spaces will help in unearthing some of the broader questions on city planning modes; however, understanding these underutilized spaces in a neighborhood is essential for this research to answer the question of how to integrate these spaces into the urban fabric. Anuradha Mathur and Dilip Da Cunha, professors of landscape architecture at the University of Pennsylvania, Philadelphia writes, "as a collection of visual and textual essays, this presents a way to image, imagine, build and advocate design".[11] As the works of architect Stan Allen suggests that the process of mappings utilize spatial media to exhibit overlaps on a plane that elicits multiple interpretations, layering media allows for the agglomeration of human experiences and products of modernity along with mass media images, the disjunctive experience of the city and the anonymity of crowd.[12] The combined works of influential photographer Richard Misrach and architecture and urban design professor Kate Orff in their book *Petrochemical America* offer a fresh perspective where traditional architectural and urban design drawings merges with photography to visually describe the forces at play. These speculative drawings, aptly termed Thoughtlines, "integrate illustration, imaginative projection, and data to develop a series of stories" that begins to unravel and expand photographs in space and time in a new form of narrative cartography that maps the civilization-wide network of interdependent relationships.[13]

DEVELOPING A FRAMEWORK FOR DESIGN INTERVENTION

The primary output of this thesis is formulating a framework for design intervention for these underutilized spaces. Even though the majority of the study in this thesis has been conducted on emerging theories and through large-scale regional mapping the solutions proposed have taken a more hyper-local form. This underscores the fact that this problem operates on a larger scale; however, to tackle these issues one needs to find solution on an individual basis. The framework has been based on the idea that the design program considered on a larger scale can be diversified through time. While at the same time solutions on a localized site have been proposed as different design scenarios that builds on existing knowledge and identifies certain sites to propose a solution that aims to improve the utility component of underutilized spaces through diversifying the program over a time period (days or weeks) and through mixed-use development practices (Fig. 2.5).

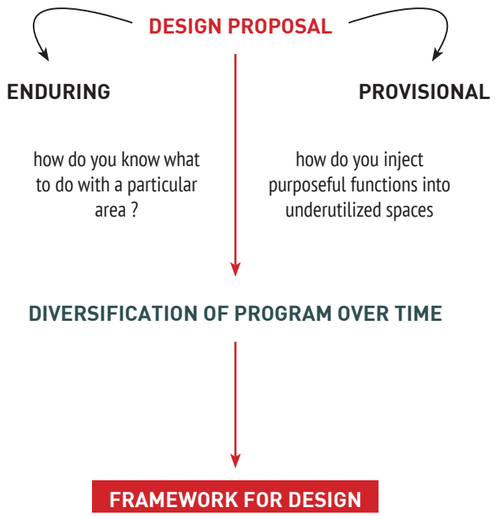

Figure 2.5 - Conceptual model for Design Framework

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"Dross is understood as a natural component of every dynamically evolving city. As such it is an indicator of healthy urban growth" – Alan Berger

3_LITERATURE REVIEW

A_RECKONING VACANCY

This chapter introduces the idea of underutilized spaces and how they entered the urban design discourse before discussing the possible reasons behind the creation of underutilized spaces. It is important to underscore that this problem is not just localized to Seattle, but affects other cities in the US as well. This chapter examines how these spaces function in reality and how they are perceived by people before attempting to classify them into categories. Additionally, it examines the existence of underutilized spaces to consider the phenomenon of urban sprawl affects creation of such spaces. The idea of placelessness and the material perception of these spaces along with the emerging theories on vacancy that are explored in this chapter are critical to understand prior to the start of any discussion on potential solutions.

UNDERUTILIZED URBAN SPACES

Although a wide variety of terms have been used for these spaces in the urban area, underutilized or unused has been one of the more explicit ones. Uncertainty revolves around the origins of these spaces and how they became part of the fabric of the land, both in the urban and rural realm. As architecture researcher Merten Nefs writes, "How can unused urban space be defined? Definitions of unused urban spaces are generally related to their origins, the way they were created".[1] Nefs discusses the important distinction between the origins of such spaces – some that have been kept vacant during the formation of the city around them and those that have had previous uses but have been abandoned at some point.The focus of this thesis is on the latter, which aims to address the reason why certain spaces become unused or underutilized to eventually undergo the transformation into becoming abandoned or vacant. Berger rightly identifies that "much of the landscape surface left in the wake of rapid horizontal urbanization is not a clearly defined, stable, and fixed entity".[2] He brings into focus the idea of underutilized spaces as liminal landscapes characterized by neglect and transition, resistant to stability and reincorporation, eluding classification and easily identifiable as marginal spaces. Predominantly deprived of human activity and interest throughout history, these spaces have only now entered the urban design discourse as the target of tactical urbanism becoming platforms of temporary use or as potential sites for future activity.

to utilize less than fully or below the potential use
UNDERUTILIZED
of, relating to, characteristic of, or constituting a city
URBAN
a boundless three-dimensional extent in which objects and events occur and have relative position and direction or physical space independent of what occupies it
SPACE

a three-dimensional physical space that is part of a city, which may or may not have a functional use, is being used less than its projected full potential
UNDERUTILIZED URBAN SPACE

Figure 3.A.1 - Defining Underutilized Urban Space

WHAT CAUSES THIS TRANSFORMATION?

The transformation in the 'use' of land from being 'used' to 'underutilized', to being completely 'unused' is a complex process that involves multiple reasons, some of which overlap to hasten the process of vacancy. Recent studies conducted by a group of architects, landscape architects and urban planners from the Texas A&M University at College Station, Texas led by Galen D. Newman in *A current inventory of vacant urban land in America (2016)* explored the chief causes that have contributed to the increase in vacant land in the United States. The study by Newman et al discovered that a varying set of factors contributed to the increase, chief among them being disinvestment, suburbanization, annexation, access to capital and deindustrialization. Less impactful were physical characteristics of vacancy such as land assembly problems and contamination. Other factors included population migration, housing crisis and transportation problems.[3] From these findings we can draw conclusions that transformation of land in terms of its decreased utility is a complex mechanism that is effected upon by the arrival of multiple factors at different periods.

DISSECTING THE STORY OF SPACES

To understand the full extent of underutilized spaces and their ramification in the quality of urban living one needs to essentially dissect the story behind these spaces. The following series of paragraphs is divided into two sections – Categories or Typologies and Perception (and Terminologies). Firstly, through the work of urban planner Erick Villagomez, I explore whether it is possible to develop a comprehensive classification of these spaces. Secondly, it is important to understand contextually how these spaces are perceived by the people living around them. Thirdly, the story of these spaces is viewed as a mapping exploration to study their spatial extent. Finally, an inquiry is made into the drivers of change that have propelled them into a concerning issue.

CATEGORIES or TYPOLOGIES

Tackling this notion of underutilized spaces requires a holistic study of spaces that includes spatial study of a city to first identify these underutilized spaces and categorize them. Deeper examination into such spaces is required to better gauge the existing challenges and potential possibilities. Finally, further exploration is required to obtain meaningful solutions to integrate these spaces into the larger urban fabric. As Mohsen Mostafavi architect, educator and the Dean of the Harvard Graduate School of Design writes, "The rate of population growth in many cities is so dramatic that conventional methods of planning are unable to respond to their rapid rates of transformation." [4]

One of the key aspects of this project is to understand how these places even exist. As they do exist, where are they and what do they look like? Then how do people respond to their existence? Are the responses overwhelmingly positive or negative? It is also pertinent to underscore that these spaces have a changing character so it is important to understand how have they evolved in a location? Additionally, it is essential to understand what has changed around them? These are some of the questions that usually comes to mind when one undertakes a research topic revolving around this idea of in-between spaces. Quantitative analysis of such spaces has been done before, and data overwhelmingly suggest that these interstitial spaces do exist in the city, hence the term drosscapes that throws light on this issue on an urban context. A quick look at the aerial view of a neighborhood may not suggest as much, but a more technical map illustrating the same shows that these spaces do occupy a significant area of the land. However, the basis of this research is also focused on the qualitative aspect of these spaces by looking at them as spaces of human and non-human experiences. This brings us to the question of how to undertake this research. A combination of quantitative and qualitative research along with a series of spatial explorations is required to unlock some of the mysteries of underutilized spaces.

A key step to understanding underutilized spaces is to look for where these spaces located are and how they function in the urban landscape. Only then can one understand the different characteristics that they emit. This identification could eventually lead to creation a category or typologies of such spaces. In his article *Claiming residual spaces in the heterogeneous city (2010)*, Erick Villagomez creates a toolkit for categorization of residual spaces in the city.[5] Although some of the categories pertain solely to building architecture, or solely to landscape architecture, it is important to understand the issue with underutilized spaces is inherently an urban design problem that encompasses different disciplines. His article classifies residual (or underutilized spaces) into eight categories (Fig. 3.A.2)

Different spaces serve different functions and sometimes calling them wastelands would not be appropriate. This brings into focus the raging debate on parking lots that remains occupied during the day but becomes empty at night, thereby adding a temporal element to the idea of interstitial spaces.

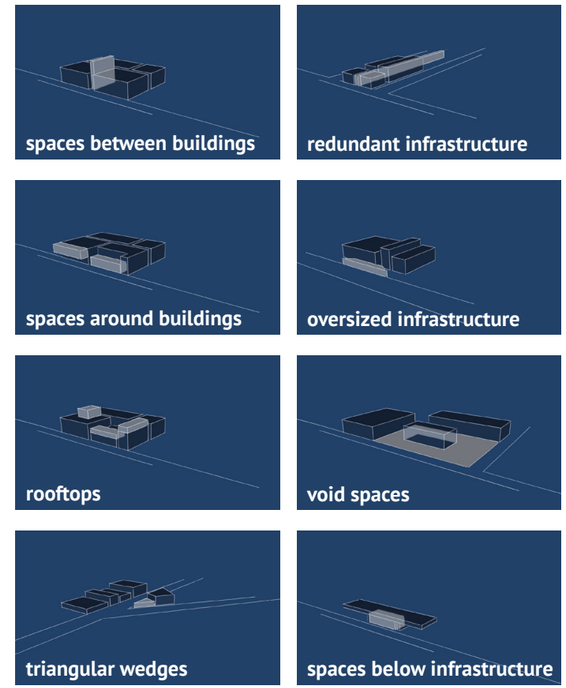

Figure 3.A.2 - Categories of Residual Spaces

makes the alleys in between them appear even more sinister, especially at night, adding another dimension to this idea – crime and safety; an idea that has been part of the dialogue since the seminal work of Jane Jacobs in *The Death and Life of Great American Cities (1961).* Hence, it can be safely concluded that the scale of the problem is massive and is a direct resultant of rapid urbanization. However, a more holistic understanding of this notion can be better examined through a comparative study in different neighborhoods and see which are the dominant interstitial spaces, maybe alleys and not parking lots dominate a residential neighborhood. It is only then can such an exercise provide valuable insights into the scale of the problem across different granular character.

Although not an exhaustive list, but potentially an important tool that allows spaces to be classified under one category or the other so that varying conclusions can be drawn as to which of these spaces dominate the urban and peri-urban areas such that future developments are carried out with special design consideration given towards those spaces. As Villagomez comments, "Technological and economic developments have simultaneously made expanding the city outward more profitable than focusing on enhancing and intensifying the existing urban fabric."[6] More importantly it allows the categories to be translated into different urban spaces. As seen from Fig.3.A.3, these urban spaces are not largely different but they fall into one or more of the categories that Villagomez has proposed.

Notes

Images of urban spaces in Fig.3.A.2 with a colored gradient bar associated with them represent the spaces that have been researched as part of this thesis.

PERCEPTION (and TERMINOLOGIES)

This leads us into the question of what these spaces look like in its present avatar. A series of contrasting images of interstitial spaces in different parts of the world reveal that these spaces can look visually appealing in certain cases (Fig.3.A.5). Although not the best image of parking lots, but the sheer presence of multitude of cars at the Los Angeles International Airport (LAX) seems a lot of 'waste' and underscores the present need for conversations that revolve around how parking spaces could be better managed. Coincidentally, LAX has started to cover their parking infrastructure to install solar cells on those roofs to create multiple uses for the same space. On the other hand, the image of a quintessential Parisian street side café evokes positive sentiments and one wonders why such spaces have not been emulated more frequently in all parts of the world. Closer to home, the image of Seattle's Post Alley throws up an example, where an interstitial space has been given a unique character and appeal. The lack of people in this image, however, seemed to have robbed the famous landmark and cultural institution of its usual hustle and bustle, thereby bringing into focus the importance of activities in such spaces, or human presence. This clearly resonates with the picture of people playing chess in Calcutta on the median in the presence of vehicles directly underneath a bridge (that cut across one of the busiest informal shopping centers in the city), which would otherwise have been left unused. The series of images offer a quick reminder of where we stand in terms of these spaces and shows us that these spaces need to be re-thought of as not just vestiges of urbanization but as important characters of a city, that are unique in different places.

After validating the existence of underutilized spaces, it is essential to understand how people (or the users) respond to the existence of these spaces. This leads us to the importance of undertaking a qualitative research in the study area to better gauge how important are some of these spaces to the people living around them. At the same time, it is imperative to find out the different terms that are used to denote these spaces and the definitions associated with them (Fig 3.A.4) (Table 3.A.1).

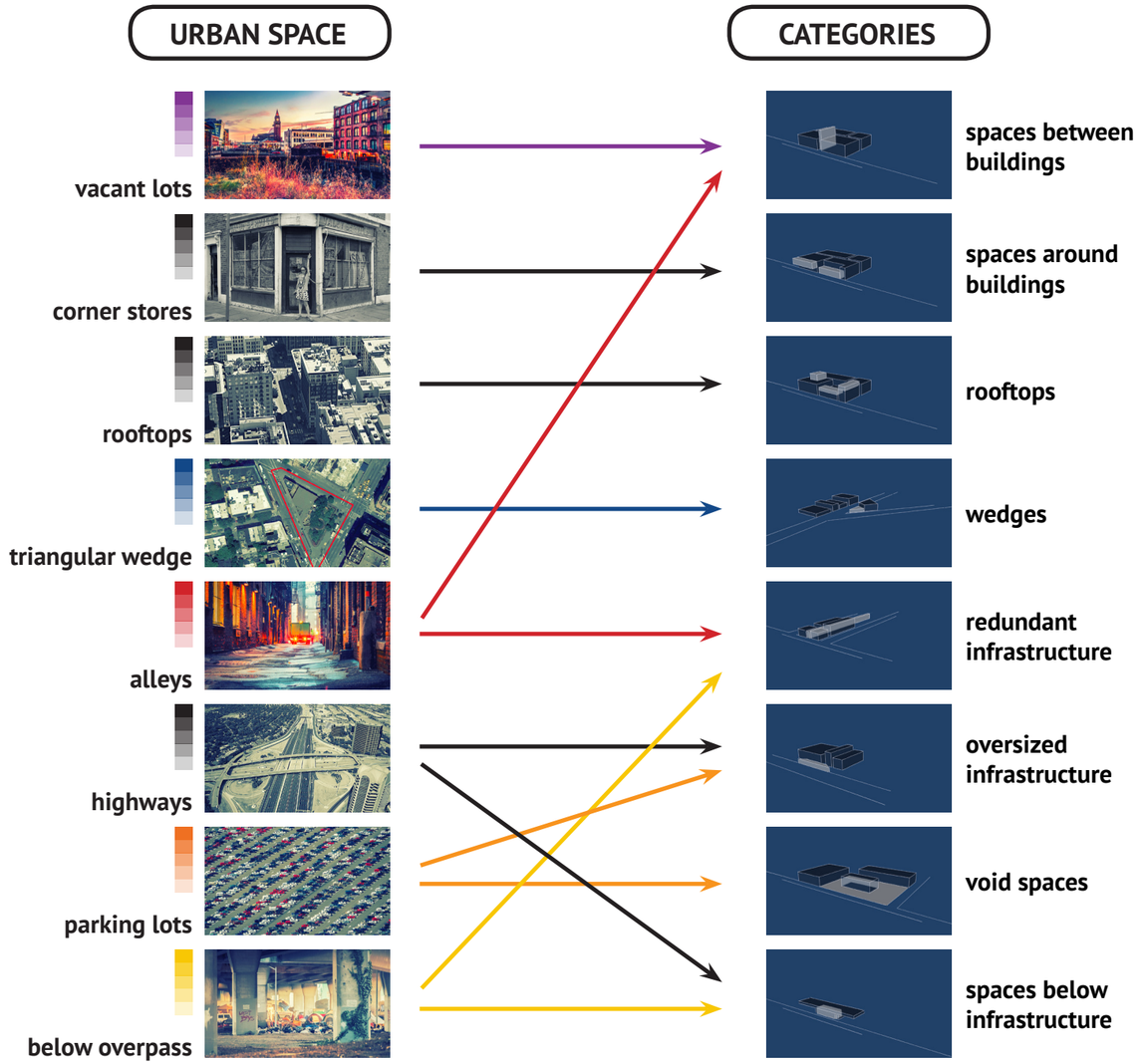

Figure 3.A.3 - Categories of residual spaces and what they look like as urban spaces

Although the list gives an idea of what are some of the different terms associated with such spaces, it is key to underscore that these terms are not used interchangeably. Rather they can be associated into different categories of their own – some of them define the activity of a space, or lack thereof, some define the utility of having a space, some define the usage of a space while others describe them as physical masses, and on the other hand, some of them are terms that are used to legally define a space that is being used, or unused (Fig.3.A.4). Thus, the definition of a space based on their character and the categorization of spaces as described by Erick Villagomez together provides a framework to create a typology of underutilized spaces in the urban fabric.

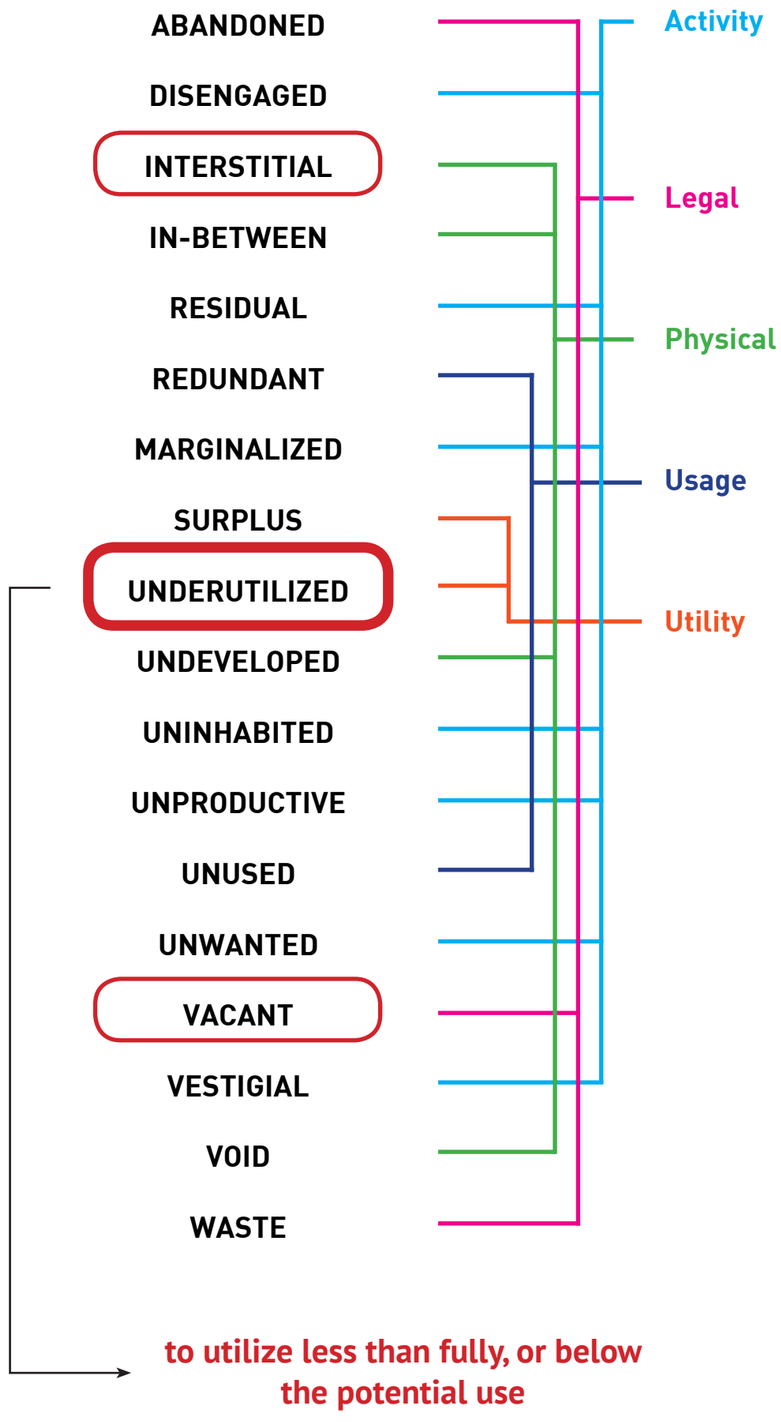

Figure 3.A.4 - Different terms associated with urban spaces and the categories that they can be grouped into

TABLE 3.A.1 - List of terminologies and their definitions as it would apply in urban design terms

Term	Definition
Abandoned	property left behind intentionally and permanently when it appears that the former owner does not intend to use it
Disengaged	the action or process of withdrawing from involvement in an activity or situation pertaining to a piece of land
Interstitial	any space between other structures or objects
In-Between	a space or thing that is between two extremes or two contrasting conditions
Marginalized	when society relegates spaces to a lower or outer edge
Residual	spaces that are left over after a process of social transformation
Redundant	spaces that are more than what is usual or necessary
Surplus	space (or part of a space) that exceeds the portion that is utilized
Underutilized	to utilize less than fully or below the potential use
Undeveloped	not having developed or been developed
Uninhabited	a place that has no people living in it or using it
Unproductive	a place that is not producing or capable of producing
Unused	a space that is not being used to its potential
Unwanted	space that is not being used by people because it is not wanted by the people around it
Vacant	land not being used at the present time but that may have utilities and infrastructure in place
Vestigial	forming a very small remnant of something that was once greater or more noticeable
Void	a space that is essential a vacuum in the fabric of the land
Waste	a place or an object which nobody is fond of resulting in it being completely useless as a space

Figure 3.A.5 (clockwise from top left) - Parking at Los Angeles Airport, California || A cafe on the streets of Paris, France || A rare image of a deserted Post Alley in Seattle, Washington || Chess players under a bridge on a median in Calcutta, India

UNDERUTILIZED SPACES IN THE UNITED STATES

The transformation of pockets of land, both in the urban and rural areas, into pockets of vacant land is not an isolated issue in one part of the country. It is true some cities like Detroit are shrinking cities and have understandably a large swathe of vacant land parcels, but at the same time some of the fastest growing U.S. cities like Seattle or Austin also have their fair share of vacancy that are almost always hidden in plain sight (Fig.3.A.6). The city of Seattle may not possess a high degree of what is classified as 'vacancy' but nonetheless possess some amount of underutilized spaces. It is prudent to understand the spatial capital of a city in terms of underutilized spaces before coming to any conclusion. However, for the limitations of this thesis, only a portion of the city will be considered to assess the spatial extent of underutilized spaces. For this study the neighborhood of Rainier Valley in south Seattle has been selected. It should be noted that the characteristics of these spaces and their spatial extent might (or may not) vary if another portion of the city were to be selected for this study.

A look into the extent of the problem of vacancy in US cities show that major cities such as Los Angeles and New York have taken the challenge head on. Although their efforts are so far restricted to vacant land parcels and not extended to include underutilized spaces, it is important to point out that these efforts have been possible due to the organization of citizen groups (Fig.3.A.7) (Fig.3.A.8). This reveals the potential of citizen groups for affecting change in these neighborhoods. A comparison of the facts and data presented by the two citizen groups Living Lots NYC and LA Open Acres show that Los Angeles has a larger percentage of underutilized spaces. So, what is really going wrong with Los Angeles? This brings into focus the effects of urban sprawl or suburbanization in Los Angeles, a city that essentially spreads out in all directions to the horizon (Fig.3.A.9).

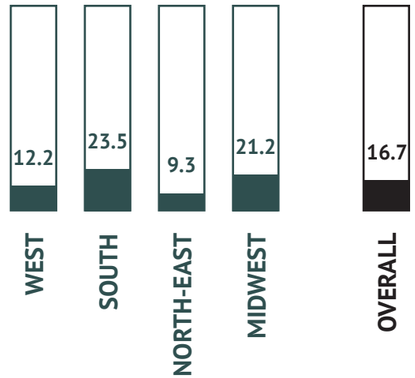

Figure 3.A.6 - Average vacant land to total land in the United States (%)

Figure 3.A.7- LA Open Acres citizen portal for vacant lands in Los Angeles

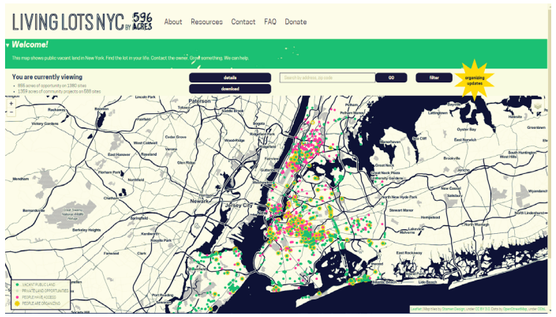

Figure 3.A.8 - Living Lots NYC citizen portal for vacant lands in New York

Figure 3.A.9 - The sprawling metropolis of Los Angeles, CA

RUPTURES IN URBAN LIVING

The argument for human interaction in urban spaces is based not just on people's personalized experience of a space but also derived from the understanding of the state of the field in the modern time and the vast possibilities that can be explored both within the design field and beyond. Spaces built in the form of infrastructure projects lacks vision and direction and oftentimes seems engaged in its search of mind-numbing conventional styles or meaninglessly wild forms and exotic grandeur. In the field of architecture, the built form often takes precedence and all too often, the landscape architect is left to 'fill up' or decorate the leftover and often neglected spaces (Fig. 3.A.11). These spaces are often termed as 'interstitial spaces'[7] or 'in-between spaces'[8] and often characterized by neglect and transition, resistant to stability and reincorporation, eluding classification and easily identifiable as marginal spaces. Japanese architect Sou Fujimoto approaches the idea of in-between spaces as a bridge between the natural and the built. Fujimoto notes, "I like to find something in between. Not only nature and architecture but also inside and outside. Every kind of definition has an in-between space. Especially if the definitions are two opposites, then the in-between space is richer" (Fig.3.A.12).[9] On the other hand, the idea of interstitial spaces has entered the urban design dialogue partly through the seminal work of Alan Berger in Drosscape: Wasting Land in Urban America. As Berger puts it, "Dross is understood as a natural component of every dynamically evolving city. As such it is an indicator of healthy urban growth".[10] They are understood as a resultant of rapid urbanization and horizontal growth. "Drosscape is the creation of a new condition in which vast, wasted, or wasteful land surfaces are modeled in accordance with new programs or new sets of values that remove or replace real or perceived wasteful aspects of geographical space."[11] According to Berger, "adaptively reusing this waste landscape figures to be one of twenty-first century's great infrastructural design challenges."[12]

There is a spatial mismatch of development patterns in how cities have developed in different parts of the world and how they have responded to changes in their priorities. As noted author and urban planning professor, Erick Villagomez points out that throughout history, from the medieval fortified towns of Europe to the dense Asian metropolises that urban life and intense land use were interdependent phenomena. In contrast, Villagomez argues against the state of underutilized spaces in the North American context, "The creation of meaningless, residual spaces has reached an extreme in North America where early illusions of limitless material resources have translated into a value system that encourages - and legally mandates - low-intensity land use".[13] This supports the views of Alan Berger and Charles Waldheim in their article Logistics Landscape where they argue that the North American industrialization pattern has undergone massive shifts, from the concentrated form in the late 19th century and early 20th centuries to being decentralized in the mid-20th century and becoming more distributed towards the 20th century and moving into the present times. The authors adds that, "The shifts between these modes of production are evident as ruptures in the urban form that preceded them, leaving previous spatial modes obsolete and abandoned in their wake".[14] This brings into focus the creation of these meaningless, residual spaces that has now reached an extreme in the North American context, where as it exists today in the form of vast tracts of underused parking, derelict urban sites, obsolete industrial wastelands and similar environments, is a product of relatively recent urban development, or more appropriately the phenomenon of urban sprawl.

Figure 3.A.10 - Ruptures in urban form and living

Figure 3.A.11 - Villa Savoye in Poissy, France designed by Le Corbusier

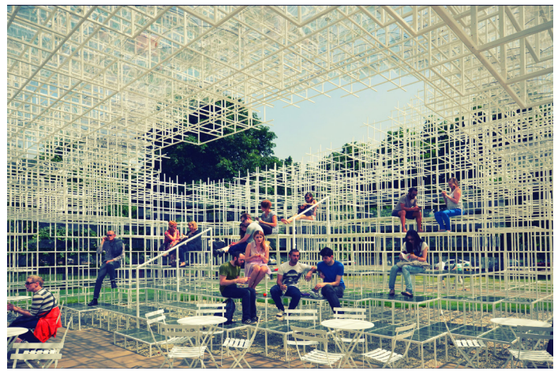

Figure 3.A.12 - 2013 Serpentine Gallery Pavilion by Sou Fujimoto

Figure 3.A.13 - Vacant, abandoned and unused properties in urban areas creating a patchwork of 'urban voids'

THERE IS A PROBLEM... BUT WHAT IS REALLY THE PROBLEM?

The traditional way to value urban landscapes is by using landscape as a place making medium. However, contemporary discourse suggests that this idea is blurred. The landscape of the contemporary horizontal city is fragmented and chaotically spread throughout the city in small bits and pieces (Fig. 3.A.13). Because it is seemingly impossible to see the landscape in its entirety, the contemporary landscape escapes the wholeness and public consciousness, once poignantly referred to as "terra incognita". [15] These transitional landscapes play a crucial role in urban evolution, then why are they seemingly under-valued and largely ignored? Alan Berger comments that the landscape left in the wake of rapid horizontal urbanization is not a clearly defined, stable and fixed entity rather a disaggregated archipelago of spaces that are in between occupancies and uses, successional phases and (dis)investment cycles that are constantly resisting stability and reincorporation.[16]

Significant research done by urban theorist and architecture professor Albert Pope on the evolution of gridiron planning and suburban enclaves in his book *Ladders (1996)* suggests a cautionary approach towards filling-up of underutilized spaces. Pope argues against blatantly filling these voids to create a new aggregated, contiguous city and suggests one needs to better understand and represent these voids, vacancies and inefficiencies left over from previous development.[17] Kenneth Frampton, architectural historian and professor of architecture at Columbia University, supports Pope's views and comments that unused spaces should be left as landscape reserves until society comes to its senses and acknowledges the destruction that has been caused by what he terms wasteful development practices.[18]

The importance of in-between spaces has been highlighted towards the late 20th century by the works of Danish architect and urban designer Jan Gehl through his seminal work *Life Between Buildings: Using Public Space (1987).* Gehl's work on identifying the quality of life in urban spaces in his hometown of Copenhagen, Denmark and formulating strategies as to what are the parameters for good public space has greatly contributed to the design and urban planning of the modern city of Copenhagen. His ideals have now been adopted in different places around the world.[19] Gehl's work highlight the importance of public space in measuring the quality of life in a city and point towards the importance of in-between spaces as holding an essential value in stitching the fragmented urban fabric.

The work of Swedish professor Lars Lerup, now a Professor of Architecture at Rice University, using the city of Houston as example is particularly important to understand the scale of the problem. Lerup calls the holes in the city as holey plane that he utilizes to draw a relationship between landscape and urbanization to re-conceptualize the city as a massive living dynamic system or a huge ecological envelope of systematically productive and waste landscapes. He theorizes that the urban landscape is composed of two things – stim and dross. Stim characterizes the places, buildings, programs, and events that most people would identify as being developed. On the other hand, dross is characterized by the landscape leftovers typically that are found in between the stims and under-valued for many reasons (pollution, vacancy, natural conditions unsuitable, etc.).[20] Lerup's work provides an important framework of urbanization and landscape in the contemporary cities, however it is debatable as to whether any vacant land qualifies as dross. To answer this question, the following sections attempt to examine the idea of placelessness in void spaces and how the people who live around them or interact with them perceive these spaces.

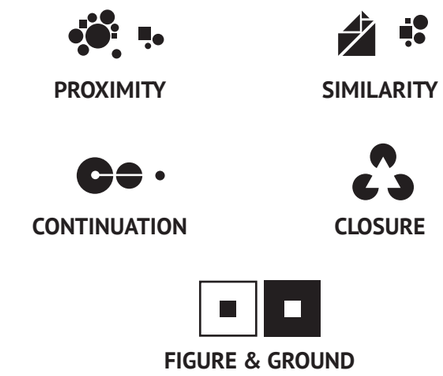

Figure 3.A.14 - The Gestalt principles

DISCONNECTED LANDSCAPES

As the urban design discourse on this topic suggests there is a disconnect of what a space is and what one can embrace ion that space. These underutilized spaces are too large, too removed or too intangible for a person to embrace and become aware of what is happening around them. Gestalt theory allows for a way to make these intangible fragments to be grouped together. Gestalt psychology discusses the notion of perceiving things so that one's mind correlates the whole before it infers the dissection of its individual parts. The parts have some relationship to each other, but together they seem to make a greater whole. Even though largely used in visual recognition and perception, Gestalt theory here has been used to understand the spatial perception. This greater whole can be created based upon a few principles: proximity, similarity, continuation, closure, and figure/ground.[21]

'Proximity' occurs when elements are placed next to one another, when proximity shifts the perception of the grouping changes. Similarly, if elements are removed then they read as separate from each other, but if put together they become one entity and can be seen as a whole. 'Similarity' is when elements are comparable to each other by one or more characteristics, but when something becomes dissimilar; it emphasizes the form creating a juxtaposition of spatial interest. 'Continuation' is when oriented units or groups tend to be integrated into perceptual whole if they are aligned with one another. 'Closure' refers to the ability to perceive elements as a collected completely if they part of a closed figure. 'Figure/Ground' illustrates the idea that an object differentiates itself from its surrounding thereby creating a balance in their relationship (Fig.3.A.14). Thus, these Gestalt principles allow for an understanding of the topic from a psychological point of view. This is critical because much of the emerging theories have invested considerable time in exploring the notion or perception of how these spaces operate, whether as fragments or part of a whole.

TERRAIN VAGUE AND DROSSCAPE

A deeper understanding of the scale of spatial existence of interstitial spaces and their importance to society requires an analysis seen from multiple perspectives. Theories on such spaces have evolved into two schools of thought – European and American. Whereas the European version has stressed on the emptiness of the terrain compared to the surrounding built environment, their American counterparts have focused on abandoned sites without urban activity and sometimes even contaminated. The chief difference in the two schools of thought being unlike the American 'wasteland', the Europeans emphasized the term *'friche'*, which means fallow or unused land. Despite their difference in opinion, one thing that remains common amongst urban thinkers is their utility, or lack thereof. This brings us to the works of Spanish professor Ignasi de Solà-Morales Rubió, who coined the term terrain vague to describe the absence of activity in the contemporary metropolis. Rubió's interests focuses on abandoned areas that he deemed unproductive, undefined and without specific limits; they possess multiple and shifting meanings and almost always no clear function and resist being defined by the existing logic of the urban landscape – floating in a sea of ambiguity and vagueness.[22] As Matthew Gandy, geographer, urbanist and professor of cultural and historical geography at King's College London, writes, "Where waste spaces have not been absorbed into the processes or urban development they present an intriguing presence within the fabric of the city".[23]

On the other hand, the American version that has gained popularity is the work of MIT professor Alan Berger and his theories on urban wastelands in American cities. Drosscapes are formed by the deindustrialization of old areas of a city and rapid urbanization of newer peripheral areas. This is the classical definition attached with the term 'drosscapes' that Berger coined. He drew inspiration from his own personal experience of taking aerial images of American cities and hence terms "the story of its genesis is serendipitous". His work explores this organic phenomenon where people are migrating towards the periphery thus creating what is now termed as 'bedroom communities'. His thorough research underlines that this phenomenon is not restricted to American cities, but in as far flung places as Sao Paulo, Istanbul, Jakarta, Mumbai and Melbourne. Berger brings into focus the notion of urban sprawl that has taken over most cities where "put simply, cities don't look or function the same anymore".[24] Like Rem Koolhaas before him, Berger agrees that urbanism is shifting its priorities from architecture to landscape architecture. Concepts such as concentrated population, bundled infrastructure, architectural density and centralized form of governance are terms from a bygone era. This has resulted in growth of horizontal cities with the distinguishing characteristic of increased surface area, or landscape, that is being taken up to accommodate fewer people. Much of which have no overt functional purpose, but are mere leftovers from development. With rapid urbanization in the modern cities, the unbuilt portions of the landscape have been squeezed into small aggregates, increasingly marginalized in-between architectural objects in the urban fabric.[25]

Although written largely in different contexts Rubió's terrain vague and Berger's Drosscape intersect at a critical point that proposes rethinking the role of the designer in the deindustrialized urban areas. Berger sees it as a new form of activism that involves the designer to assume the role of a social thinker and problem-solver who utilizes his/her creative skills to inscribe meaning onto these fallow landscapes. Rubió's interpretation of these spaces is quite similar as he sees these often distraught and neglected spaces as valuable commodities within the fabric of the city. He further urges designers to recognize these spaces as possible opportunities that can contribute towards social progression of the city. In conclusion, it can be agreed upon that terrain vague and drosscape are one of many frameworks that show the various degree of value placed on same concept of underutilized space and as the authors rightly point out that the prerogative lies with the designer to make meaningful uses out of these neglected spaces.

(NEED TO ASK DISCUSS THIS SECTION - WRITTEN TO ELABORATE ON THE DIFFERENT SCHOOLS OF THOUGHT)

LIMINAL SPACE & THE IN-BETWEEN

The Simmons Hall at MIT by Steven Holl is a good example of what Rubió and Berger talks about when they mention unused spaces as potential opportunities of socio-economic progression (Fig. 3.A.15). Located on a sliver of land between a road, sports complex, a train line and defunct buildings, and even though the building is introvert in nature it uses the liminal space of the site to its advantage. Perception of this building is critical as one approaches the building and once inside it becomes apparent that the internal flow has been choreographed with views of the surrounding landscape[26] (Fig. 3.A.16). This brings us to the concept of liminality and liminal spaces. In anthropology, liminality is defined as the marginal moment between the three-step process of ritual initiation – separation, limen and re-aggregation. Anthropologist Victor Turner expands on this idea and adds a spatial dimension to the concept, asserting that it is not a mental state of transition but a physical habitable space. This physical space is not outside the social structure or lying on the periphery but within the cracks of the social structure itself. Turner explains the idea of liminality as a midpoint between a starting point and an ending point - a metaphysical state of mind that has a temporary presence but rooted in the physical structure of society.[27]

The idea of liminal space is not a new concept as seen from the works of architect/artist Gordon Matta-Clark in the 1970s. In a bold move, Matta-Clark bought fifteen vacant sites that he realized were liminal spaces to show how one can own them, but can never experience or occupy them (Fig. 3.A.17). His project, which turned into a show at the MoMA at New York, called Fake Estates: Reality Properties (Fig. 3.A.18) was the inspiration for urban designer Nicholas de Monchaux's project *Local Code: 3659 Proposals about Data, Design, and the Nature of Cities (2016).* Using present day digital resources de Monchaux located over 2,000 additional spaces in the same area as Matta-Clark's in New York before expanding the study to San Francisco and Los Angeles in California as well as presenting an additional case study in Venice, Italy. His work is presented as a spatial analysis of different data, such as vacant parcels, households in

Figure 3.A.15 - Simmons Hall at MIT, Cambridge, MA

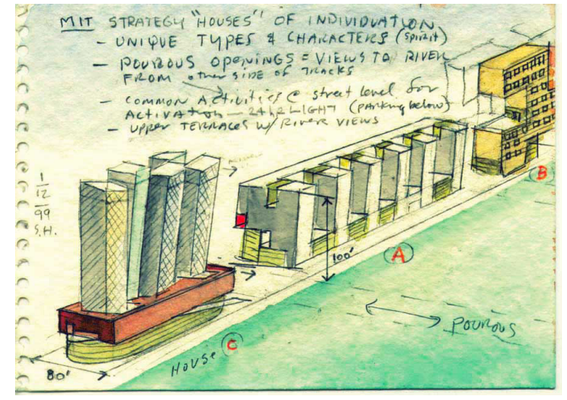

Figure 3.A.16 - Sketch of Simmons Hall by architect Steven Holl

Figure 3.A.17 - 15 Vacant parcels in New York by Gordon-Matta Clark

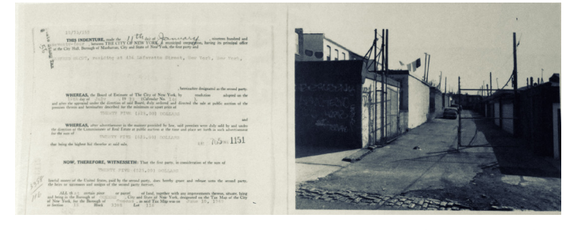

Figure 3.A.18 - 'Fake Estates' exhibition by Gordon-Matta Clark

poverty, respiratory ailments, crime reports, urban heat islands, etc. (Fig. 3.A.19). This is then formulated into a Flow Diagram for each city (Fig. 3.A.20) that can then be used for design solutions for differently sized parcels that taps into the initially framework of design (Fig. 3.A.21). These in-between spaces as de Monchaux and Matta-Clark's projects suggest is that they exist physically but certainly not in our mindsets. De Monchaux argues, "That it is only through understanding and engaging the existing nature of our cities as complex, networked artifacts that we can design for, and imagine, a robust and resilient future for them. Such a future is considered here, socially, economically, ecologically, and, as an inevitable corollary, spatially, materially, and formally – built into and out of the city itself."[28] It is why projects such as LA Open Acres and Living Lots NYC should be lauded for bringing to light the existence of these spaces through their activism and outreach programs.

In-between spaces are not just restricted to high-density American cities such as New York or San Francisco. The work done by Marieluise Jonas and Heike Rahmann in *Tokyo Void: Possibilities in Absence (2014)* highlights the existence of such spaces in a rapidly urbanizing city in another part of the world. Their analysis is crucial for they identify the interstitial spaces as not just mere gaps in the urban landscape, "but as leftover buffer zones without clearly defined functions or boundaries."[29] Their exploration of Tokyo's complex, multilayered urban fabric throws up voids that are "inconspicuous, subtle breaks in a continuous urban tissue." [30] The authors make a compelling argument that discussions on urban voids have revolved around temporary uses, tactical urbanism projects and art exhibits – as tools for future possibilities. They rightly point out that "urban vacant spaces have somehow become synonymous with the idea of informal appropriation as a widely-applied tactic in reclaiming unused land, and, increasingly, as a new approach for community-driven urban redevelopment".[31] They acknowledge this approach, however, especially for the community-oriented integration. At the same time, they caution that this trend has only been established in European and North American

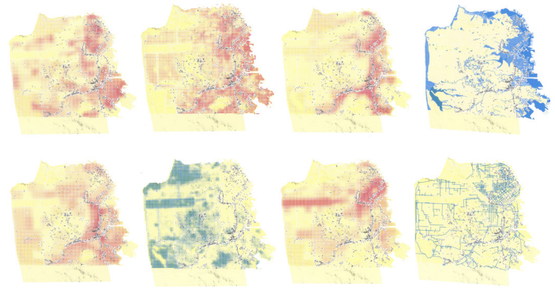

Figure 3.A.19 - Spatial Analysis of different variables in San Francisco, CA

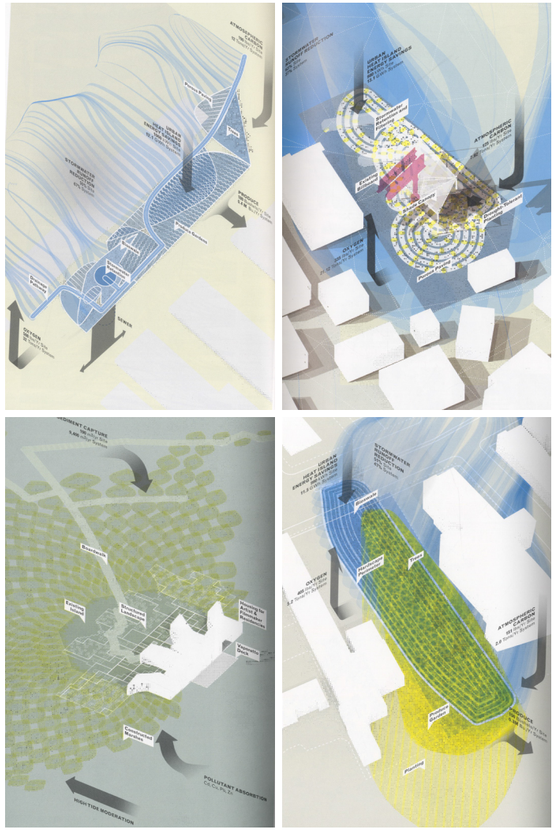

Figure 3.A.20 (clockwise from top left) - Flow Diagram for San Francisco, CA || Venice, Italy || New York City, NY || Los Angeles, CA

Figure 3.A.21 (L-R) - Design typologies for different parcels

contexts, activating urban voids in cities like Tokyo may prove to be much harder. However, their findings also reveal a shift in the Japanese society. From being inherently defined by smallness and inwardness there has been a spike in the number of alternative practices and temporary activation of vacant lots.[32] The success of these projects or as they term 'pop-up spaces' highlights the shift in attitudes towards recreation and public open space in general that paints an optimistic future for purposeful utilization of underutilized spaces and their integration of into the existing urban fabric.

The authors highlight the extraordinary example of the Ginza Rice Farm in Tokyo. A one hundred square meter vacant lot was converted into a temporary rice paddy that was maintained by the public, which also supported other wildlife at the same time. This project, by architect-turned-farmer Kazumi Iimura was put up to raise awareness for food shortages, rice farming techniques, sustainable food production, urban farming as well as activation of urban voids. This surprisingly successful project came up on the backstreet of Tokyo's fashionable Ginza district, the equivalent of New York's Fifth Avenue (Fig. 3.A.22). This project is one of many examples that validate the purpose behind the need to activate urban voids.[33]

Figure 3.A.22 - Ginza Rice Farm in Tokyo, Japan

TERRAIN VAGUE AND ITS MATERIAL PERCEPTION

The urban environment evolves around these areas of ambiguity and undeclared regions that form a patchwork of used, unused and underused urban landscapes. The renewed interest in these issues have become more prevalent; however, there is no physical difference between these places rather the difference lies in how they are perceived. Creating questions of status along their existence these spaces are not fully understood, but have the potential to become catalysts for new interpretation of the spaces to form a sense of place. As the Gestalt theory of material texture, suggest that the flow of energies and existing fragments of a site can be applied to new and old materials to enhance the overall function and create a joint between liminal spaces and the functioning parts of the land. In Ignasi de Solà-Morales Rubió's texts the two extreme contradictions come to the fore. The first criticizes that these spaces are in pure disarray and they can stay in this form. The second highlights their potential to act as the healing tissue by utilizing the history and context of the site to allow for a more holistic design.

Rubió's terrain vague concept discusses these vacant zones as having no benefit to the socio-economic welfare to the city. Without the will to overcome the root causes of this problem, Rubió argues that interventions get limited to the 'image' of the location. People are forced to wait for others to act and future developments to solve the problem, resulting in quick cosmetic fixes that fail to take into account the context of the area. Rubió's argument is that these spaces should be left as it is, but what he fails to discuss is that when they became too large they start to become detrimental to the well-being of the city.[34] These spaces are ultimately a function of progress, but not when they become prevalent and outnumber the progressive parts of the city. The landscape is so vacant that the order and rules of consumption do not apply to them in the same manner as other parts of the city. Offering the space for spontaneous appropriation and informal uses thus finds way into these areas, which would otherwise not be possible in the public realm. Rubió, however, cautions against designers'

introduction of violent transformations striving to eradicate the problem instead of trying to integrate them into the existing fabric. The idea of underutilized spaces to become a laboratory for an intensified experience of space that leads a person to be aware of the place around them. The argument is not for the provisional design solutions (temporary) or something more enduring (permanent), but for a participatory mix of elements that heighten the human experience.

PLACELESSNESS AND THE LOSS OF SOCIAL CAPITAL

As explained previously, the primary concern regarding the creation of underutilized spaces in urban design terms is seen in the decline in the social capital of a city. In this context, extensive research has been carried out to explain the notable decline in the vibrancy of American civil society towards the latter half of the last century. The catalyst behind much of these research has been identified in the works of Robert D. Putnam, political scientist and presently professor of public policy at the Harvard University John F. Kennedy School of Government. In his seminal work *Bowling Alone: The collapse and revival of American community (2000)*, Putnam surveys the declining social capital in the United States since 1950. Systematic inquiry has shown that the quality of governance was determined by longstanding traditions of civic engagement (or lack of it). Voter turnout, newspaper readership, membership in choral societies and football clubs were some of the more popular identifiers of civic engagement during this period. Putnam's research identifies that some of the trends in these activities have sharply reduced in recent times. Voting booths have become increasingly deserted, newspapers have increasingly shifted to an electronic media, religious affiliations have dwindled, labor union memberships have been falling for decades and membership even in volunteer and fraternal organizations have been witnessing substantial drop. As Putnam notes, "The most whimsical yet discomfiting bit of evidence of social disengagement in contemporary America that I have discovered is this: more Americans are bowling today than ever before, but bowling in organized leagues has plummeted in the last decade or so".[35] What is important to understand from Putnam's work on civic disengagement is that it corroborates the notion that America's social capital has been eroding due to an increasing want for personal space and privacy. As his work suggests that the proportion of Americans who socialize with their neighbors has slowly but steadily declined, and people are found less trusting than before.[36]

Robert Putnam identifies four factors behind this erosion of social capital: the movement of women into the labor force, mobility, demographic transformations and the technological transformation of leisure. His suggestion of these factors essentially point out that these changes have shaped the American lifestyle going into the 21st century, where as he postulates that there is growing fervor of individualism and a growing erosion in societal bonds through civic engagement.[37] His commentary mirrors the problems identified in the existing urban design discourse on underutilized spaces, especially vacant lands, derelict lands, deindustrialized zones, parking lots, etc. Although there is no concrete evidence to suggest that civic disengagement and underutilized spaces can be linked as being the resultant of the other, however, as this thesis suggests that there is a clear legible connection between them as to why these spaces have become underutilized or unused. The fragmentation of social life as Putnam suggests have clearly resulted in a lifestyle that breeds a variety of consumer spaces, some of which are chosen more often than the rest, resulting in a fragmented urban form. This culminates into a notion of placelessness in these spaces, where the sense of being in a place has been lost.

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“You can’t regulate desirable growth without controlling the places where growth is less or undesirable. As in sculpture, the positive form cannot be fully revealed unless the negative material is first removed.” – Charles Zucker

3_LITERATURE REVIEW

B_POLITICS OF VACANCY

This chapter attempts to decipher the causes behind the creation of underutilized spaces by returning to the earliest historic expressions of urban development patterns and models of development that defined the creation of cities. Despite the presence of such models that seemed to integrate the different parts of the urban areas, some cities have expanded horizontally in a fashion that is now termed as urban sprawl. The remainder of the chapter looks at this phenomenon of urban sprawl, the challenges it brings, its role in the creation of these void spaces in the urban fabric and the urban design literature that revolves around these issues, predominantly in the European and American context.

A BRIEF HISTORY OF URBAN DEVELOPMENT

To understand how underutilized spaces, operate on a city scale it is pertinent to understand the history of urban planning and the evolution of the models of city development (Fig. 3.B.1). The history of urban design literature suggests that urban forms began with the first cities that were centralized in their form, whether organic or geometric in shape. One of the earliest models of city development is the Concentric Circle Theory prepared by German economist Johann Heinrich von Thünen in 1826 where he suggested that similar land uses would tend to locate at similar distances from the center of the city. However, von Thünen considered only one isolated market with no interactions; the land surrounding was flat with uniform fertility and no transportation infrastructure.[1] Later in 1903, Richard Hurd came up with a modified version of the Concentric Circle Theory, which he called Direction of Least Resistance Theory that implied that cities grow in the direction of least resistance or greatest attraction.[2]

With the advent of industrial revolution and expansion of cities sociologists in Chicago, who were sometimes referred to as the Chicago School sociologists (1914-45) developed the Concentric Zone model. Primarily developed by Canadian-American urban sociologist Ernest Burgess it was also considered an updated version of the von Thünen model in the 1920s. This model assumes a relationship between the Central Business District (CBD) and the income levels and divides the city into six concentric zones. Commute time increases as one moves away from downtown but housing quality improves.[3] One can consider the Concentric Zone model as being flawed as the sociologists felt Chicago was the prototypical growing industrial city of their period and what was true for Chicago was true for most other cities.

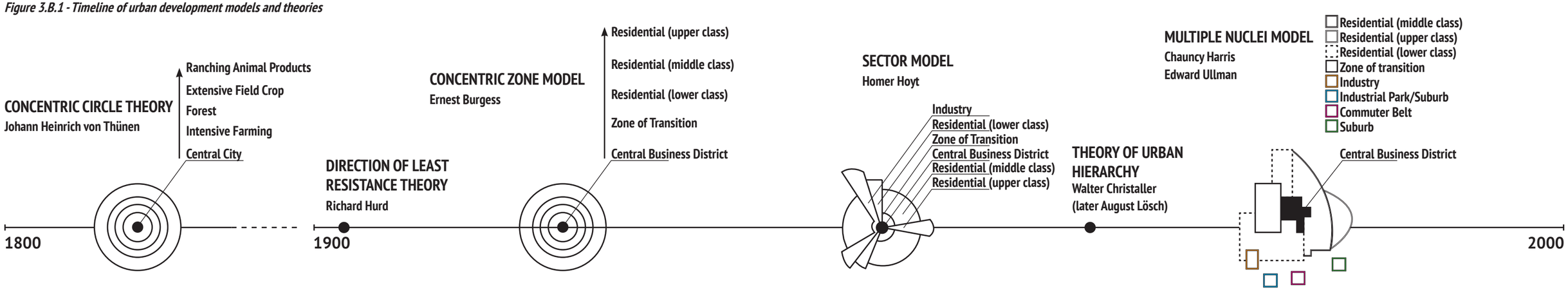
However, by the first quarter of the 20th century, the models of urban development started to realize the shortcomings of the Concentric Zone model and recognize the inherent complexity involved with the cities and their dynamic nature of growth. This was reflected in the ensuing series of models that came about. German geographer Walter Christaller introduced the Theory of Urban Hierarchy (or the Central Place Theory) in his book *Central Places in Southern Germany (1933)* that proposed the existence of a geographical urban hierarchy where higher-order cities are fewer and further apart than lower-order cities based on transportation and administration. His theory states that central places are distributed over a uniform plane of constant population density and purchasing power. Movements across the plane is uniformly easy in any direction, transportation costs vary in a linear fashion and consumerist actions are geared towards minimizing transportation costs. German location theorist August Lösch expanded on Christaller's work in his book *The Spatial Organization of the Economy (1940)* where he assumed a system of beginning with lowest-order (self-sufficient) farms that were uniformly distributed in a triangular-hexagonal (honeycomb) pattern. This system allowed for specialized places allowing some central places to develop richer areas that others and minimize transportation costs and average distance from each city to all points in its service area. Empirical research later done in America shows that Iowa and Wisconsin come closest to meeting Christaller and Lösch's assumptions.[4]

Homer Hoyt, an American land economist conducted a study of 142 American cities in 1939 and argued against the supreme validity of the Concentric Zone Model. He came up with the Sector Model that introduced the notion that the distributions of rents and the city's socioeconomic status groups are organized in homogeneous, pie shaped wedges or sectors that run from the city's CBD to the periphery.[5] Hoyt's model argues that high rent residential growth tends to proceed from its given point of origin along established lines of travel or toward another existing nucleus or trade area. Babcock extended on this idea and proposed that one district expands by gradually encroaching upon neighborhood districts or an expanding district may jump a barrier.

American urban geographers Chauncy Harris and Edward Ullman proposed an extension of Babcock's idea through their Multiple Nuclei model in 1945 where they suggested that there were four reasons for clusters – some activities require specialized facilities, economies of agglomeration, unlike activities are sometimes adverse to each other and some activities can afford the high rent of the most desirable sites.[6] Rather, they postulate that there are several differently growing nuclei, each of which exerts influences on the distribution of people, activities and land uses. Furthermore, these nuclei had their own specialized functions and varied in size, such as retail, manufacturing, education, industrial, health services, residential, etc.[7] This model was important because it did not consider the city as being organized around a CBD, even though they did not disregard its existence, instead they proposed the CBD as one of several functionally important nuclei.[8]

Even though most of these models and theories on urban development were theorized or developed in the early to mid-20th century, they provide an understanding of the layout of cities. Although constructed primarily in American and European context, in applying these models to other societies beyond, researchers have identified elements of the three models in the geometry of spatial structures of the cities. Cities in developing societies, as they are exposed to the global network of socio-

Figure 3.B.1 - Timeline of urban development models and theories



economic and political changes the pattern of changes have been observed to be consistent with that developed societies.[9] Researchers have observed that in the case of post-industrial cities such as Los Angeles they do not conform to the classical models, rather they belong to the decentralized and dispersed multi-centric metropolitan region of the postmodern age.[10] Revisiting Hoyt's model we can see that he incorporates Hurd's idea that growth and development first takes place along main transportation routes from the city's center to the hinterland, which includes rail lines, highways and navigable bodies of water. This idea is explored at length in the following sections as development along main transportation routes takes prominence with the popularity of the automobile and the social implications that arises out of it.

ROOTS OF URBAN FORM

The earliest form of human settlements was expressed in some geometric form or followed a rectilinear pattern. Earliest known settlements such as Mohenjo-Daro and Harappa in the Indus Valley, excavated towns in Babylon and China and even in the Egyptians towns of Kahun and Amarna all followed this type of development. After the fall of Rome, new European cities emerged in the middle Ages were shaped around military considerations, such as the *bastides* in France and *Zähringer* towns in Germany. By the 17th century, the Renaissance period started shaping European cities, but geometry still seemed to be a big part of their design as evident from the plan of Palmanova, Italy (1593) (Fig.3.B.2). Some of the fundamental concepts of urban design, however, reached a mature phase during this era: the idea of the street as a spatial element in its own right; the concept of purposely shaped and defined public space; network of streets and public spaces organized by visual foci; and the idea of deploying buildings with uniform facades to define streets and other public spaces.[11] The city of Amsterdam assumes great significance during this period. In 1607 the city adopted the Plan of the Three Canals, which called for the construction of canals that would serve as the main streets, but also incorporated the idea of phased construction where each canal could act as the outer boundary in successive enlargements – an idea of an elastic city (Fig.3.B.3).[12] The planning of Amsterdam greatly influenced the layout of New Amsterdam, which later came to be known as Manhattan borough of New York City. Even though New Amsterdam began as somewhat organic, the arrival of the governor Peter Stuyvesant transformed the city into a lattice of new streets.[13] Shortly thereafter, 'the grid' assumed great significance in the New World as seen in the sophisticated grid layouts of Pennsylvania by Thomas Holme and at Savannah, Georgia and Charleston, South Carolina by James Oglethorpe.[14] At that point, the grid was seen as maximizing the potential of the land; both George Washington and Thomas Jefferson believed a grid geometry represented the democratic principles upon which the new nation was founded (Fig.3.B.4).[15]

With the advent of the industrial revolution, the importance of waterpower – rivers and streams – started to lose their importance to coal and steam power, especially after the Civil War. The new economy demanded that factories be located closer to mercantile cities, which harbored a large labor pool.[16] The 1920 US census showed that for the first time more people lived in cities than in farms (Gillham and MacLean, 2002). This spike in population in cities along with the migration of immigrants saw manifold rise in major cities, such as New York and Chicago. New industry brought with it new means of travel: first railroads, then streetcars and then suburbs. This new era of decentralization stretched the cities beyond its boundaries and spawned multiple suburbs. Suburbs, such as Riverside outside of Chicago (Fig. 3.B.5) and Llewellyn Park in New Jersey that started as social experiments– a form of railroad Eden that became leafy enclaves for the rich to escape from the dirt and squalor of city life. Suburbs, however, did not remain the preserve of the rich for too long. The emergence of better and affordable means of transportation along with the improvements in methods of building construction meant housing for the first time could be mass-produced. The middle-class suburbs was seen as the

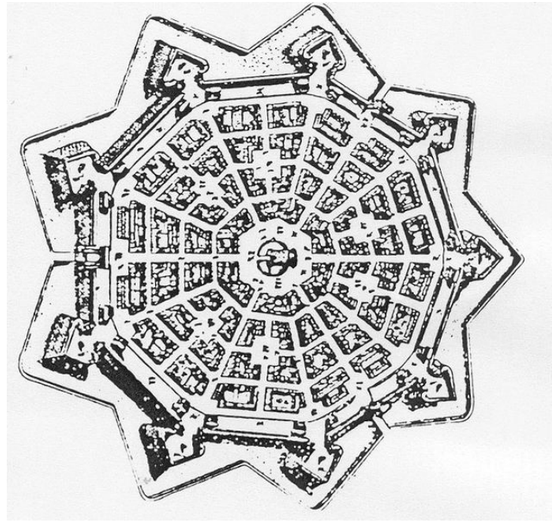


Figure 3.B.2 - Plan of Palmanova, Italy

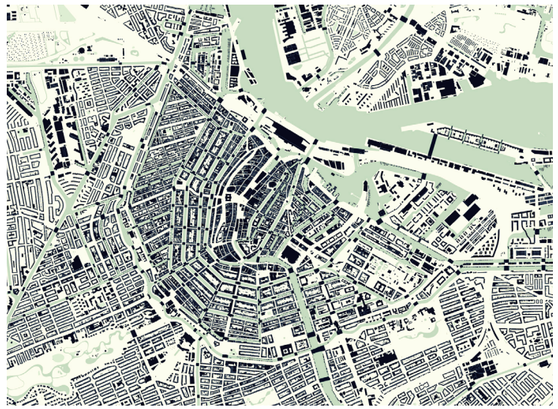


Figure 3.B.3 - Plan of Amsterdam showing the medieval city in the center

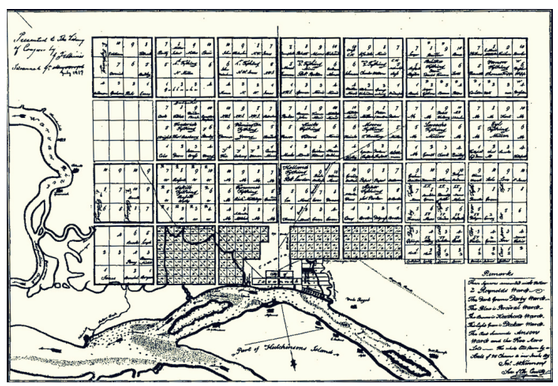


Figure 3.B.4 - Grid-iron planning for Savannah, Georgia

Figure 3.B.5 - Plan of Riverside, a suburb of Chicago, Illinois

Figure 3.B.6 - Streetcar suburbs in the United States is still a way of life

epitome of the American dream at the time, as explained by James Truslow Adams in 1931, "that dream of a land in which life should be better and richer and fuller for everyone, with opportunity for each according to ability or achievement... regardless of the fortuitous circumstances of birth or position."[17] Streetcar suburbs was the start of an entirely new type of urbanization in the United States: relatively dense, wooden-framed cities of one-, two- and three-family homes on lots as small as a tenth of an acre (Fig.3.B.6). Soon, these suburbs with high-volume transit lines became urban neighborhoods such as Bronx and Brooklyn in New York City.[18]

Across the Atlantic, however, this mass-produced horizontal expansion failed to draw parallels. In 1902, inspirational English planner Sir Ebenezer Howard published the *Garden Cities of Tomorrow (1902)* in which he set forth a compelling alternative to the uncontrolled suburbanization. Howard's idea of Garden City was meant to incorporate employment centers within each city with residential neighborhoods, shopping districts, parks and public open spaces surrounded by a permanent belt of agricultural land (Fig. 3.B.7).[19] His publication greatly influenced the garden city movement and led to the building of Letchworth Garden City (1903) and Welwyn Garden City (1920) in the Hertfordshire countryside in England. Even though some projects, such as Forest Hill Gardens in Queens, New York by F.L. Olmsted in 1909 (Fig. 3.B.8) and Radburn, New Jersey by Clarence Stein and Henry Wright in 1929 as well as the Suburban Resettlement Program towns of the 1930s were influenced by the Garden city movement, Howard's idea never caught on in America.[20]

As cities grew more congested and dense during this period, a horizontal and vertical, mixing of uses increasingly appeared to pose a threat to public health and an assault on esthetics. Jacob A. Riis's photographs from 1890 in *How the Other Half Lives: Studies Among the Tenements of New York*[21] served as a timely reminder for the negative effects of industrial cities (Fig. 3.B.9). One of the reactions was zoning ordinances in cities that aimed to help stabilize property values by providing some assurances about what might someday be built next door.[22] Another was the baroque styled city-reconstruction plans termed the City Beautiful Movement that emerged from Chicago's Word Fair of 1893 (Fig. 3.B.10). Under the leadership of Daniel Burnham, the movement gained momentum and master plans were drawn for Chicago, Cleveland, San Francisco and Washington, D.C., most of which were modelled on Baron Haussmann's plan for Paris where series of great diagonals pierced the existing grid with focus on functional and esthetic. The grandeur of his plans, however, necessitated an authoritarian patron to bring it to reality, hence much of his ideas never fully materialized.[23]

Ballooning population in the early 20th century resulted in cities growing vertically. Even though U.S. cities had rapidly expanded horizontally, the core commercial and trading areas remained same. Armed with new technologies, new planners and designers began to think vertically. One of the earliest proponents of skyscrapers was the Beaux-Arts trained Ernest Flagg who advocated for setting back tall buildings from the property line to allow all four sides to remain open to view and access. Flagg, while introducing his Singer Building in New York, notes, "We should soon have a city of towers instead of a city of dismal ravines".[24]

New York's World Fair in 1939-40 marked a defining moment in America's urban history (Fig. 3.B.11). Skyscrapers, such as the art deco styled Chrysler building and the Rockefeller center dominated the urban design landscape of the period as celebrated by Hugh Ferris's renderings of height and density. Another exhibit, General Motors' Futurama, however, painted a future what would later become a reality of American urbanism (Fig. 3.B.12). The display exhibited future cities served by highways and limited-access continental highways that snaked around the countryside.[25] With the decrease in manufacturing costs and government policies that enlarged the network of paved roads, automobile ownership burgeoned.[26] Between 1900 and 1927, America saw an increase of 3000 percent in car ownership. The car was well on its way from upper-crust toy to middle-class necessity.[27] Soon America's urban areas started to be defined by streetcar suburbs and automobiles. The size of average building lots nearly doubled, while residential densities dropped by half. The United States had truly entered the automobile age and was relentless in its search for the American dream.[28]

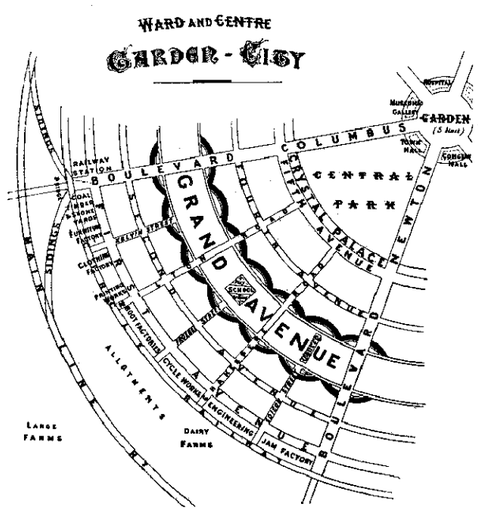


Figure 3.B.7 - Theoretical plan of Garden City Movement

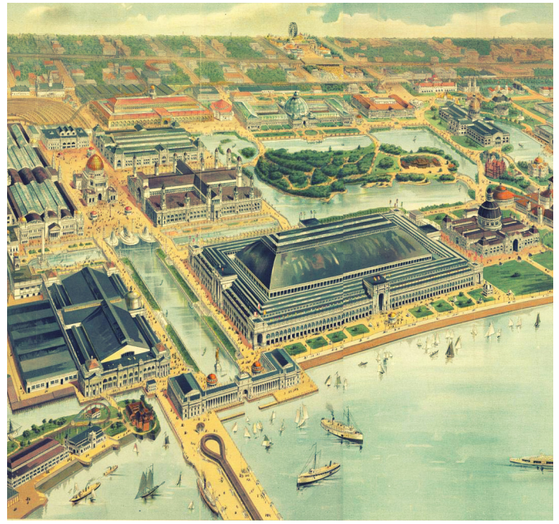


Figure 3.B.10 - City Beautiful Movement at Chicago's World Fair, 1893

Figure 3.B.8 - Forest Hills neighborhood in Queens, New York City

Figure 3.B.11 - The futuristic vision of New York's World Fair, 1939

Figure 3.B.9 - Public life in New York City in late 19th century

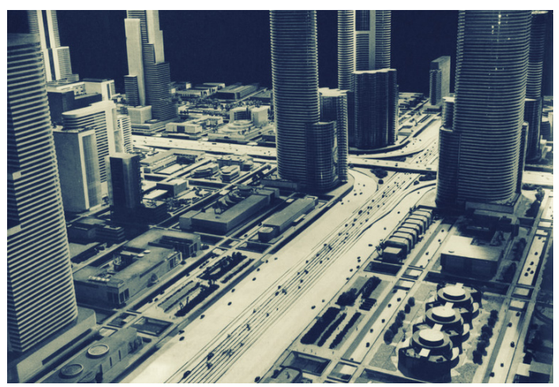


Figure 3.B.12 - The proposed automobile urbanism by General Motors

THE AMERICAN DREAM - the hunger for space and privacy?

The marked changes during the early to mid-20th century period involved explosive growth in cities, both in Europe and America, resulting in varying urban forms such as skyscrapers, suburbs, green belts, middle class transit suburbs and garden cities before regulation of industrial cities started taking over. The decline of industrial cities led to a stage of decentralization that was characterized by multiple features such as the workers' city in Europe and automobile suburbs in America. The rise of suburbia, particularly in America, especially with the mentality *'what's good for General Motors is good for America'* led to the propagation of cities that grow horizontally outward (Fig. 3.B.13).[29] Alan Berger, rightly points out that this horizontal growth has been detrimental in 'management' of the landscape and a direct resultant of the creation of drosscapes.[30] This brings us to the question of whether this rapid urbanization in the form of horizontal growth has a direct link with the creation of underutilized spaces.

The period of the mid-20th century that saw the onset of the automobile age and streetcar suburbs coincided with the advent of the American dream. The roots of this ideology are embedded in opportunity for prosperity and success coupled with an upward social mobility achieved through hard work. However, in urban design terms, it spawned the horizontal expansion of cities and a hunger for privacy and access to space aided by the over-reliance on automobiles. The promoting of the American dream indirectly exacerbated urban sprawl as seen from the magazines of the period. One such was the advocacy of *House Beautiful*, especially during the twenty-year span under the editorship of the crusading Elizabeth Gordon. Her determination in rejecting the followers of International Style, such as Mies van der Rohe and Le Corbusier has been widely documented as being a threat to the American dream.[31] She viewed it as subversive, foreign, autocratic, communist and even fascistic. A 1950 issue of the magazine proclaimed the three big ideas for house design – climate control, privacy and the American style. Her mission was to convert her readers, predominantly middle-class suburban homemakers, to high-middlebrow taste and to extol the virtues of American modernism rooted in specific values and political beliefs.[32] Although the focus of the magazine was directed towards rational design of house and integration with landscape along with adoption of modern techniques of construction, privacy was professed as being the number one requirement.[33] *House Beautiful* famously proclaimed in their October issue from 1952, "you must give your personal expression, your taste, free play – or you will emerge like an end product on an assembly line of canned culture".[34] For Gordon believed, without the privacy there would be no sense of individuality – a core belief of the American independence and freedom.[35] Urban sprawl it seems is not a phenomenon that just happened, rather it is evident from the social climate of the mid-20th century that the search of the ideal American dream directly contributed to the horizontal expansion of cities for the sole aim of having access to space, and more importantly, access to space that is private.[36]

Figure 3.B.13 - Aggressive marketing campaigns to promote car usage

DECODING URBAN SPRAWL

It is hard to define sprawl as a process, but everyone knows that it happens. Professor, urban historian and architect Dolores Hayden comments that "everyone understands that sprawl is politically unfair as well as environmentally unsustainable and a financially shortsighted model of development".[37] However, it should be noted that urban sprawl is a phenomenon, and not a model of development, that has some or all the following characteristics – single-use development, job sprawl, spatial mismatch, low density, conversion of agricultural land to urban use, housing subdivisions, segregated commercial use and an overdependence on automobiles. Hayden sums it up accurately as, "sprawl, as a process of excessive development driven by coalitions of business and political leaders who favor unlimited growth, expresses the values of nineteenth-century town site speculators".[38] Hayden's comments returns the focus back to sprawl as being a costly outcome of how cities were planned in North America. Her work in A Field Guide To Sprawl adds a much needed face and vocabulary to the discourse on urban sprawl as a problem (Fig. 3.B.14). A quick glance at her efforts in characterizing different images of urban and suburban America as being the chief protagonists in the advent of the sprawl process throws light on the scale of the problem.[39]

Planning policies and design considerations are closely linked to each other – what we design is guided by the urban planning policies that have been laid down. Thus, it is imperative to understand that designs are generated within the umbrella of policy considerations, and thereby directly or indirectly lead us to the creation of underutilized spaces. It is to be noted that there is widespread disagreement as to what can be considered to constitute urban sprawl and more importantly how to quantify it. Additionally, opinions are divided across the Atlantic as to whether sprawl is an appropriate term. The European Environment Agency refers to this type of development as 'peri-urbanization'[40] while in America it is being increasingly recognized as 'suburbanization'. However, there is a consensus associated with the characteristics of sprawl – decentralization, discontinuity and segregation.

alligator
asphalt nation
ball pork
big box
boomburb
car glut
category-killer
clustered world
drive-through
duck
edge nodes
export garbage
greenfield
gridlock
ground cover
growth machine
impervious surface
interstate
landfill
leapfrog
litter on a stick
logo building
low density
locally unwanted land use
mall glut
mansion subsidy
manufactured housing
noise wall
ozoner
pod
pork chop lot
power center
power grid
privatopia
putting parsely round
pig
rural slammer
sitcom suburb
snout house
starter castle
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theming
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tract mansion
truck city
valhalla
water feature
zoomburb

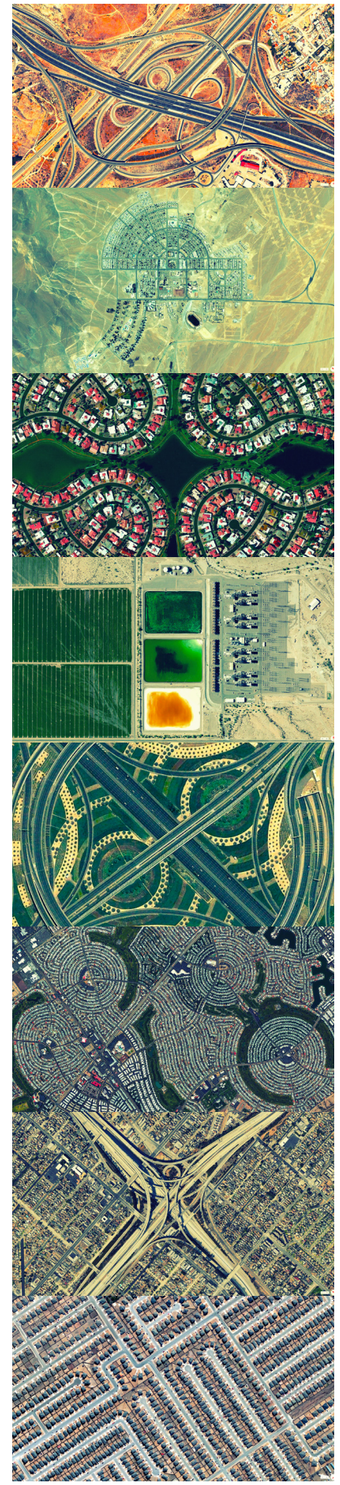

Figure 3.B.14 - The face and vocabulary of urban sprawl

THE MODERN CITY - DECENTRALIZED, DISCONTINUOUS AND SEGREGATED?

New York's World Fair of 1939-40 was a landmark event as it laid out automobile urbanism as the roadmap for future urban design in America. At about the same time European visionaries, such Tony Garnier, Le Corbusier, Walter Gropius were imagining utopian socialist cities, such as Corbusier's Plan Voisin that emphasized the need for urban surgery to reorganize existing cities, as opposed to building new ones.[41] Under the banner of *Congrès internationaux d'architecture moderne* (CIAM) the new urbanism that started in America at this time posited the segregation of land into functional areas – dwelling, work, leisure and circulation.[42] Greatly opposed to both suburbia and street-defining buildings, planners proposed either constructing entirely new cities or what Sigfried Giedion called transforming existing cities through heroic measures. Highways and parkways were thought of as the urban corridors with clearly legible segregation of traffic and buildings to be kept apart from each other to provide for parks and open spaces.[43] (It should be noted here that open spaces would end up being parking lots in large numbers in the future) At the same time growing concerns related to congestion and safety of citizens due to rising population and density led to planners, such as Harvard University's Department of Regional Planning chairman William Wheaton to outline a national policy for dispersing urban centers across the landscape.[44] Such planning measures, even though noble, played right into the hands of the burgeoning and increasingly powerful auto-industry. The creation of the Interstate Highway system in the 1950s not only promoted the use of automobiles but also started to stretch the urban centers far apart. Almost all plans from the mid-20th century had to deal with automobiles in innovative ways. The principal problem involved how to capture and store the car so that people could walk and civically engage in fully pedestrian environments.[45] It was becoming apparent that automobile urbanism that defined the American modern city was leading to decentralized urban centers discontinuous from one another and a life that was becoming over-reliant on automobiles.

DEINDUSTRIALIZATION AND CREATION OF THE 'LOST SPACE'

Closely linked with automobile urbanism was the era of industrialization in American cities and the growth of factory towns. However, employment in manufacturing had dropped remarkably by the turn of the 20th century, not just in the United States but also in Europe. This phenomenon has been widely referred to as 'deindustrialization'. This phenomenon marks an important phase in urban development as it gave rise to multiple post-industrial sites and set forth a trend of physical and economic repercussions for future development. Many commentators regard deindustrialization as an alarming trend that contributes to high unemployment rate by showing a faster growth of productivity in manufacturing than in the service sector. However, it could also be translated as signs of an evolutionary development. Economists Robert Rowthorn and Ramana Ramanaswamy point out that industrialized zones have just become more efficient. They argue that deindustrialization is not a negative phenomenon, but as a natural consequence of successful economic development in advanced economies; a state of deindustrialization means the economy is ready for the next step of progression.[46] This progression can be broken down in four economic sectors. The primary sector involves harvesting raw materials in the new world. The secondary sector involves manufacturing of goods. The tertiary sector encompasses the service economy (retail, transportation, entertainment, media, banking, insurance, etc.). Finally, the fourth involves is a derivative of service sector that includes, culture, government, scientific research, information technology, etc. Theoretically, as one nation develops it masters one sector before moving onto another, always with the progression of economic stability in mind.[47]

This economic progression, per noted urban designer and educator Roger Trancik, has been translated physically onto the American landscape in the form of post-industrial sites. The previously vast urbanized terrain has now been populated with seas of parking lots, vacant stretches of land alongside roadways, warehouse districts with blocks of used and unused

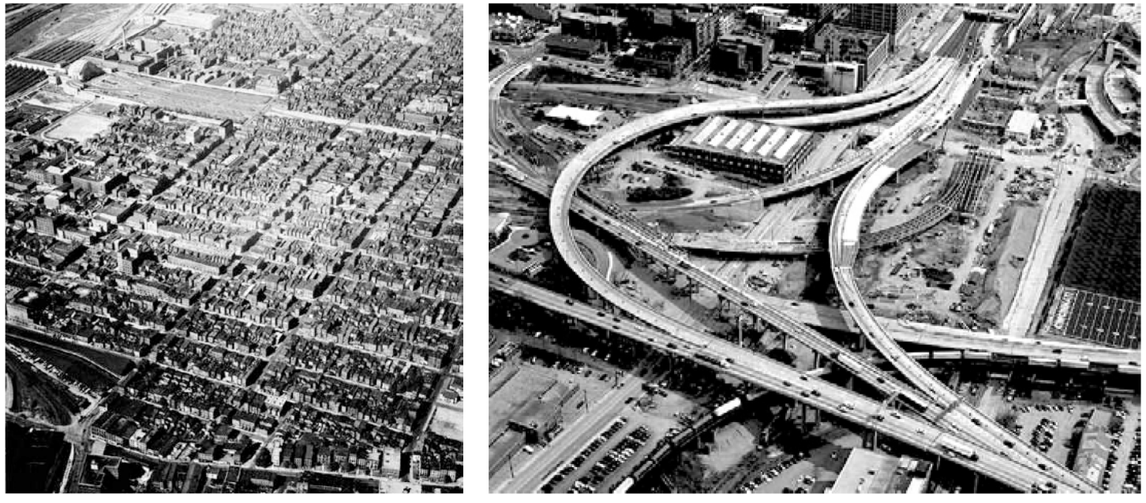

Figure 3.B.15 - Before and after images of Queens, New York showing highways constructed by removing low-income houses

buildings, and buildings as objects surrounded by dreary abysses. The exodus of activity from all these places is the resultant of multiple reasons. Trancik terms these spaces as anti-space or lost spaces that leads to a socially and spatially disconnected environment in our urban areas. He adds that there are five distinct factors that can be attributed to the creation of these spaces. The first contributor to this phenomenon was the automobile. With the Interstate Highway Act coming into effect in the mid-20th century, highways and parkways began to carve up the American landscape and re-shaped the organization of the cities. This led to the decentralization and segregation of cities. The second is the modern movement in architecture that contributed to the creation of a hostile environment full of freestanding buildings. The third was zoning laws and urban renewal projects that even though were well intentioned deteriorated the spatial and social connectivity of cities without taking into much considerations the needs of the human. Trancik blames the privatization of corporate America and their ideology of American individualism that has bred consumerism rather than an attempt to fit in with the context. Finally, the last cause can be attributed to the changing land use of the inner city. The relocation of industry, obsolete transportation facilities, abandoned military properties, and vacated commercial and residential buildings have created vast areas of underused spaces through the urban fabric.[48] The urban fabric has become so fractured in the 21st century that the void spaces have become prominent lying among the existing fragments of the past, a culmination of years of neglect and transition.

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"Perhaps the real significance of transport is that it restructures the economy, which may or may not lead to enhanced growth" – Roger Vickerman

3_LITERATURE REVIEW

C_REACTIONS TO THE VACANCY AND SPRAWL

This chapter looks at the shifts from automobile urbanism to mass-transit usage, especially transit-oriented developments and their benefits before discussing the potentials of light rail transit systems in the context of economic progress, increased density and reducing traffic congestion. Transit-oriented developments has been presented in this section predominantly under the premise of being a counter-measure to urban sprawl, which in turn can potentially influence the creation of underutilized spaces.

AUTOMOBILE URBANISM AS THE AMERICAN PLANNING POLICY?

Automobiles have heavily influenced how a daily American live their life since the modern era, which comes as no surprise looking at the public policy on automobiles. Historically, public policies have shown an inclination towards automobiles through government subsidies and tax reliefs. This has spawned the increase in car ownership, which even though provides personal convenience comes at the cost of economic and health detriments; in some ways, can also be considered a direct contributor to the creation of these underutilized spaces. Urban developments fashioned around the car tend to consume large parcels of land at low densities and tend to stretch urban areas far apart from each other. American architect and urban planner Andrés Duany points out that government subsidies on highways and parking alone amounts to 8-10% of the national gross national product (GDP). In effect, this entails that costs of driving a car are borne by everyone, not just the drivers but also people who are too old or too young to drive, or poor enough to even own a car.[1] This comes as no surprise if one looks at the historical trajectory of highways in the United States, especially around the modern era.

This brings into focus the work of Robert Moses, noted city planner and administrator who operated in the mid-20th century in the New York metropolitan area who became synonymous with highways (Fig. 3.C.1). Moses with the help of landscape architects such as Gilmore Clarke started building recreational routes and access roads within parks in the hope of garnering public approval and political support (Fig. 3.C.2).[2] To finance such projects, he built tollbooths and stand-alone government agencies to bypass the political machinery thereby allowing him to build, own, operate and maintain new facilities. This was indeed a boon for elected government officials as these freestanding agencies allowed construction of major public works projects during the Great Depression with little or no outlay and more importantly at no cost to the public budget.[3] Moses was criticized for his bipartisan approach towards the poorer (and often people of color) sections of the society from using his transportation network as well as for excluding mass transit facilities from his projects.[4] Nevertheless, with the adoption of the Federal Aid Highway Act of 1956 that begun the construction of the Interstate Highway System, new and huge amounts of funding became available. Not only highways that were constructed were to be functional, but also safer and faster as well as having a higher capacity than the parkways that Moses was constructing (Fig. 3.C.3). To his credit, Moses adapted to the changing policies and facilitated the construction of numerous highways in the New York metropolitan area at a rapid and efficient rate allowing New York to adapt to the modern times and the auto age but at the cost of exacerbating suburbanization and undermining the long-term sustainability of the city's core.[5] It is worth noting that despite Moses's extraordinary effectiveness New York City remains one of the least auto-dependent city in the country in the 21st century and boasts an excellent mass-transit system.[6] However, it should also be noted here that the recent Federal Highway Administration policies in the 21st century have been revised in a manner that promotes infrastructure for multi-modal transportation systems, including walking, bicycling and transit ridership that are integrated with existing (or new) vehicular roads.[7]

> *You can draw any kind of picture you want on a clean slate and indulge your every whim in the wilderness in laying out a New Delhi, Canberra, or Brasilia, but when you operate in an overbuilt metropolis, you have to hack your way with a meat ax.*
> **Robert Moses**

Figure 3.C.1 - Robert Moses

Figure 3.C.2 - Parkway system in New York State in the 1950s

Figure 3.C.3 - Interstate Highway System that was implemented in 1950s

SHIFTING AWAY FROM AUTOMOBILE URBANISM

The car remains an important component of the American Dream, whether in America itself or beyond, a symbol of upward social mobility, personal wealth and class. American sociologist Kent P. Schwirian points out that the automobile continues to symbolize socio-economic progress in developing countries, whether for an individual or for the population in general (Fig. 3.C.4).[8] However, there has been a gradual shift from automobiles to alternative modes of transportation towards the end of the 20th century. Bicycles have been suggested as the changing face of transportation in many countries, particularly in northern Europe, where most people tend to walk or bike to work, shop or for recreation. The popularity of bicycles emanates from its ability to act as a potential tool for social interaction in increasingly fractured and multi-cultured societies but also provides a healthy alternative to driving cars (Fig. 3.C.5). Buses have also proven to be a better alternative to automobiles for social interactions, faster transport and reduce the exertions on an increasingly fragile natural environment (Fig. 3.C.6). Many cities have adopted streetcars or light rail transit infrastructures because they not only perform similar functions as buses, but also provides a larger capacity to move people from one place to another (Fig. 3.C.7). The projected efficiency and benefits of such transit infrastructure in guiding urban development (transit-oriented developments or TODs) [along with propensity for multi-modal transportation networks] have thus become the main apparatus of New Urbanism[9] in the 21st century.

It is pertinent to understand whether future investments for developing the infrastructure for these alternative modes of transportation meets the needs of the users and whether they will need them. In 1994, the U.S. Department of Transportation (USDOT) released the National Bicycle and Walking Study (NBWS) to better comprehend what would ideally motivate people to switch from automobiles to these alternative modes.[10] Recent studies suggest that public attitude, city size, density, cost of gasoline, income, climate and existing infrastructure are key factors in determining whether there is sufficient

proof to switch to an aggressive spending on alternative modes.[11] Research suggests that one of these alternative modes, bicycling is predominantly considered a recreational activity and the top four cities in the U.S. in terms of bicycle commuting are college towns – Boulder (CO), Eugene (OR), Gainesville (FL) and Madison (WI).[12] Climate (particularly rain) has also proven to be a significant deterrent for bicycle commuting.[13] However, it should be noted that recent findings suggest that U.S. cities with a well-developed bike infrastructure and higher average state spending per capita on bike facilities tend to develop a higher percentage of bicycle commuters. Cities such as Sacramento, Minneapolis and Portland have shown that if there is an infrastructure in place then people will use them.[14] The debate on whether government funds should be allocated for infrastructures for alternative modes of transportation brings to focus the case of Copenhagen, Denmark. For all the health benefits, cycling affords a series of other important features as evident from Copenhagen, a city with a fully functioning, well-maintained and ever-expanding infrastructure. Surveys suggest that it is the fastest mode of transportation, requires less space, provides a sense of security and safety and builds on an already established cultural ethos. This has been possible because huge investments have been made into bringing that into fruition [DKK 1bn or $140mn has been spent since 2005] that also complements the overwhelmingly positive reaction from the citizens.[15] Studies thus show that there is a positive correlation between investments into infrastructures for these alternative modes of transportation and their popularity (or usage) among users. However, it should be noted that transforming American cities using the same techniques as Copenhagen is not possible especially with cities here being predominantly afflicted by horizontal growth or sprawl (Fig. 3.C.8).

Considering such alternative modes of transportation, it should be noted that the shifting socio-demographics of a nation like the United States needs to be taken into consideration. Many recent immigrants from Latin America, the Caribbean, eastern Africa, southeast Asia and the Indian subcontinent bring with them a culture and heritage more receptive of small-scale, demand-responsive modes of transport such as private vans, micro-buses and transit (Fig. 3.C.9).[16] The argument is not for providing for immigrants, but to assert that lessons can be learned from cultures abroad in implementing compact, mixed-use neighborhoods within a convenient reach of public transport.[17] This is important because majority of office spaces in most U.S. cities are outside the traditional downtowns resulting in many low-income inner-city residents to reverse-commute via public transit, especially in cities such as Los Angeles.[18] The shift away from automobile urbanism is not an easy task as other modes of transport cannot provide the flexibility and privacy that a car can provide, especially in a country built along those lines. Nevertheless, as growth continues to spread out, there is a widening mismatch between geography of commuting and the geometry of traditional transportation networks.[19] It is thus, necessary to implement an approach geared towards integrated transport and urbanism as a way of community-building.

> *There is one rule for the industrialist and that is: make the best quality goods possible at the lowest cost possible, paying the highest wages possible*
> **Henry Ford**

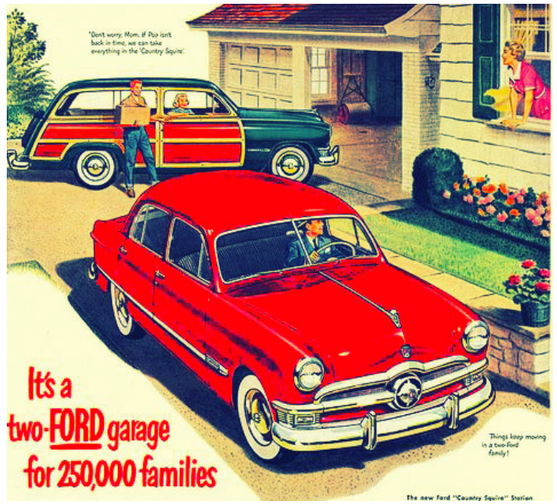

Figure 3.C.4 - Car as a marketable commodity in the mid-20th century

Figure 3.C.7 - A hugely successful light rail system in Denver, CO

Figure 3.C.5 - Protected bike lanes in San Francisco, CA

Figure 3.C.8 - Cycling as a way of life in Copenhagen, Denmark

Figure 3.C.6 - A thriving bus network in Seattle, WA

Figure 3.C.9 - Popular micro-bus network in Mexico City

TRANSIT-ORIENTED DEVELOPMENTS

Emerging theories on 21st century urban development has spawned into multiple forms of urbanism that does not intend to create wholesome cities like 19th and 20th century town planners. Rather the approach has been fractured into multiple bits and parts, each of which tackle different socio-economic problems contextual to a region. With ballooning population in all parts of the world, re-thinking of urban development around the existing transport infrastructures has proven to be one of the most widely advocated theories. Transit-oriented developments or TODs have thus become one of the leading development tools to 'manage the land' to create vibrant, livable, dense and sustainable communities by implementing a comprehensive system that incorporates compact, walkable, pedestrian-oriented, mixed-use communities centered around high quality train systems with an overarching goal of reducing dependency on automobiles while promoting healthy living.[20] Public transportation in the US have undergone major shifts, especially after the Second World War when annual passenger trips across the trip fell by 69% between 1945-75, while private car ownership rapidly increased. State and local expenditures between 1975-2005 rose from $3.2bn to $22.8bn, but total annual passenger trips rose from 8bn to 9.5bn in the same period.[21] This clearly highlights the challenges facing the public transportation system in the US. The following sections explore the different characteristics of TODs in 21st century and outline some of their benefits before attempting to address why public transportation still lacks popularity despite steady investments from state and local governments.

CHARACTERISTICS

The chief concern of transit-oriented developments is to prioritize walkable design around a prominent train station that can also serve as a town center. This train station acts as a regional node containing a mixture of uses in close proximity such as office, residential, civic, etc. and other specialized retail such as cafes, groceries, dry cleaners thereby providing a dense walkable district within a 10-minute radius of the station. Additional considering is given towards accommodating other modes of transportation, such as buses, light rail, bicycles as well as considerable parking (esp. for bicycles) (Fig. 3.C.10).[22]

WHY ARE THEY BECOMING COMMONPLACE?

There are a many factors that contribute to the adoption of TODs as a model of development in 21st century America. A rapidly growing trend of traffic congestion and two-hour commutes in most metropolitan areas around the country has been cited as the chief reason for TODs coming into fashion. Attempts to solve the congestion and commute problems by constructing more highways have inadvertently led to more sprawl and more suburban towns. This has led to an increasing distaste for suburban living and created a growing desire for quality urban living including walkable lifestyles. Changes in family structure and rise in young people living on their own and adopting a 'sustainable' way of living have all contributed towards the popularity of transit-oriented developments as the new means of urban development.[23]

BENEFITS

Surveys conducted by the Transit-Oriented Development Institute, based out of Washington, D.C. suggests that TODs provide a wide range of benefits from lifestyle to environmental to economic. One of the chief benefits has been the reduced dependence on driving by allowing the residents to live, work and play in the same area. This has reduced the carbon footprint of that area and lessened the general impact on the environment. 'Sustainable' living has allowed those areas to develop by providing greater consumer choices, better access between urban and suburban areas, stimulated local jobs, greater access to entertainment and other recreational activities and revitalized the overall character or image of areas that are served by the transit-oriented developments.[24] Various studies have also shown that property prices (both commercial and residential) around TODs are significantly higher closer to the stations and decreases as one moves away from the main transit hub, however, it also depends on target markets and the kind of transit option (whether commuter rail or light rail). Hence, these studies give an indication of the importance of TODs in urban development in the 21st century.[25]

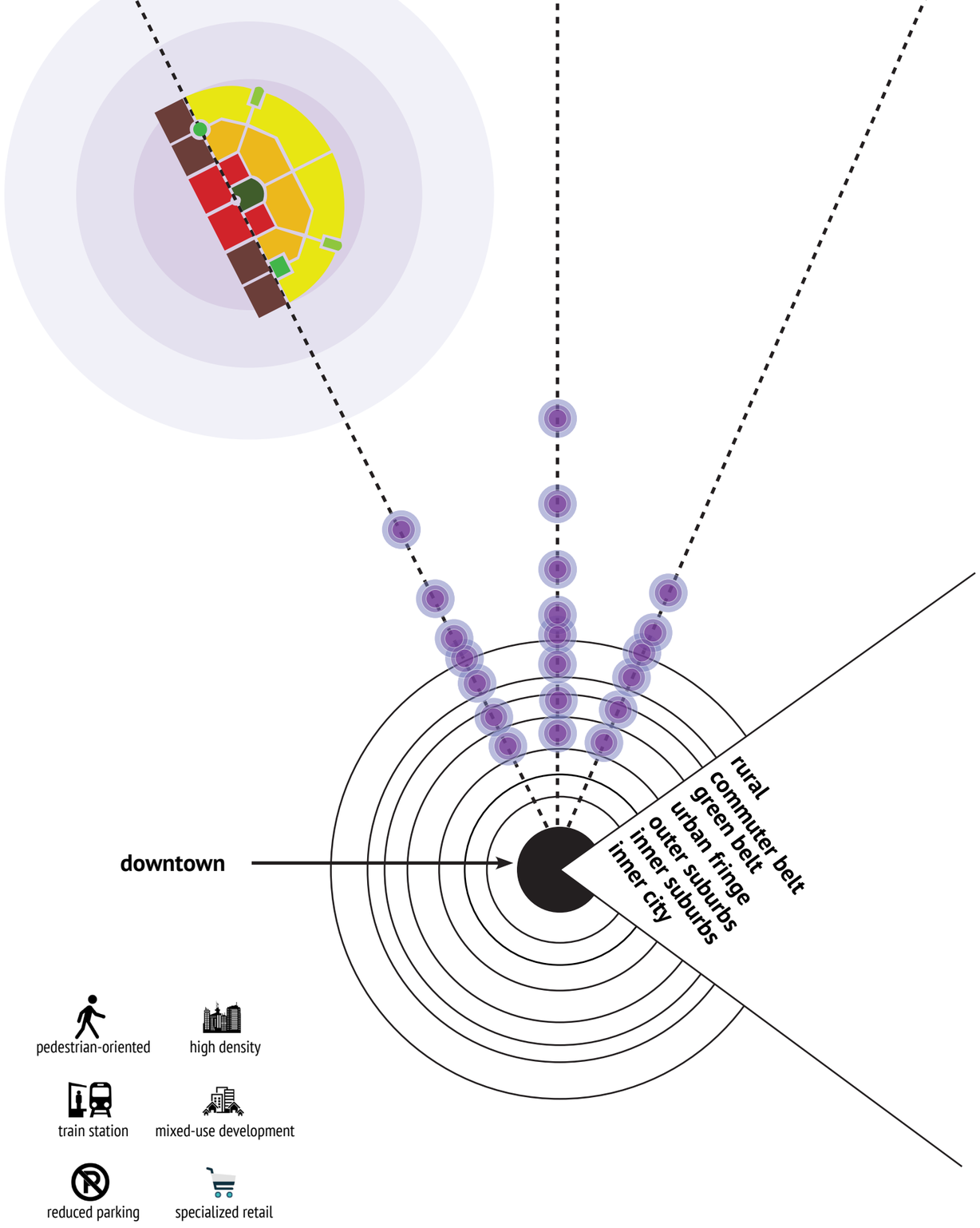

Figure 3.C.10 - Model illustrating how TOD operates on the scale of a city and at a smaller scale around transit in terms of higher density and mixed-use

MAKING A CASE FOR TRANSIT AS AN ALTERNATIVE TO AUTOMOBILE USE

TODs have ostensibly used as a counter-measure to curb urban sprawl and thus transit has been mooted as the logical alternative to use of the automobile. However, does compact development have a positive influence in curbing automobile usage? Mark R. Stevens, professor of planning at the University of British Columbia, comments that evidence from various empirical research provides no conclusive proof that compact development has a direct influence whether people drive less. Stevens cautions that planners should probably assume for now that compact development will only have a limited influence on driving rather than taking an aggressive approach towards advocating for such developments.[26] This contrasts with previous meta-analytical studies conducted that suggest that all types of D-variables (density, diversity, design, destination accessibility, distance to transit and demographics) have statistically significant effect on vehicles miles travelled.[27] Similarly, researchers also point out that even though there is lack of conclusive studies that make a compelling case for TODs an alternative to automobile use, to suggest that compact development will have only minimal influence on driving is too far-fetched.[28]

To understand the impacts the rail transit it is essential to consider projects that have been successful rather than focusing on projects that have potential as in North America. Rail transit projects have shown great demand in Asian cities, with robust population and demand for public transport as well as in European cities where both government policy and public demand have gradually leaned onto mass public transit. Studies on four light rail projects in central England (which opened between 1992-2000) by planners Shin Lee and Martyn Senior of Cardiff University (2013) provide a better understanding into this topic. Using census data from 1991 and 2001 the study considered light rail investments and its impacts on car ownership and usage of alternative modes of transportation through the Greater Manchester Metrolink Phase 1 (1992), South Yorkshire Supertram in Sheffield (1994), Midland Metro between Birmingham and Wolverhampton (1999) and the Croydon Tramlink (2000) (Fig.3.C.11).[29] Data gathered on passenger journeys up to 2009 suggest that except the Midland Metro, all the other three have shown gradual increase in passenger count year-on-year. The Croydon Tramlink interestingly showed major rise in usage, from 15.0million in 2000 to 27.2million, while at the same time showed car ownership increased at the slowest area in their associated control areas. Percentage of worker household with no cars has, however, decreased during this period.[30] Evidence also indicates that this rise in passenger count on light rail has coincided with drop in bus trips suggesting that light rail has had a greater impact on bus journeys than on automobile use.[31] Thus, it can be safely concluded that light rail services can influence car use, either directly by reducing car ownership or at least restrain its growth in the control areas. So, are there lessons that can be extracted from the British example to be applied in an American context?

Figure 3.C.11 (from top to bottom) - Greater Manchester Metrolink, South Yorkshire Supertram in Sheffield and Croydon Tramlink

HISTORY OF LIGHT RAIL TRANSIT IN THE UNITED STATES

Many cities around the world have begun taking aggressive measures to implement transit-oriented developments and incorporate them into future planning considerations and urban developments. The needs and demand of TODs vary from one city to another, hence some cities opt for commuter rail systems or light rail systems or street-level streetcars. The focus of this thesis is however, centered around light rail systems. This section examines the historical trajectory of the light rail system in the United States that started to take off in the post-World War years but faded after the 1970s, with few new systems being implemented and only a handful managing to remain fully operational, largely due to the result of the government policies and funding that were not geared towards the sustenance of light rail systems. Light rail is defined as a range of rail transit between basic city streetcars and high-capacity rapid transit lines. A versatile mode of transportation that has since been implemented on city street medians, railroad alignments and subways.[32] The American transportation research board (TRB) defines light rail as "Light rail transit is a metropolitan electric railway system characterized by its ability to operate single cars or short trains along exclusive rights-of-way at ground level, on aerial structures, in subways or, occasionally, in streets, and to board and discharge passengers at track or car-floor level." [33]

Rail transit systems have their origins in the 19th century horse-drawn street railways. However, it was the invention of the cable car in 1873 by Andrew Hallidie on Clay Street in San Francisco where the cable running underneath the street running between rails were used to run the cable car (Fig. 3.C.12). In 1888, American naval officer and engineer Frank Julian Sprague improvised the motors and gear designs for streetcars developed by Charles Van Depoele that collected electricity from overhead lines. The first successful instalment of streetcars was in Richmond, Virginia in 1888 (Fig. 3.C.13).[34] Urban historians note that the impact of the streetcar was like the automobile urbanism in the mid-20th century by allowing people to live away from commercial cores without spending too much money and time in commuting.[35] While working on control of elevators is skyscrapers Sprague furthered developed multi-unit control, which in combination with electric traction allowed underground subways to develop in cities such as Chicago, Philadelphia, Boston and more importantly New York (Fig. 3.C.14). Another byproduct, the electric interurban railway allowed faster commuting options thereby contributing heavily to the earliest form of suburbs.

The Depression era marked a radical shift in the history of transit ridership. By 1946, only a few streetcars were in operation across the country. Most were either abandoned or converted into bus lines. This change was largely due to the changing lifestyle as people moved to the suburbs in search for better amenities which was closely followed by offices and industries thereby leading to sharp drop in population in many cities. Travel patterns also contributed to this change as automobile ownership rapidly increased aided with the implementation of the Interstate Highway System and changing attitudes of public agencies towards street railways. Growing traffic congestion due to the peak in automobile usage necessitated street improvements and streetcars were seen as an obstacle rather than a solution to alleviate these problems by the 1970s.

Although the light rail traces its roots to the interurban railways of the 19th century, it had largely fallen out of favor by the 1970s in America. Europe, particularly Germany and the Netherlands, after the World Wars saw it as an evolutionary convergence of the streetcar and interurban railways and adopted them as stopgap measures before cities can afford rapid transit. The second generation of rail that survived into the 1970s was the mass-produced Presidents' Conference Committee (PCC) car that proved to be competitive with the automobile (Fig. 3.C.15). By 1978 the light-rail concept had entered the urban design vocabulary in North America, particularly with the opening of a light-rail line in Edmonton, Alberta in Canada (Fig. 3.C.16). Fashioned on the PCC car, the third and current

generation of light-rail vehicle (LRV) improvised greatly on rider comfort through larger windows and better interior lighting. Nevertheless, the popularity of light-rail transit has largely been low until becoming one of the key cogs in transit-oriented developments.

This rise in importance and popularity of light-rail transit has been explored by eminent transportation and planning consultants Herbert Levinson along with John Allen and the late William Hoey where they posit that light-rail systems in the United States can be divided into three categories – abandoned, surviving and revived. The following paragraphs will look at each category to assess what were some of the challenges they faced and gauge the importance of the surviving and revived ones.

ABANDONED

Most of the light rails were built between 1910s and 1930s during the Depression era and even though were meant to connect outlying areas with the downtowns they failed to develop sufficient ridership. Shortly after the World War a lot of the light rail systems, which were predominantly privately owned saw public takeover of these companies and were soon abandoned. Two of them, one in Milwaukee, WI and Rochester, NY were reused for major urban freeways but many of them remained unused. Levinson et al notes that even though some of them were excellently engineered they were in poor competitive positions as compared to the automobile, such as Oakland's Key System in the east San Francisco Bay area (Fig. 3.C.17).[42]

SURVIVING

Light rails in bigger cities that went through phases of population growth, city size, downtown employment densities, traffic congestion, etc. survived abandonment, such as in Boston, Philadelphia and San Francisco. Another key reason was the government (and sometimes federal) initiatives taken to market these light rails as distinct from other modes of transportation and more akin to rapid transit as well as solutions to alleviate traffic congestions. This is evident from the case of Boston which ran twelve lines at its peak in the early 20th century before the numbers dwindled to the existing four. However, one of them, the Green Line is considered one of the most complex light-rail operations in the country and carries more than many rapid transit lines (Fig. 3.C.18).[43] Similarly, Philadelphia extended its light rail system in 1955 and currently operates five routes almost entirely in mixed traffic.[44] San Francisco on the other hand kept streetcars (Municipal Railway or MUNI) on five of its busiest routes (Fig. 3.C.19) and essentially constructed the more modern Bay Area Rapid Transit (BART) either parallel (underground) or ensured the streetcars met BART stations at important transit junctions. Similar routes in Cleveland, Pittsburgh and Newark have survived predominantly due to public policy decisions by integrating them with publicly-owned transit system and continued modernization of the infrastructure. [45]

Figure 3.C.12 - First cable car on Clay Street, San Francisco

Figure 3.C.13 - First successful streetcar in Richmond, VA

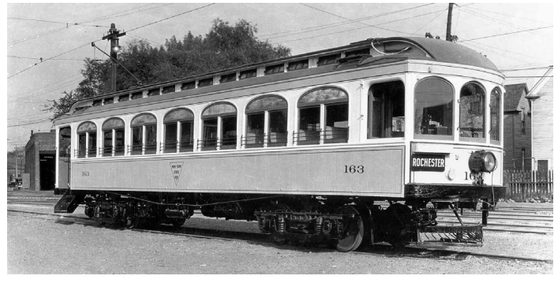

Figure 3.C.14 - Interurban railway in New York state

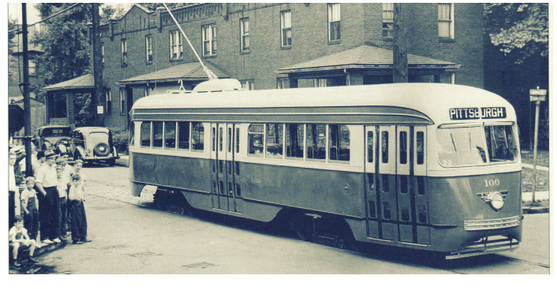

Figure 3.C.15 - A PCC car on the streets of Pittsburgh, PA

Figure 3.C.16 - One of the earliest modern day light rail in Edmonton

Figure 3.C.17 - The now abandoned Key System in Oakland, CA

Figure 3.C.18 - Boston's Green Line, considered the most complex system

Figure 3.C.19 - Old streetcars still in operation in San Francisco, CA

REVIVED

Several of the modern light rail used in major cities have been revived from previous interurban electric rail rights-of-way, such Portland's MAX, Baltimore's Central Light Rail and Los Angeles' Blue Line. Much of this is owed to the fact that these interurban rail lines were abandoned post-World War years and efforts to implement an all-bus transit system were met with average ridership and increasing demand for alternative modes of transportation.[46]

The work of Levinson et al suggests that there have been multiple factors for light rail systems to be abandoned, revived and still surviving. Public attitude towards the value and transit in fostering a healthy urban lifestyle (as in Portland), federal financial support for upgrading and/or extending systems along with large regional populations, strong downtowns, transit-supporting land development around stations (TODs) have been the chief reasons for the popularity of light rail systems or the lack of it.[47]

IS DENSER BETTER ?

The literature revolving around TODs indicate a better and sustainable form of living can be achieved through their implementation through a dense, mixed-use platform of development focused around a transit node that also decreases auto-dependency, traffic congestion, oil-dependency, climate change and rein in urban sprawl. However, is density the answer to solving all these problems? The following sections takes a critical look at this issue of density in the larger context of transit-oriented development to shed light on the topic.

Studies have shown that vehicle miles travelled (VMT) and vehicle trips (VT) are closely linked with traffic safety, air quality, energy consumption, climate change and other social costs of automobile use. At the same time, walking and transit use (it is assumed that transit use involves some measure of walking) have the potential to alleviate some of these problems by engendering mobility, better livability, social justice and improving public health thereby greatly impacting the built environment.[48] Extensive research conducted by Reid Ewing and Robert Cervero (professors of city planning and transportation systems at the University of Utah, Salt Lake City and at University of California, Berkeley, respectively) notes that residential self-selection and travel pattern, primarily walking is closely linked with the effects on the built environment. Similar empirical research shows that nearly 40-70% effects on built environment are closely aligned with better walking infrastructure.[49]

A meta-analysis study[50] performed by Ewing and Cervero (2010) based on over 200 studies that relate to travel and built environment by considering density, diversity, design, destination accessibility, distance to transit and demographics as variables show that destination accessibility is the most strongly associated variable with built environment and density shows the weakest association.[51] This contradicts conventional wisdom that says that population density is the chief factor in controlling or moderating VMT. Their study shows that density is an intermediate variable that usually supports the other variables and does not form the basis of better built environments.[52] This may be true for American cities, but studies on European cities suggest that residential densities in light rail corridors have a stronger impact on car ownership due to increased accessibility to such light rail services.[53]

ECONOMIC PROGRESS THROUGH TRANSIT-ORIENTED DEVELOPMENTS

Historically economic progress was closely tied to advances in the agrarian economy and development of rural areas. Hyper-urbanization, however, has led to the stagnation of the agrarian-based economy by draining the human capital in the rural areas. Mahatma Gandhi and Mao Zedong shared a common distrust for large cities and often advocated for rural-based development.[54] 21st century economics has, however, developed multiple ways of economic progress, much of which is tied with advancement in urban areas. French economist Rémy Prud'homme suggests that in the new century the urban form and mobility characteristics in metropolitan areas have a major bearing on economic performance. More specifically, size of urban area, proximity of co-dependent activities, commuting speeds, well-functioning transportation systems and good housing seems to provide better economic advantages.[55] Rapid economic growth, however, leads to freeways that are more crowded across metropolitan areas.[56] There are numerous economic impacts of TODs, as highlighted by the study on New Jersey's River Line and its impact on home appreciation value. The study found out that smaller houses and lower-income areas are more likely to benefit from TODs, and increased lower-cost housing could intensify the benefit. However, economic effects on larger houses in the zone of influence have been low. This reinforces the notion that when choosing transit alignments planners should always evaluate the nearby housing stock and neighborhood and developable parcels and zoning constraints.[57]

With shrinking fiscal resources and soaring capital expenditures, aggressive expenditures into rail transit infrastructure will not only yield under-appreciated environmental and societal benefits in the long run, but reduce carbon emissions and reduced dependency on foreign oil supplies. Nevertheless, to yield appreciable dividends there must a close alignment of transit investments and urban development patterns, which till now has been linked with roadway infrastructure. Success in transit-oriented developments requires pro-active government involvement and a coordinated land-use policy. Future developments should also be closely linked with surrounding job opportunities and population densities. Because otherwise the full impact of TODs will be restricted and will, only yield limited environmental, societal and economic benefits (Fig. 3.C.20).[58] European commentators on light rail transit echoes the sentiments of their American counterparts. Hans De Bruijn and Wijnand Veeneman, professors at the Delft University of Technology in the Netherlands through their work on 15 light rail projects, both successful and abandoned highlight the importance of governance and regulation in LRT infrastructure. Most projects begin with a goal-oriented approach, which although is successful in smaller projects, highly complex transit infrastructure rarely achieve similar success leading to constitutional delays and cost overruns thereby loses political and public appeal leading to a switch to the easy solution of bus-based systems as seen from the Dutch example.[59]

Figure 3.C.20 - Visuals of projected Transit-oriented Developments

LESSONS IN LAND-USE INTEGRATION IN DENVER, COLORADO: A CASE STUDY

Considered one of the best places to live in the USA, the city of Denver, Colorado sitting at the foothills of the Rocky Mountains is at the forefront of mass regional rail transit system through major alterations to its land use and urban form through transit-oriented developments. Aptly called FasTracks, an ambitious program was approved by regional voters in 2004 for regional land use and transit development and not just a transit program. Much of this case study is explored through the lens of *'The reshaping of land use and urban form in Denver through transit-oriented development (2010)'* by urban geographers Keith Ratner and Andrew Goetz.[60] Ratner and Goetz conducted their study through accessibility-based analysis to understand land use patterns that aims to address less distance travelled and consideration of telecommunications technologies as a substitute for travel.[61] It should be noted that Denver's last streetcar ran in 1950 (Fig. 3.C.21), before only being revived in 1994 on a 5.3-mile stretch (Fig. 3.C.22). Subsequent strong numbers in passenger count has paved the way for the 157-mile expansion through FasTracks (Fig. 3.C.23).[62] This come amidst the 2010 report of Commuter Survey that highlight that the percentage of commuters driving alone in the Denver-Aurora-Lakewood MSA is lower than the national average and transit users is over the national average, indicative trends that point towards potential towards mass transit infrastructure.[63] Their findings indicate that transit zones in Denver have a greater population and household density than the entire Denver transit region and all stations are experiencing major office developments to serve these population – developing a culture where live/work/play are in close proximity.[64] This is clear from the longitudinal study carried out by Ratner and Goetz on land-use patterns between 2000-09. Regional office developments around a TOD has risen from 15% in 2002 to 60% in 2009, with over 90% in downtown Denver alone. In the same period, residential development around TODs increased from 9% to 65%, which is remarkable considering that new residential development declined in the region. Retail development has however, not followed such an upward trajectory, from 11% in 2000 it rose to 33.22% in 2006, before drastically falling to 4.7% in the next year before rising back up to 21.28% and 18.66% in the following years before dropping down to a low of 0.98% in 2010. This fluctuation has largely been due to the opening of large retail centers.[65]

Like all American cities, Denver is no exception to the automobile urbanism that afflicted the country and urban development pattern in the city reflect the decentralized urban sprawl so commonly associated with the car. However, the re-introduction of the light rail in 1994 has evidently greatly affected the urban growth in the city and the region. Although initial investments focused on the Central Corridor serving the downtown areas, this study highlights the importance of TOD to overall development of the region. In 2009, 65.65% regional residential development, 59.98% regional office development and 18.66% of the regional retail development was in TOD.[66] The implementation of the ambitious FasTracks project is projected to build on the initial success of the transit system. While Denver remains a relatively low-density city still heavily reliant on the automobile and highway transportation, regional (not just city) policy encouraging more transit and high-density TOD has garnered public and political support and is having a recognizable effect on the culture, land use and urban form of the city (Fig. 3.C.24).[67]

Additional research conducted by Andrew Goetz with Sutapa Bhattacharjee at the University of Denver attempts to understand the impact of light rail on traffic congestion. Although this study is restricted to the Denver metropolitan area, using data from vehicle miles travelled, (VMT) obtained from Annual Average Daily Traffic (AADT) counts and length of road segments over a period between 1992-2008 on highways it provides a temporal and spatial analysis on traffic spread in the city.[68] Their findings indicate that traffic has increased in this period; however, the increase is higher outside the zone of influence of light rail than within it. Spatial analysis reveals that traffic has increased more along the interstate highways and parts of the beltway both within and outside the rail influence.[69] The study clearly points out that though total traffic volume has increased in the city, the three light rail corridors have shown a combined impact on mitigating traffic congestion. The rate of increase in the zone of influence has increased by 31% as compared to 41% outside the zone influence. Although there is no guarantee that the implementation of the FasTracks project will show even greater impact, evidence from the existing light rail infrastructure is encouraging for the robust program that the city has taken on in reducing traffic congestion and concentrating growth.

Figure 3.C.21 - One of the last streetcars in Denver

Figure 3.C.23 - Map of Denver's ambitious FasTracks project

Figure 3.C.22 - Multi-modal transport system in Denver today

Figure 3.C.24 - The newly renovated Union Station in Denver

WHAT DOES THE FUTURE HOLD FOR TRANSIT-ORIENTED DEVELOPMENTS ?

Transit-oriented developments have proven to be a better alternative to automobile urbanism, but is decreased auto-dependency the sole concern or are there other means that can aid in the evolutionary trajectory of such developments? How can it develop along with other modern concepts in the 21st century when environmental factors and population explosion among others have become such an important issue? And can policies on TODs be changed to better adapt to the future needs? The following paragraphs looks at some of the challenges facing light rail transit and considers other modes of transport that can potentially aid urban development in the future.

Light rail has been considered an essential form of transport surrounding transit-oriented developments as it provides for a utilitarian rider market. Its closest counterpart, the streetcar, has been usually talked in the same breath as tourism or special activity centered destinations. Statistical analysis by Luis Enrique Ramos-Santiago and Jeffrey Brown, from the Florida State University (2015) of seven streetcar systems and fourteen light rail transit system in the US as identified in the National Transit Database (NTD) indicate that streetcar and LRT systems share some of the same factors associated with station-level ridership particularly in terms of the population living near the station. Although external factors are key indicators regarding the success of such projects, it is hard to come to that conclusion particularly when only Seattle and Portland are the only cities with both such systems.[70] This study, however, suggests that internal factors such as service frequencies, park and ride spaces and connectivity to other modes of transport are also critical.[71] Even though LRT and streetcars, or even legacy streetcars serve entirely different sections of the population they form part of the public transport infrastructure with a specific function that should be combined in future endeavors.

Light rail transit (LRT) has long been considered an environmental-friendly mode of transportation as opposed to the automobile. However, future technological improvements in automobile design can provide direct competition for LRTs in the form of electronic vehicles (EV), which have so far been in their nascent stage in terms of consumer usage. Studies conducted in Christchurch, New Zealand caution that both EV and LRT, even though reduces the burden on fossil fuels are power demanding systems that are likely to add significant stress on the electricity system or local grid.[72] Power demand for an EV fleet is significantly higher than an LRT line providing same passenger miles. However, if on the demand side electronic vehicles gain currency then researchers caution that several substations can suffer peak time overload if an LRT operates at peak time and EVs charge at the same time.[73] Like streetcars, electronic vehicles can have an impact on the transportation infrastructure in the future and new policies should be constructed marrying the infrastructures of LRTs and EVs, otherwise there is a chance one will dominate the other. If America's transport development history is anything to go by, then EVs, if not gradually introduced and managed can hinder public mass-transportation networks.

On a separate note the concept of green TODs, or a combination of TODs and green urbanism have been mooted by urban planners around the world, but particularly in Europe. Green urbanism professes reduction in energy use and carbon emissions, less water pollution and waste from a stationary source through green architecture and sustainable community designs.[74] Combining green urbanism with transit-oriented developments one can build on the two approaches to produce a more holistic form of urban development. Firstly, higher density promotes efficiency in resource use but also reduces heating and cooling expenses through sustainable forms of construction. Secondly, this expenditure on shared heating and cooling expenses can be further reduced by a diversity in land use, thus promoting greater consumer choice in close proximity and encouraging a predominantly walkable and bike-able neighborhood. Thirdly, this would mean less cars and parking lots that can then be utilized for more green infrastructure both for recreation and for serving environmental needs such as groundwater recharge.

Figure 3.C.25 - Hammarby Sjöstad in Stockholm, Sweden

Figure 3.C.26 - Vauban district of Freiburg, Germany

Figure 3.C.27 - Kogarah Town Square in Sydney, Australia

Finally, TODs usually produce a lot of overhead canopies that can be utilized to generate solar energy. Additionally, policy initiatives such as bike-sharing or even car-sharing have shown to produce considerable reduction in carbon emissions.[75] The idea of green TODs is nothing new as cities in Europe have shown that former brownfield sites can be converted to serve not just transit needs but also in a sustainable manner, such as Stockholm's Hammarby Sjöstad in Sweden (Fig. 3.C.25), Reiselfeld and Vauban districts of Freiburg in Germany (Fig. 3.C.26) and the Kogarah Town Square in Sydney, Australia (Fig. 3.C.27).[76] These examples indicate that green TODs not only foster a lifestyle oriented around walking, cycling and transit use over the car but also reduces the stress on the environment, or in other words, a form of 'social engineering'.[77]

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"The richer you are, and the more educated you are, the more stuff you will throw away" – Adam Minter

4_RAINIER VALLEY AND SEATTLE

This chapter examines the regional information pertaining to this thesis, focusing on the larger neighborhood of Rainier Valley in south Seattle and what it means for the existing population given the fast growth that the city of Seattle has been experiencing in recent times. In particular this section looks at the planning policies that have been taken by different government bodies, especially by City of Seattle and King County. Emphasis in this section has been given primarily towards what it means for the residents of Rainier Valley and not on the entire city of Seattle. Additional focus has been given on the area around the Mount Baker transit station, which has been termed as North Rainier as well in the following texts.

LIVABLE CITIES

In order to understand what determines the pulse of a city one needs to understand what constitutes a good livable city. The answer to this question cannot be answered in simple terms. This is because all cities are inherently complex and dynamic in nature – in a constant state of flux. There is a propensity for people to like one city over another, with a vast array of factors being the reason for some cities to be termed 'livable'[1], while others termed as 'less livable'. One factor that contributes to the livability of a city is the people that live and constitute those cities, thereby creating a quality of life that is particular to each city. The quality of life in a city can be measured by the state of their urban spaces. Urban spaces are vastly different in different parts of the world whether it be in an expansive city in North America or in an overcrowded metropolis in Asia. Nevertheless, human interaction in these urban spaces is critical in shaping both an individual and a city, separately and collectively. Human interaction, therefore, is key to the success (or failure) of any design or planning project (Fig. 4.1).

Figure 4.1 - Vibrant public life are the bedrock of livable cities; seen here along the River Thames in London, England (above) and a skate park along Venice Beach, California (below)

THE URBAN TRANSFORMATION INTO AN OVERBURDENED ENVIRONMENT

One of the biggest challenges facing cities in the 21st century is the transformation in urban areas where more and more people are predominantly migrating to cities (Fig. 4.2).[2] One needs to understand that this is not a localized phenomenon, rather is a pattern that is being increasingly observed across the globe (Fig. 4.3).[3] Studies predict that by 2050, 70% of the world population will be living in the urban areas (Fig. 4.4).[4] This gradual shift from rural to urban living can be attributed to varying set of factors. One of the chief factors is labor specialization and the superior economic benefits that tend to draw a large number of people to the urban areas. Additionally, urban areas tend to provide savings in costs of social interaction along with greater and improved consumer choices as well as varied choices in terms of intermodal transportation systems. On the other hand, some urban areas tend to have special reasons of being at the core of urban transformation, such as being a leading innovation center or having positive locational externalities.[5] Miller and Geltner comments that the growth of any city is a dynamic process and there are similarly multiple factors that contribute to it, such as natural resources, industrial production, transportation facilities, government offices, financial services, cultural and social factors, telecommunications and technological developments.[6] Even though the two list of factors overlap on many counts, it is critical to point out that the reasons of urban growth in the 21st century will be different from the previous century and will be largely driven by technology and less dependent on a city's industrial output.

These figures highlight the alarming rate at which cities everywhere are urbanizing. Although rapid urbanization was presumably localized to east and south Asia and probably blamed for their rapid rise in population, recent figures suggest that cities in Europe and North America are gradually transforming in the same manner. This phenomenon demands a closer look at what it would mean to live in a 21st century city, especially when one considers that these cities were predominantly built in the 19th and 20th century. Can a sum of medieval and

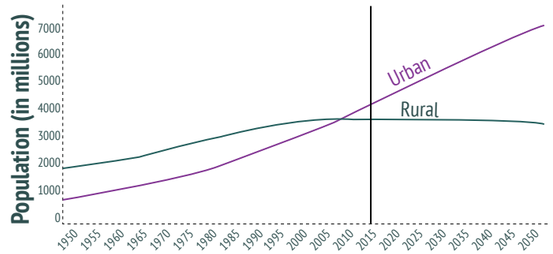


Figure 4.2 - Projected urban/rural population growth on a global scale

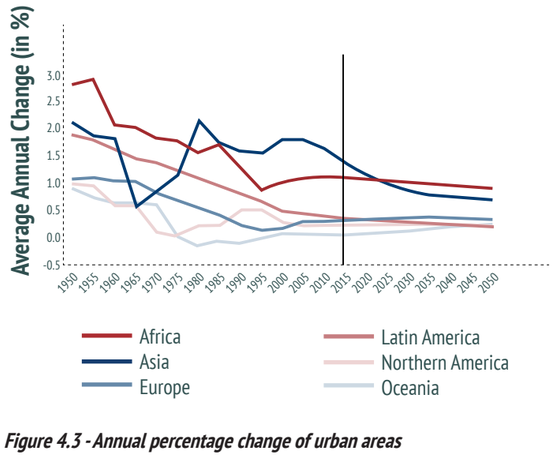


Figure 4.3 - Annual percentage change of urban areas

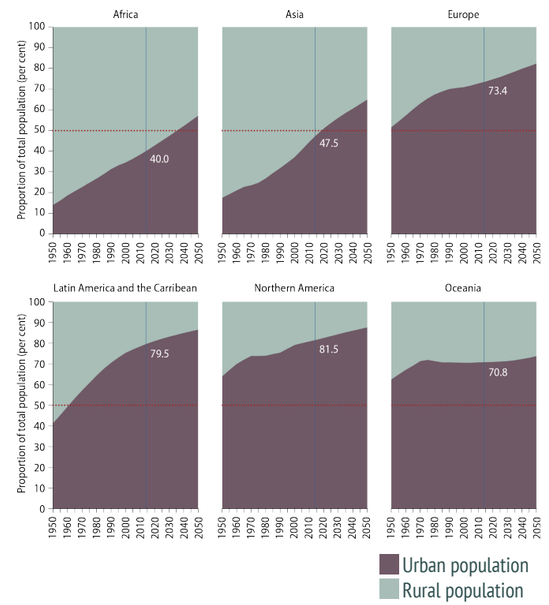


Figure 4.4 - Projected proportion of urban/rural of total population

modern infrastructure sustain the growing needs of the post-modern world as we enter the information age? There is no simple answer to this question and probably no easy solution to solve the problem. Nevertheless, an approach towards adjusting to these growing needs and changing patterns should be the order of the day. This thesis attempts to present one such solution addressing the potential of underutilized spaces in the urban fabric for fostering socio-economic development and urban regeneration.

UNITED STATES IN THE 21ST CENTURY

Even though the greatest percentage of human migration into urban areas is occurring in Asia, particularly in China and India, The United States of America has also been witnessing similar migration patterns (Fig. 4.5).[7] This change has largely been due to the mismatch in economic benefits in different parts of the country. Using data obtained from the 2010 US Census, researchers at the Martin Prosperity Institute at the University of Toronto, Ontario have mapped out the migratory patterns for both domestic and international migration. Their analysis suggests that big cities like New York, Los Angeles and Chicago have been suffering from major domestic outflow, but at the same time witnessing major international inflow, resulting in their continued rise in population. Much of the migration, both domestic and international are being driven by two factors and concentrated into two regions. Climate has been found as a major factor, hence the influx in Sunbelt metros such as Phoenix, San Antonio, Dallas, Austin, Houston, Orlando and Nashville. The other factor has been the influx in knowledge-based economies such as San Francisco, Seattle and Washington, D.C. have been gaining from domestic and international migration. It is easy to understand then that where both these factors coincide, such as in San Francisco, Seattle or Austin some of the fastest growth has been seen in recent times (Fig. 4.7).[8]

Another reason that has contributed to this change is trade relations, with countries from Asia assuming greater importance

in commerce and trade with the US as opposed to Europe; hence, cities on the West Coast have assumed far greater importance as compared to their counterparts in the rest of the country.[9] Similar research conducted on immigration by the Migration Policy Institute in Washington, D.C. suggest that a lot of people are coming into the country between the ages of 30-45 and this coupled with an already existing young population is bound to create an even younger population in the coming decades. Their research suggests that the historical trends in immigration has been rising steadily in the past few decades and a large majority of those, with the exception of neighboring Mexico, has been from Asian countries like India and China (Fig. 4.6).[10]

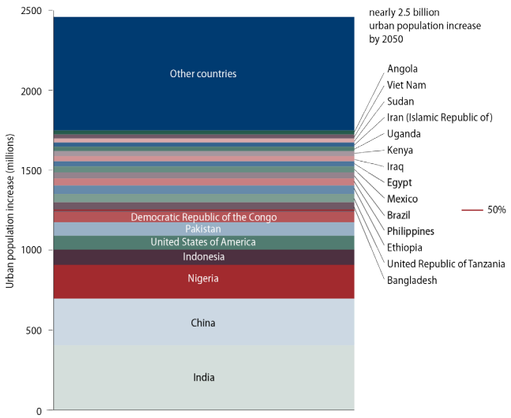


Figure 4.5 - Contribution to global population rise by countries

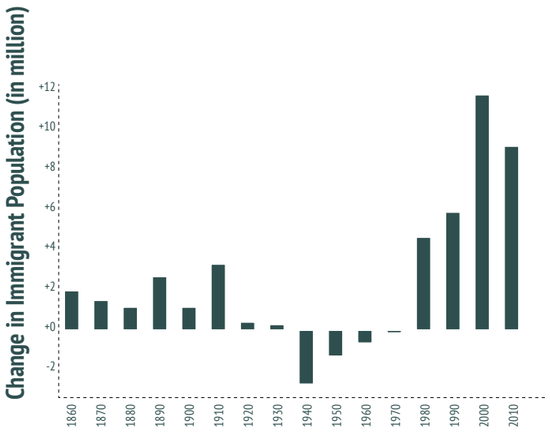
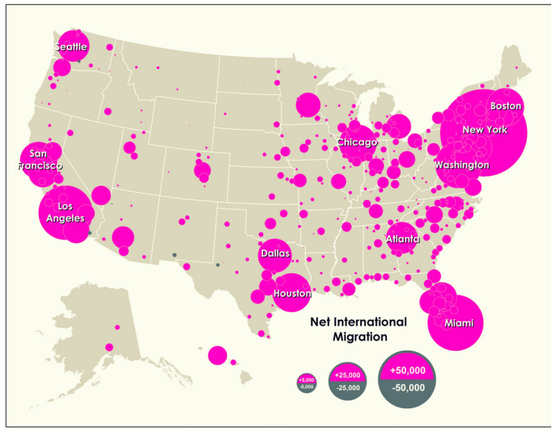
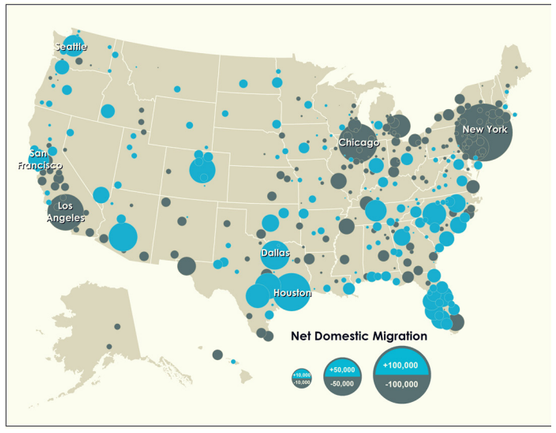


Figure 4.6 - Change in the U.S. Immigration Population by decades





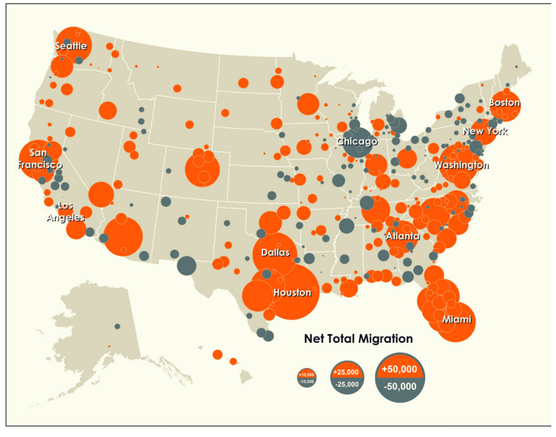


Figure 4.7 - Migration patterns in different American cities; (from top to bottom) Net International Migration, Net Domestic Migration and Net Total Migration

BOOM TIME FOR SEATTLE

Long understood as a relatively small city tucked in between the mountains in the far northwest corner of the country, Seattle has been redefining the development of cities in the country. The industrial history of Seattle has been a story of booms and busts as represented by the city's growing importance during the Klondike Gold Rush, before steadily building on its natural resources through timber and coal industries and ship-building. The city came to the forefront during the World Wars partly due to the presence of the local Boeing Company before a dip in the industrial fortunes and finally being revived by technology giants Microsoft, and later Amazon, in the Information Age thrusting Seattle to the forefront of the technological advancement (Fig.4.8).[11] This rapid change in the fortunes of the city have seen remarkable urbanization, not just in Seattle, but in the entire Puget Sound region, propelling Seattle into the fastest growing city in the United States (Fig.4.9). This has led to migration to the region on a scale never seen before (Fig. 4.10).[12] Data suggests that much of these migrations is taking place from the Southwestern states of California and Arizona, but people from all over the country are moving to the Greater Seattle area in equal numbers as well (Fig. 4.11).[13] Seattle in the 21st century thus presents a unique challenge – adapting to the rapidly changing times while at the same time assimilating the wide diaspora of people moving into the Pacific North West. Understandably, this has put stress on the general cost of living in the region, which is steadily rising and gradually pushing Seattle into one of the more expensive cities to live in.

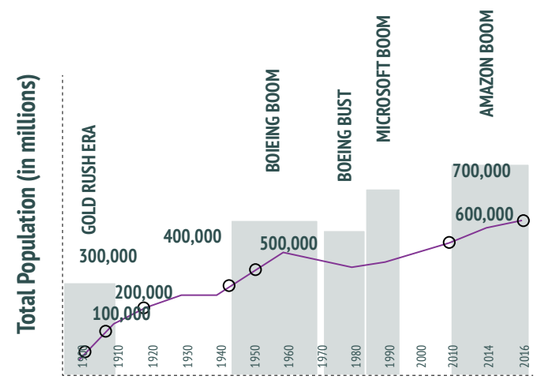


Figure 4.8 - Seattle's historic population is tied to its major industries

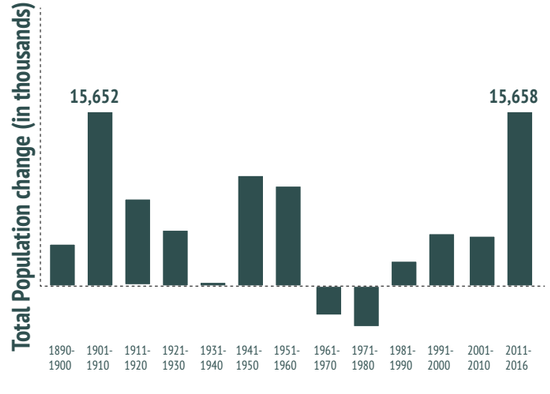


Figure 4.10 - Recent population growth in Seattle has hit record levels

Figure 4.9 - Seattle is now the fastest-growing city in the US

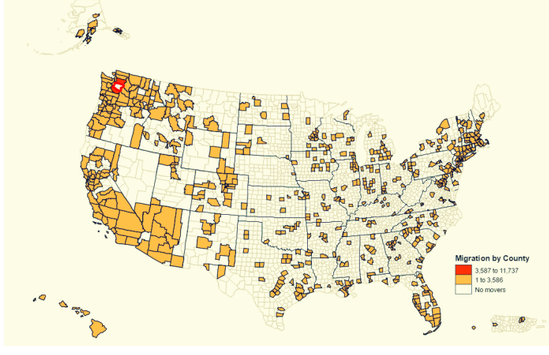


Figure 4.11 - Total Inbound Migration flows into King County, Washington

RAINIER VALLEY

This thesis identifies that a specific location or a neighborhood is essential to study the different threads observed in underutilized spaces. Although any neighborhood would emit some characteristics in terms of these spaces, these characteristics will be distinct to different neighborhoods. However, for the purpose of this thesis, the larger neighborhood of Rainier Valley has been chosen. The Rainier Valley is located in south Seattle, part of the city's South End. Noted for being one of the most diverse neighborhoods in the country, both culturally and economically, this part of town is also broken down into multiple smaller neighborhoods, each with its own unique characteristics. The economic core of the South End is largely centered on the north/south orientation of Rainier Avenue South that links to the neighboring city of Renton. Running almost parallel to this road is the Martin Luther King Jr. Way South (MLK Way), where most recent new investments and developments are being concentrated (Fig. 4.12). Since 2009, this area has been served by Central Line branch of the Link Light Rail running along the western boundaries of the Rainier Valley neighborhood and almost entirely on or parallel to the Martin Luther King Jr Way S. Additionally, the light rail has 4 stops in this predominantly N-S linearly arranged cluster of neighborhoods – Mount Baker, Columbia City, Othello and Rainier Beach before winding its way down to the SeaTac airport. (Fig. 4.13) Historically, Rainier Valley is the poor and neglected part of town and is home to a large migrant population, a sizable section of whom were born outside the United States.

Figure 4.12 - Location of Rainier Valley in south Seattle

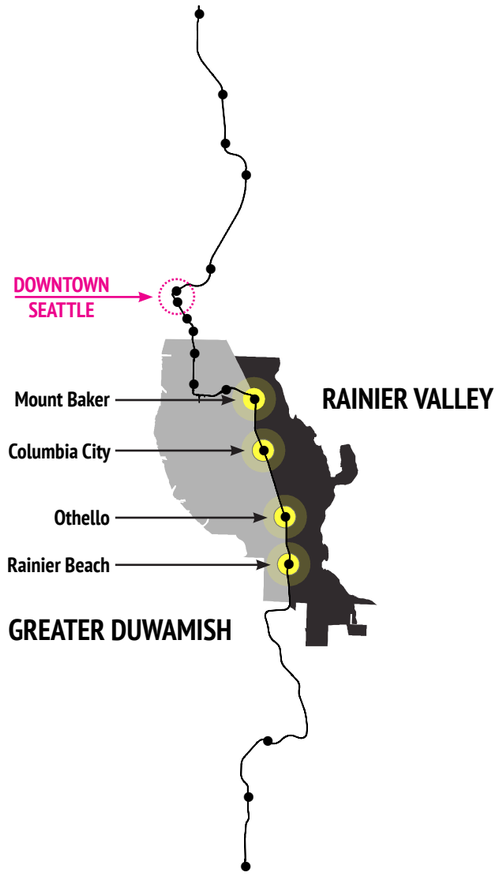


Figure 4.13 - Map of Link Light Rail through south Seattle

HISTORY OF RAINIER VALLEY

The history of the neighborhood of Rainier Valley is one of massive changes in both human and environmental terms. Where once there was native footpaths there is now high-traffic car and rail corridors. Dense forests gave way to small farms that have now redeveloped into residential blocks and commercial districts. One of the contenders for the title of 'most diverse neighborhood in the country', it has a large population of African Americans, Latinos, immigrants from Southeast Asia, East Africa along with descendants of early Italian, German and Irish settlers. The economy of the neighborhood has closely mirrored the fortunes of the neighboring Boeing Company. However, in times that are more recent it has seen the influx of young professionals even though other parts continue to remain in poverty. The following paragraphs examines the historical trajectory of the neighborhood to understand what it means to live in this part of a city that is at odds with the general image of Seattle and the rest of the country.

Towards the end of the 19th century, the European settlers had displaced most of the Native Americans. Some Japanese farmers however managed to retain some of their smaller farms (Fig. 4.14). Several lumber mills were established in this neighborhood shortly after along with farming practices in vegetables, fruits, tobacco, chicken, cows and sheep (Fig. 4.15). Development of the electric railway through the neighborhood in 1891 prompted increased commercial opportunities and connected Seattle with the neighboring city of Renton. Rainier Valley around this time was touted as a tourist destination for day-trippers and those interested in purchasing cheaper land (Fig. 4.16).[14]

Rapid growth characterized the early years of the 20th century as settlers arrived to take advantage of the plentiful and cheap land (Fig. 4.17). Communities started to emerge in different pockets of the valley as schools, churches and other establishments and associations started to develop (Fig. 4.18). By 1907, the entire neighborhood up to Rainier Beach on the south end became incorporated into the city of Seattle. The

Figure 4.14 - Smaller farms belonging to Japanese immigrants

Figure 4.15 - Lumber mills were one of the first industries in Seattle

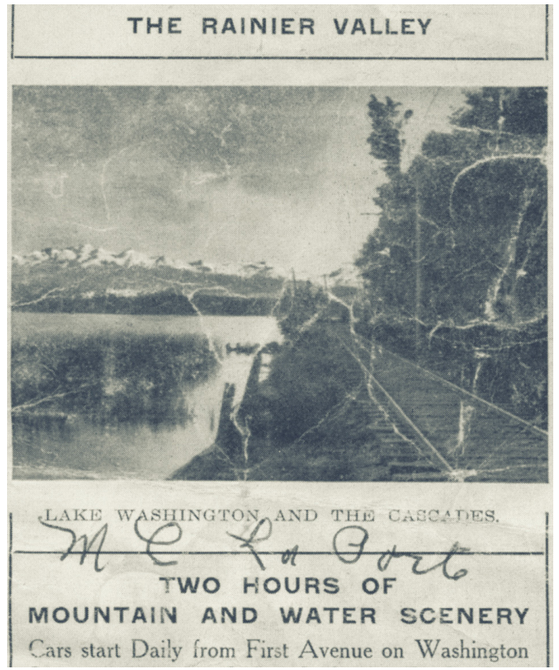


Figure 4.16 - Rainier Valley in 19th century was a tourist destination

Rainier Avenue streetcar continued to remain a key mode of transportation during these years despite accidents, fare wars, and continued revenue loss. At the same time similar developments started to take shape for car traffic along Empire Way (now MLK Way) (Fig. 4.19).[15]

The Great Depression and World War II brought a period of demographic and infrastructural changes to the valley as smaller businesses struggled to survive (Fig. 4.20-4.21). Transportation underwent radical changes as the streetcar was finally removed and Rainier Avenue adapted for cars and buses and Interstate 90 split the northern section of the valley (Fig. 4.22). World War II brought with it a large number of defense workers for the Boeing plants resulting in displacement of the existing population. Soon after the war, public housing projects were built at Holly Park and Rainier Vista for the returning veterans (Fig. 4.23). Very few of the displaced population returned as they migrated to cheaper areas south of the city.[16]

The 1970s were a period of stagnation for the valley due to the Boeing Bust resulting in an economic recession as well as a growing drug culture among the urban youth (Fig. 4.24). The valley started to be recognized for its higher crime rate and gang activities. However, things started to change in 1978 when Columbia City was designated a national register district by the federal government and City of Seattle designated it as a local landmark district (Fig. 4.25).[17] The following years saw gradual rise in development and smaller businesses as historic buildings and parks started to be conserved and re-purposed in tune with the needs of the community (Fig. 4.26-4.27).[18] One such establishment of particular interest to this research is the site of the Sicks' Stadium, a baseball stadium that was demolished in 1979, before being converted into the present Lowe's Home Improvement Store in the 1990s and is currently in line to be demolished in favor of the upcoming Mount Baker Town Center (Fig. 4.28).[19]

Figure 4.17 - Businesses grew up along the streetcar in the early 1900s

Figure 4.18 - Columbia Laundry was a flourishing business by 1910

Figure 4.19 - The Seattle, Renton & Southern Railway streetcar

Figure 4.20 - Kusak Cut Glass Works established in 1914 still in operation

Figure 4.21 - Stewart Lumber & Hardware Company still runs till this day

Figure 4.22 - The floating bridge forming Interstate-90 opened in 1939

Figure 4.23 - Federally funded housing development Rainier Vista

Figure 4.24 - Empty streets in Columbia City after Boeing Bust of 1970s

Figure 4.25 - Ground-breaking ceremony by council members in 1980

Figure 4.26 - Columbia City Farmers Market was established in 1998

Figure 4.27 - Refugees from Africa now form an integral part of the valley

Figure 4.28 - Sicks' Stadium, built in 1938 was demolished in 1979

ETHNIC COMPOSITION & DIVERSITY

This section considers who lives in the neighborhood and analyzes the socio-economic challenges that the existing population is facing. This is crucial in understanding the needs of the population and how the new developments will benefit or affect them in the short and long run. The neighborhood of Rainier Valley has been receiving a lot of attention in recent times since being hailed as the most diverse neighborhood in the country in 2010 (US Census 2010). The tag of being the 'most diverse neighborhood' has been lost to other parts of the country, but Rainier Valley still remains one of the top 10 most diverse neighborhoods in the country.[20] This is largely because only a fraction of the 60,000 or so population is white, while rest of the neighborhood is comprised of Hispanic, African-American, and Asian populations. One of the fastest growing ethnicity in the neighborhood per the US Census is the Somali population. Populations are rarely static in an area and the same goes for Rainier Valley. In 1940, the population was 97% white, which dropped to 85% in 1960 owing much to the influx of the Asian community. The 1965 introduction of the Immigration and Nationality Act altered the way immigrants were allowed into the USA. A system that was heavily biased towards white Europeans now saw immigrants judged based on their skills in relationship to American citizens, thereby allowing a large Asian community to thrive throughout the country. At the same time the closure of many low-income properties in central areas of Seattle through 'urban renewal' schemes by then mayor Norm Rice meant minorities moved to the Rainier Valley Area, especially Somali immigrants in the early 1990s.[21]

Demographics have suggested that reduction in white population have been consistent with influx of new immigrants throughout the neighborhood. Recent figures suggest that as much as 80% the population in Rainier Valley is now non-white, which is in stark contrast to the white/non-white composition in Seattle or Washington State. It should also be noted that statistics apart, the neighborhood is being hailed as being in possession of a unique balance in terms of their diversity (Fig. 4.29). The racial population is evenly distributed on most blocks instead of having pockets with high concentrations of each population in different areas, as is seen in many diverse areas. Although there are some instances of pocketing, this has been found to be the exception rather than the rule. A variety of languages are spoken in Rainier Valley, with around 9% of the population classified as non-English speakers or speak broken English. This implies that any new developments need to be considerate of how the population is spread around the neighborhood.[22]

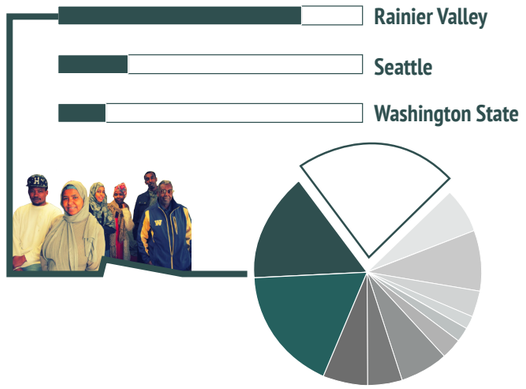


Figure 4.29 - Ethnic Composition in Rainier Valley and distribution of white and non-white population

DEMOGRAPHICS

Recent figures suggest that the age of the residents living in Rainier Valley is predominantly of that of a teenage population with an equal number of middle aged persons and very few seniors living in that area (Fig. 4.30). Figures on household distribution and household income distribution suggest that the economic condition in the neighborhood is consistent with a low-income area (Fig. 4.31). Rainier Valley is thus one of the poorest neighborhood in the city of Seattle. Many of these residents also rely heavily on rented homes, even though median rent in the neighborhood is only a shade lower than the median rent for the whole city. Other statistics on household distribution suggest that average household in larger than the Seattle and in fact has a larger number of family households than the rest of the city. Education figures for Rainier Valley indicate that close to 30% of the population has reached the high school level and only very few of the remaining population has attained a bachelor's degree or above. A large section of the population is also born outside the US, with an even larger share not born in Seattle itself.[23] Thus, the statistical analysis on demographics largely sheds light on the vulnerable and racially diverse population and brings into focus the relatively young population and their needs going into the future. The data reported on person crime and property crime over a ten-year period in Rainier Valley indicates that crime rate has been consistently higher in this neighborhood, which has been almost double of the average reported crime in the rest of Seattle, indicating a propensity of violence and brings to light the safety concerns in this area of town, even though reported crimes has been gradually decreasing year-on-year (Fig. 4.32).[24]

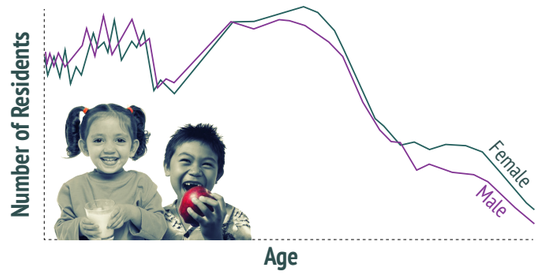


Figure 4.30 - Rainier Valley has a predominantly young population

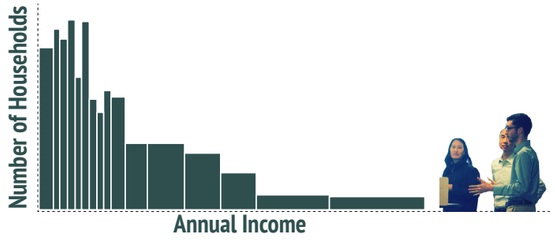


Figure 4.31 - Rainier Valley is a predominantly low-income neighborhood

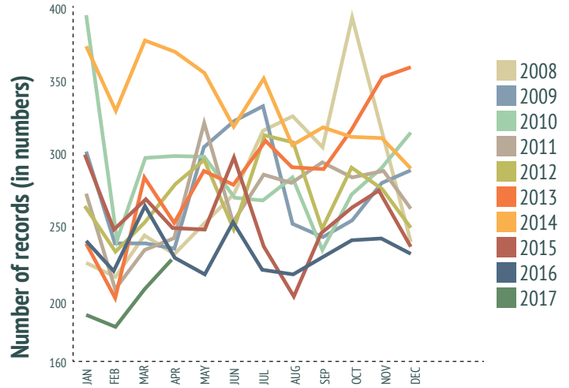


Figure 4.32 - Monthly crime count in Rainier Valley during 2008-2017

A VULNERABLE POPULATION

Between May-October 2014, the Race & Social Justice Initiative (RSJI) staff conducted 37 listening sessions, much of which were conducted in the racially diverse Rainier Valley to discuss institutional and structural racism with a view towards working towards equity.[25] The strategies and outcomes from these sessions were adopted as part of the Vision and Strategy for the ensuing three years 2015-17. The strategies included ensuring racial equity in city programs and services through annual tracking measures, working with community-based organizations and through Racial Equity Funds allow them to develop creative strategies.[26] These strategies are important, because the poverty rates in Seattle have clearly shown that people of color have predominantly higher unemployment rates (Fig. 4.33).[27]

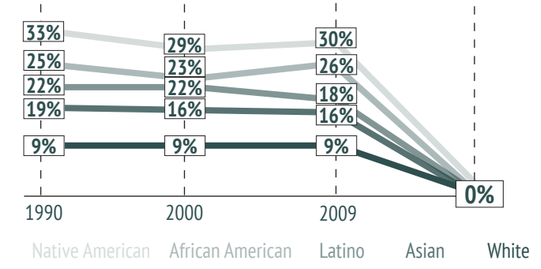


Figure 4.33 - Poverty rate in Seattle over time

Given the rising population and expected demand for housing stock in the coming years, the City of Seattle Office of Planning & Community Development has recently updated its Comprehensive Plan that incorporates proposals conceived through the Race & Social Justice Initiative (RSJI) in order to work towards social equity through its plan for projected growth. This document titled Growth and Equity: Analyzing Impacts on Displacement and Opportunity Related to Seattle's Growth Strategy (May 2016) is crucial as the population in Seattle is more diverse than ever before and a city that is increasingly becoming an international city. This means that a lot more people, especially people of color and immigrants are expected to live inside an urban center or village.[28] The city of Seattle identifies 38 urban centers, urban center village and hub/residential urban villages, four of the hub/residential urban village lie in the larger neighborhood of Rainier Valley, namely North Rainier, Columbia City, Othello and Rainier Beach (Fig. 4.34).[29] The equity analysis combines data about demographics, economic conditions and built environment to create composite maps for the entire city of Seattle. This composite index of displacement has been divided into two indices – Displacement Risk Index and Access to Opportunity Index (Fig. 4.35-4.36; Table 4.1-4.2).[30] As seen from the maps constructed that all four urban villages indicate a high displacement risk, with the least being in the North Rainier village. While at the same time access to opportunity is higher for North Rainier and Columbia City, but one of the lowest for both Othello and Rainier Beach.[31] Seen together it means that both the latter urban villages have one of the highest vulnerability, with the least at North Rainier being closest to the downtown core; however, the south end of Seattle are one of the highest in terms of vulnerability in the city (Fig. 4.37).[32] Based on their study this means that North Rainier, as well as Columbia City fall in the category of High Displacement Risk / High Access to Opportunity, while both Othello and Rainier Beach fall under High Displacement Risk / Low Access to Opportunity (Fig. 4.38).[33] More importantly this translates into a higher demand for housing stock in hub urban villages with very good transit service, which at Mount Baker (North Rainier) is expected to grow by 60% and employment expected to grow at 50%, both figures being one of the highest in the city of Seattle (Fig. 4.39).[34]

Existing market trends suggest that there is a high occupancy in rental units of 4-9 bedroom houses, which is although consistent with Seattle trends; the disparity starts to appear in rental units in apartments where figures are much lower than the overall figures for the city. This might be true given that houses/condos are much more common than apartment units are. Housing prices in the neighborhood are almost half of the average Seattle prices, both for houses and apartments. Surprisingly residents of Rainier Valley have a higher number of cars than the rest of Seattle in both houses and apartments. These figures are consistent with the figures for preferred mode

Figure 4.34 - Urban Centers in Seattle with decrease in population by race

TABLE 4.1 - Indicators for Displacement Risk Index

PEOPLE OF COLOR
LINGUISTIC ISOLATION
EDUCATIONAL ATTAINMENT
HOUSING TENANCY
HOUSING COST-BURDENED HOUSEHOLDS
HOUSEHOLD INCOME
PROXIMITY TO TRANSIT
PROXIMITY TO CURRENT OR FUTURE LIGHT RAIL
PROXIMITY TO CORE BUSINESS
PROXIMITY TO CIVIC INFRASTRUCTURE
PROXIMITY TO HIGH-INCOME NEIGHBORHOOD
PROXIMITY TO JOB CENTER
DEVELOPMENT CAPACITY
MEDIAN RENT

TABLE 4.2 - Indicators for Access To Opportunity

SCHOOL PERFORMANCE
GRADUATION RATE
ACCESS TO COLLEGE OR UNIVERSITY
PROXIMITY TO LIBRARY
PROXIMITY TO EMPLOYMENT
PROPERTY APPRECIATION
PROXIMITY TO TRANSIT
PROXIMITY TO CURRENT OR FUTURE LIGHT RAIL
PROXIMITY TO COMMUNITY CENTER
PROXIMITY TO A PARK
SIDEWALK COMPLETENESS
PROXIMITY TO A HEALTH CARE FACILITY
PROXIMITY TO A LOCATION THAT SELLS PRODUCE

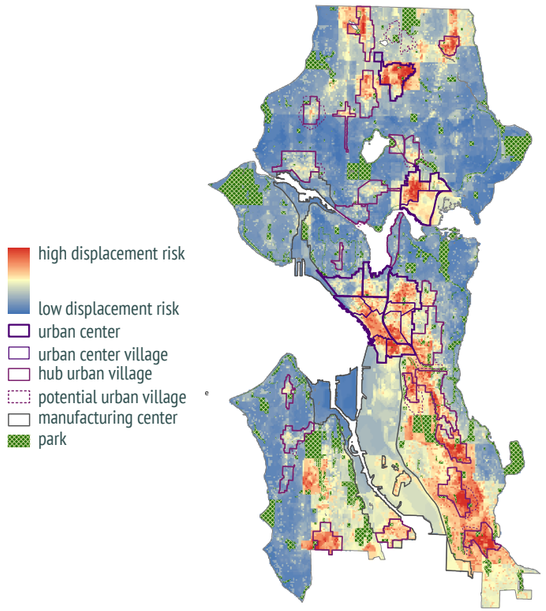


Figure 4.35 - Displacement Risk Index map

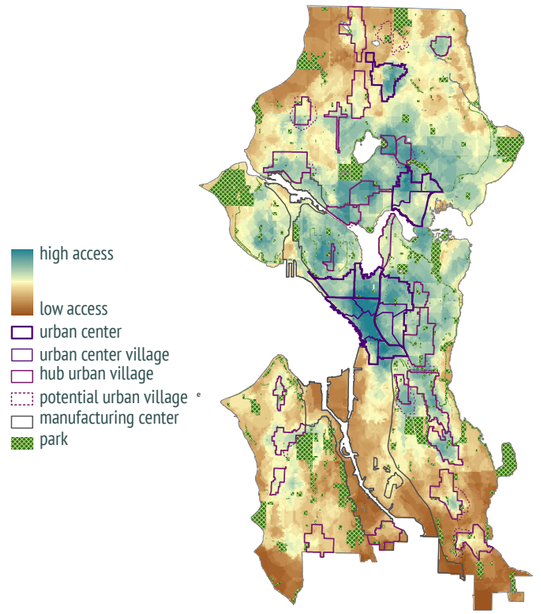


Figure 4.36- Access to Opportunity map

of transportation that indicates that most people still use cars, and only recently have started to go for carpool, transit and buses (Fig. 4.40). Analysis of existing housing stock shows that most of the houses built here are before the 1960s. However, recent developments in housing stock is more than triple of what has been developed in the rest of Seattle, thus indicating that a lot of the newer developments are starting to take shape in Rainier Valley.[35]

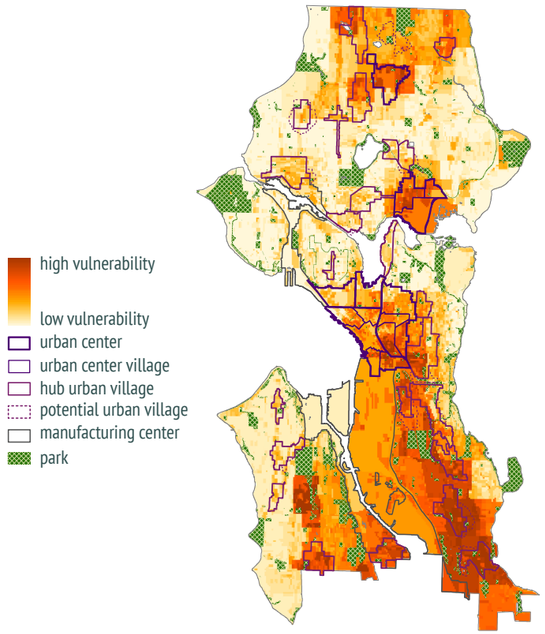


Figure 4.37 - Composite Vulnerability Indicator

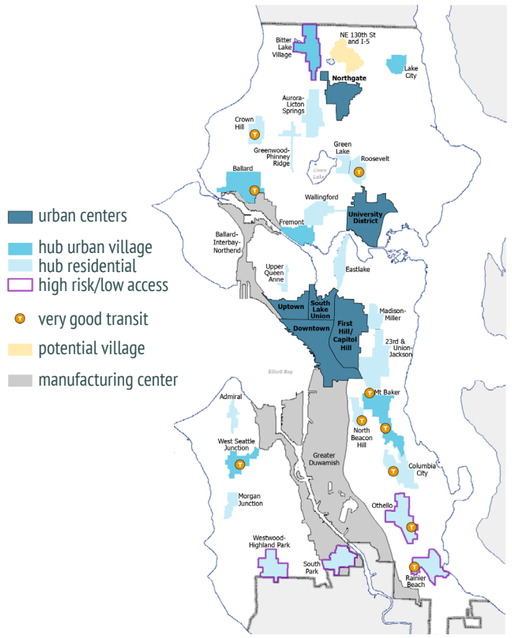


Figure 4.39 - Expected housing growth rates in Seattle

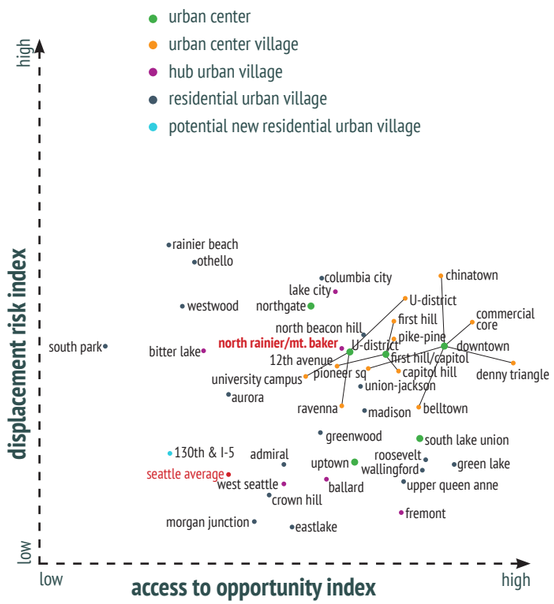


Figure 4.38 - Displacement Risk/Access To Opportunity Typology

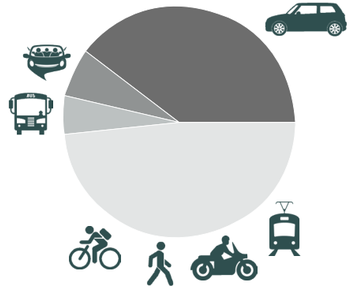


Figure 4.40 - Preferred mode of transportation in Rainier Valley

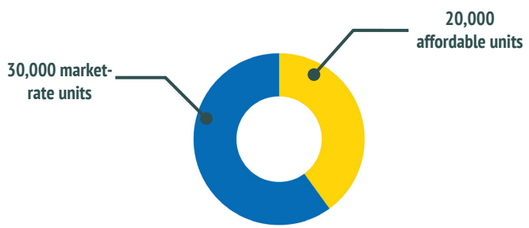


Figure 4.41 - Projected housing need as per HALA proposal

Although not the sole source of financing opportunities that can be tapped into, yet the projected goal of Housing Affordability and Livability Agenda (HALA) as part of Mayor Ed Murray's resolution of creating 50,000 new homes within 2025 is admirable, if not entirely lofty and ambitious (Fig. 4.41). The agenda titled Housing Seattle: A Roadmap to an Affordable and Livable City (July 2015) is a reaction to the expected rise in population coupled with the already existing problems such as lower income households that struggle to pay for basic necessities and unable to afford housing due to the high housing costs in the city (Fig. 4.42).[36] Hence, the key policies proposed by the mayor's office intends to invest in affordable housing for those who need it most and prevent displacement, foster equitable communities and promote innovate development in an efficient manner.[37] The projected construction is split into 30,000 market-rate units and the rest 20,000 being affordable units that will be offered to low-income individuals, thereby radically improving the current situation of the affordable housing stock and alleviate a major crisis in that sector.[38]

HALA, in conjunction with the Mandatory Housing Affordability (MHA) is slated to adopt increased density and up zoning in neighborhoods with plans already in motion for University District, Downtown and South Lake Union neighborhoods. However, it seems adopting MHA in these already populated and expensive districts will not only increase rental prices in these neighborhoods but also not direct the funds in the more needier parts of town. Specific plans for the south end of Seattle include making strategic investments to anchor existing communities and prevent displacement.[39]

The recently approved Seattle Housing Levy (2016) which garnered 70% public votes entrusts the City of Seattle to release $290 million in funds for affordable housing between 2017 and 2023. Along with other funds expected to arrive from the county, state, federal and private entities are expected to be primarily utilized in guiding the Rental Housing Program by providing a mix of affordable rental housing serving a range of households and income levels (Fig. 4.43).[40] The program is intended to target a stable and healthy living environment such that low-income families can thrive in culturally relevant and linguistically competent services with access to education, employment, affordable transportation and other opportunities and amenities. Preservation of existing housing stock in vulnerable communities that are at high risk of displacement and ties to historic neighborhoods is another chief concern for this program. Thus, social equity is behind the creation and sustenance of this program.[41]

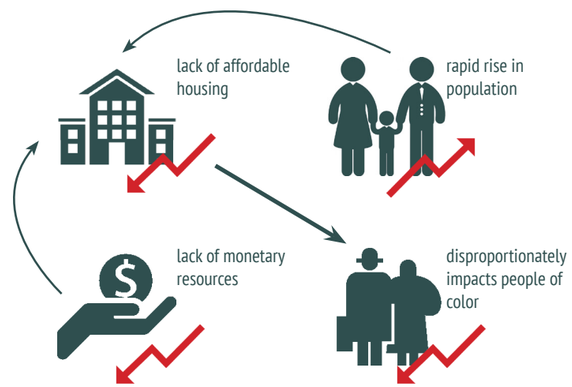


Figure 4.42 - The chief reasons behind the HALA proposal

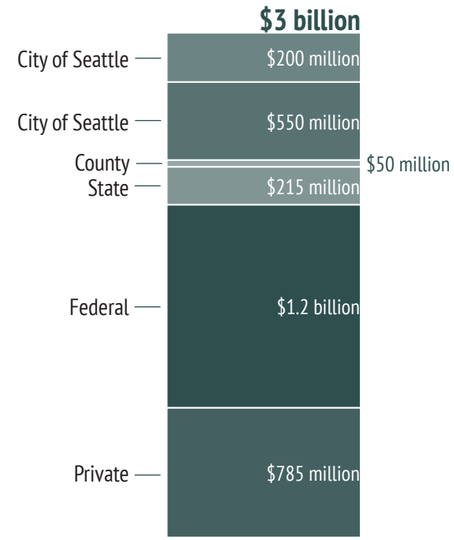


Figure 4.43 - Capital investments towards 20,000 homes in 10 years

HISTORY OF TRANSIT IN SEATTLE

Travelling around the hilly slopes of Seattle was dangerous before Frank Osgood established the first horse-drawn streetcar line in downtown in 1884 along 2nd Avenue (Fig. 4.44). J.M. Thompson and Fred Sander introduced the first cable car in 1887 from Pioneer Square to Leschi Park via Yesler Way and Jackson Street. Osgood introduced electric streetcars in 1889. Much of the then 'suburban' areas of Ballard, Greenwood, Rainier Valley as well as University District, Woodland Park and Madison Park continue to operate modern transit routes along those early streetcar lines (Fig. 4.45). Rapid progress in real estate developments increased the fleet to 22 separate line, which in 1898 was consolidated under the control of the Seattle Electric Railway Company, a subsidiary of the national utility holding company Stone & Webster.[42]

Seattle Electric was constantly losing money due to mandated nickel fares, numerous strikes and growing competition from buses and private automobiles coupled with an aging and erratic mode of transport (Fig. 4.46). In 1918, the city of Seattle agreed to buy the streetcar system for $15million; the high price severely crippled the new Municipal Street Railway with debt from the outset. By the 1930s, there were 410 streetcars in operation on 26 electric routes and 3 cable railways. However, mounting debt was still a major concern and plans to revive and reform the system failed to come to fruition and the last streetcar ran on April 13, 1941 (Fig. 4.47). By the 1950s, the car was the dominant mode of transport and plans to incorporate rail right-of-way in early plans for Interstate-5 was rejected.[43]

The 1962 Seattle's World Fair introduced a new kind of transit, the Monorail, which revived the interests of the Municipality of Metropolitan Seattle, or Metro for a mass transit system (Fig. 4.48). With an auto-dominant community refusing to support a transit system and coupled with the Boeing Bust, by 1972 most transit systems were on the verge of collapse. However, with improvement in economic fortunes for the city, in 1990 the State Legislature passed strong new laws for growth management and rail transit development. Metro passed the rail transit torch

Figure 4.44 - First horse-drawn streetcar in Seattle

Figure 4.45 - Streetcars introduced in suburban areas of Seattle

Figure 4.46 - Seattle Electric sold the streetcar network to city in 1918

Figure 4.47- Streetcar networks were dismantled after 1941

Figure 4.48 - The monorail was introduced as part of the 1962 World Fair

Figure 4.49 - Sound Transit now operates multiple modes of transport

Figure 4.50 - Central branch of the Link Light Rail

to a new Regional Transit Authority and its bus system was taken over by King County. In 1996, the Transit Authority won voter approval of a "Sound Transit" system combining light rail, commuter rail, and express buses (Fig. 4.49).[44]

The modern version of the light rail came into effect on July 12, 2009 after a $2.3billion investment into developing a 14 mile segment between downtown Seattle and Sea-Tac airport over 5 years (Fig. 4.50). In early 2016, this segment was stretched northward to the University District and a year later towards the southern tip up to Angle Lake. The popularity of the mass transit system has meant that the Central Line of the Light Rail already has expansions under constructed on both its north and southern ends with a further 7 extensions lines being under consideration (Fig. 4.51).[45]

Figure 4.51 - Future expansion plans of the regional transit networks

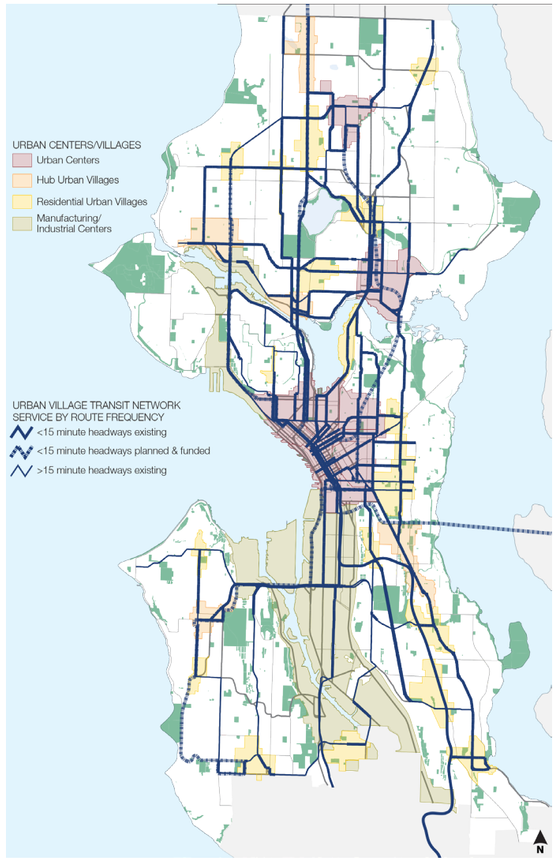


Figure 4.52 - Seattle's Urban Villages and frequent transit service

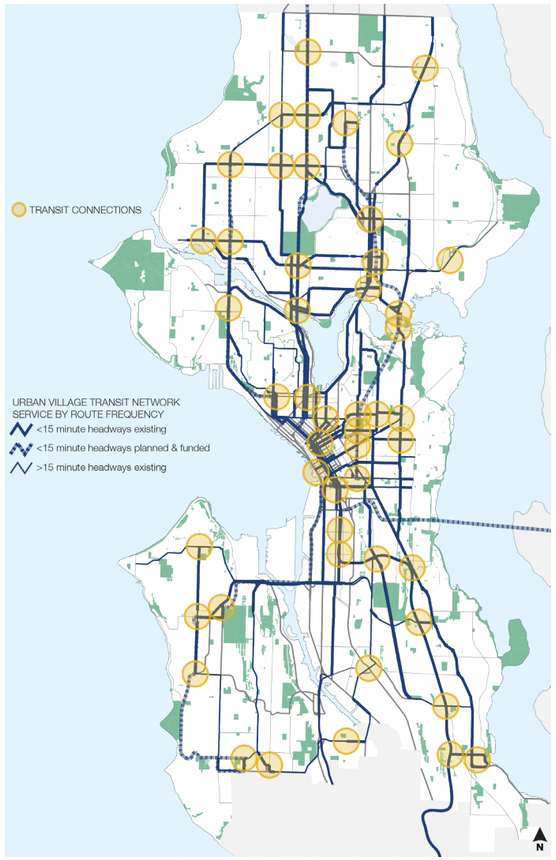


Figure 4.53 - Seattle's Transit Connections and frequent transit service

TRANSIT-ORIENTED DEVELOPMENTS IN SEATTLE

Transit communities are not new to Seattle; many of the favorite neighborhoods were originally developed around the old streetcar network. Transit services still exist in the city, albeit primarily through the bus system. Given the benefits of such developments such as lower overall household costs, improved public health, enhancing local businesses, reducing carbon footprint and preserving regional open space and natural resource lands it is being increasingly adopted as the main format of development (Fig. 4.52-4.53).[46] The 2010 report Seattle Transit Communities: Integrating Neighborhoods with Transit by the Seattle Planning Commission outlines the major plans proposed around this type of development. They have been divided into four types: Mixed Use Centers, Mixed Use Neighborhoods, Special Districts and Industrial Job Centers. Within Rainier Valley, Mount Baker is the only one that has been identified as a Mixed Use Center, while Columbia City, Othello and Rainier Beach as Mixed Use Neighborhoods.[47]

Mount Baker, usually considered the gateway to Rainier Valley has been identified as having the potential to become a Mixed Use Center. This entails that it should have a diverse residential population with a high concentration of jobs and households in taller buildings. This should be supplemented with small to large businesses and institutions as well as retail outlets both local and larger departmental and grocery shops. It should be pedestrian friendly with wide sidewalks and activities that encourage walking as well as generous public open spaces and parks with multiple utilities. This strategy has been furthered emboldened with station area plans or implementation strategies for individual transit stops, with Mount Baker being one of the prioritized stations.[48] Since then, suggestions from the Seattle Planning Commission have been incorporated with development plans that have been constructed through the Mount Baker Town Center: Neighborhood Design Guidelines (2016) by the City of Seattle Office of Planning and Community Development which has proposed a robust upgrade in zoning ordinances for the area surrounding the transit center.

ECONOMIC OPPORTUNITIES IN MOUNT BAKER

One of the chief reasons for the newer developments being focused in Rainier Valley has been the proximity to the light rail, which runs almost parallel along its western boundaries with the larger neighborhood of Greater Duwamish. Much of these new developments has been concentrated along the four transit stops of Mount Baker, Columbia City, Othello and Rainier Beach. However, land-use in the neighborhood is primarily mixed-use along Rainier Avenue South, the major arterial road passing through the neighborhood and only recently has this been mimicked along the transit route. Considering these recent developments, much of the newer investments are hence being focused around the Mount Baker transit station, not only being the closest to downtown Seattle, but also the location where the two major arterial roads of Rainier Avenue South and MLK (also light rail) intersect. Opportunities in future developments are equally supported due to the presence of large parcels of vacant land as well as the opportunity to change the zoning laws in this area as a large majority is now earmarked for industrial or manufacturing (Fig. 4.54).

The strategic location of Mount Baker transit station as part of the North Rainier Urban Village is supported by several recent investments that have either been made or pledged to this specific zone. Outlined below are some of the investments that are destined to change the character of the entire Mount Baker area. Seattle Mayor Ed Murray recently designated the Mount Baker neighborhood a Redevelopment Opportunity Zone (ROZ) (City of Seattle), thus opening the door to multiple investors and stakeholders investing in urban regeneration surrounding the upcoming plans for the new town center. This comes amidst the recent proposal by Governor Jay Inslee to invest $1.1 million into the redevelopment of the neighborhood and the proposed $400,000 already invested by the Seattle Department of Transportation.[49] One of the key stakeholders for projects in this area is the community-based nonprofit Mount Baker Housing Association, which has entered a partnership with the City of Seattle and the Washington Department of Ecology that aims to provide affordable housing in south Seattle.

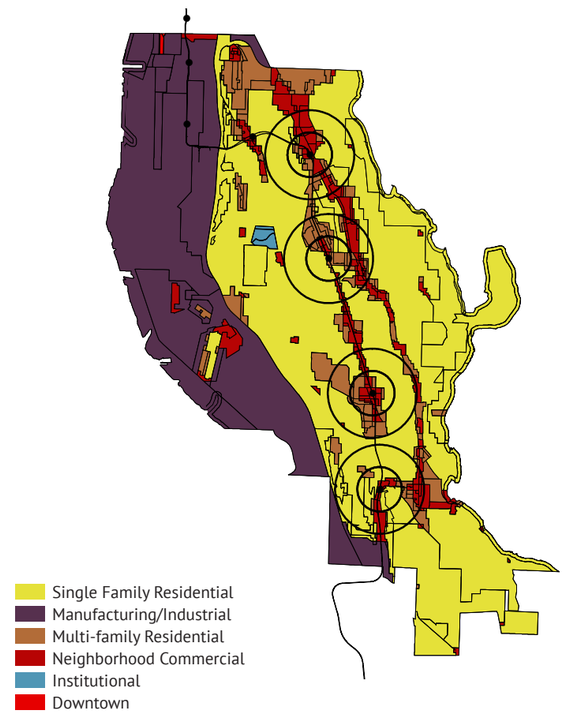


Figure 4.54 - Existing land-use zoning in south Seattle

FUTURE OF MT. BAKER TOWN CENTER

The arrival of the Department of Ecology and their investment of as much as $400,000 is a major boost to the re-development that aims to address the cleanup of multiple vacant lots and contaminated sites that are now either abandoned gas stations or industrial dry cleaners.[50] This will be supplemented with funds that are projected to be received under the state's Brownfield Redevelopment Trust that was established in 2013. In fact, the Mount Baker Housing will be the first non-governmental organization to receive funds under this scheme.[51] The proposed Mount Baker Town Center that is slated to come up at the location of the present-day Lowe's Home Improvement Store is being billed as the prime reason for this spate of redevelopment schemes in the neighborhood. Per the plans proposed by the City of Seattle for the town center it involves major up zoning of the land-use surrounding the town center with projected growth in more mixed-use and residential clusters keeping in accordance with high density mixed-use developments around transit stations. This has resulted in increased involvement of the Mount Baker Hub Business Association, the association of retailers operating in the Mount Baker area (Fig. 4.55).

Figure 4.55 - City of Seattle's plans for Mount Baker town center

The recent redevelopment proposal for Mount Baker in Mount Baker Town Center Urban Design Framework, City of Seattle (October 2011) is built upon the previous North Rainier Neighborhood Plan (1999) and the North Rainier Hub Urban Village (2009). The revised plan for the North Rainier Urban Village and the Mount Baker Town Center as proposed by the Seattle Department of Planning and Development in 2011 aims to preserve some of the existing character of the neighborhood, but in keeping with the development trend as seen in the rest of city, the proposal aims to promote a vibrant, business district with a destination shopping area targeting not just the nearby residents but the rest of the Rainier Valley as well. Preserving the ethnic and cultural diversity among small business owners is a key strategy adopted by this visioning process. This development also aims to address the projected and existing housing deficiencies by addressing new housing stock that accommodates a wide economic range of population. Proposed development is not restricted only to the town center proper but also expected to farm out to the surrounding areas through connections such as greenbelts, boulevards and parks with a hierarchy of open spaces (Fig. 4.56).[52]

In 2014, the City of Seattle adopted Ordinance 124513 to create a transit-oriented development around Mount Baker transit station imposing a series of supplemental development regulations. This led to rezoning of 109 parcels on an area of 26 acres.[53] The rezoning aims to foster a vibrant walkable neighborhood in what was a seriously deficient public infrastructure and amenities. This also aims to address the major gaps in usable open space and access to them, which is one of the worst in the city of Seattle (Fig. 4.57).[54] The gaps have been a result of the dominance of automobile, even though 30% of residents do not own a car, in an area also witnessing high pedestrian traffic. Multiple internal analysis prepared by the Department of Planning and Development over the years leading up to the Ordinance in 2014 suggests that open space to be treated as a 'priority amenity' and maximum open space can be provided through a proposed incentive zoning policies, assuming buildings 125 feet or higher, thereby concentrating the high-density developments to free up space for public open space. The DPD Director's Analysis even notes, "The Downtown standards are a good fit for the proposed site".[55]

The assessment study North Rainier Urban Village Assessment (April 2015) has identified underutilized spaces that exist adjacent to the transit station and an increasingly auto-dominated pattern of development that lacks the multi-modal infrastructure necessary to support an urban village environment. The sidewalk network has been highlighted as being poorly developed with narrow sidewalks, blank walls and lack of on street parking with a poor pedestrian connection from adjacent neighborhoods. There is an increasing presence of industrial establishments as seen from the land-use zoning, which although sustains the workforce from all over Rainier Valley is a key deterrent in establishing any new developments.[56] However, the introduction of the planned Town Center has also opened the door to major private developments in the neighborhood, with a flurry of new housing stock being planned within the quarter-mile or half-mile radius that are projected to be mixed-use and contain high efficiency small dwellings. Recent proposals, either approved or applied for permit, suggest that most of these developments are keen to tap into the existing link station and the upcoming town center.[57] Even though the new Artspace project adjacent to the station incorporates ideas of mixed-use high-density transit-oriented developments, other new developments have still not broken ground hinting that conditions may not yet be ripe for development.[58]

The culmination of these years of studies and analysis has been reported recently in Mount Baker Town Center: Neighborhood Design Guidelines (August 2016) by the City of Seattle Office of Planning and Community Development. The final guidelines suggested by the report are given below[59]:

- Using natural systems and features of the site and its surroundings as a starting point for project design
- Strengthen the most desirable forms, characteristics and patterns of the streets, block faces, and open spaces in the surrounding area
- Contribute to the architectural character of the neighborhood.
- Open space should complement and contribute to the network of open spaces around the site and the connections among them.
- Create a safe and comfortable walking environment that is easy to navigate and well connected to existing pedestrian walkways and features.
- Encourage human interaction and activity at the street-level with clear connections to building entries and edges.
- Incorporate design features that facilitate active forms of transportation such as walking, cycling, and use of transit
- Optimize the arrangement of uses and activities
- Develop an architectural concept that will result in a functional and harmonious design
- Integrate open space with the building design
- Use appropriate and high quality elements and finishes for the building and its open spaces

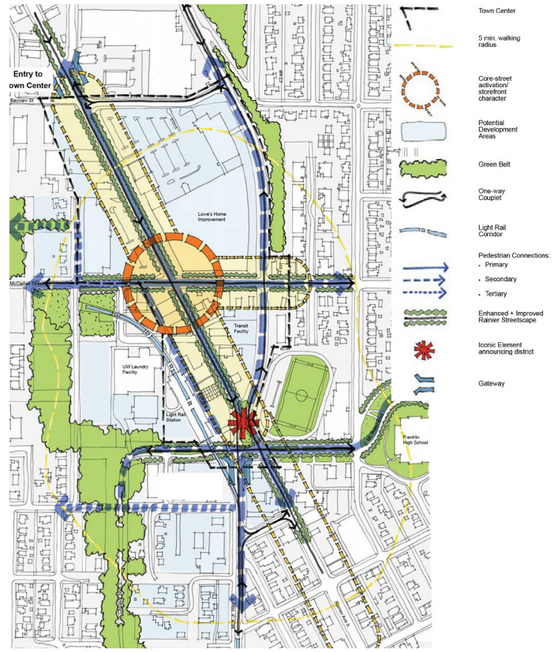


Figure 4.56 - City of Seattle's plans for Mount Baker town center

ARE DEVELOPMENTS INCLUSIVE OF THE EXISTING POPULATION?

The focus shifts as to whether these recent developments and new investments that are being directed towards Rainier Valley, particularly surrounding Mount Baker, have been done keeping in mind the needs of the existing population. One of the most marginalized populations in the city, it is also culturally and ethnically diverse, most of whom are living dangerously close to the poverty line. Keeping this in mind, the City of Seattle has taken great measures to create a holistic development agenda for the entire Rainier Valley. The inclusionary measures adopted by the local government have been geared towards community building and fostering youth empowerment in what is a predominantly young population. This has been done primarily through hands-on workshops and smaller-scale interactive meetings as well as follow-up meetings through online portals. In the year 2009 alone, as many as 48 meetings were conducted by neighborhood and city-sponsored agencies in North Rainier. Bicultural and/or bilingual Planning Outreach Liaisons (POLs) hosted 38 community workshops during this period resulting in greater connectivity and dialogue between underrepresented communities and the City of Seattle.[60] Community discussions achieved through this workshop directly contributed to the update of the North Rainier Neighborhood Plan (2009). The following paragraphs examines how these were achieved and the strategies implemented that aimed to include the marginalized population in the planning discussion of their neighborhood.[61]

- One of the goals set out through this community planning process included strengthening the Rainier Valley Chamber of Commerce to increase membership of local business owners to create a vibrant business district that would still contain a grocery and pharmacy. The new town center should in all ways possible be generating a healthy mix of existing local shop owners as well as new shops to achieve a diverse mix of consumer choices without affecting the livelihood of the existing owners.
- Mixed-use development projects have been identified as being a good source of revenue generation for the existing population, which as planned will be in conjunction with affordable housing and affordable commercial space that target the needs of the existing residents.
- Residential developments to be cognizant of the income levels of the existing population and housing provided should be made affordable to meet their needs. At the same time, there should similar developments that target a more affluent population so that much needed revenue can be injected into the neighborhood.
- Developing a green hub by connecting the presently scattered vacant lots and unused open spaces has been proposed to connect all these fragmented underutilized spaces. Connecting the Cheasty Greenspace with Mt. Baker Boulevard is being considered as the major connection.
- Funding programs for the large population of youth in the neighborhood is a key initiative proposed by the city through education outreach and vocational skill development programs.
- Crime has been a major problem in Rainier Valley, however, recent numbers indicate that they are dropping, much of which can be attributed to community-based crime prevention programs and increased police patrolling measures as well as installing more lighting throughout the neighborhood.
- Improvement in road quality and more pedestrian and bike access are one of the newer measures being proposed by city to reduce traffic congestion in the neighborhood and encourage a more livable lifestyle.

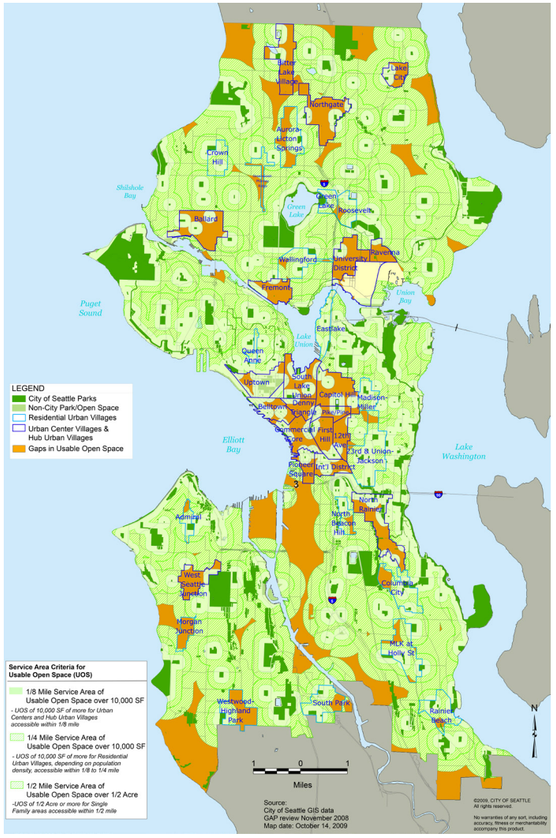


Figure 4.57 - Development Gap Analysis (2017)

Figure 4.58 - The newly Rainier Valley Teen Center in Columbia City

THE CHANGING FACE OF RAINIER VALLEY

A quick stroll along the neighborhood of Rainier Valley whether on foot, bike, bus or car tells you that this is a unique part of town, much different from the affluent neighborhoods of Seattle. The houses here are different, the smell is different and you encounter a diverse set of faces that you rarely catch a glimpse of in the rest of Seattle. It is no wonder that this is one of the most diverse neighborhood in the country and well balanced in terms of how the population is spread throughout the area. Hidden in plain sight is, however, the inherent struggle faced by these people, many of whom are migrants and barely speak English. Skirting with poverty and a burgeoning younger population the area is further well known for its propensity towards violence. It is thus important that the new investments planned for the neighborhood has caught the attention of the local residents. The Link Light Rail has been key in bringing these new investments, with TODs becoming such commonplace throughout the country. As seen from above, most of the investments have been concentrated in the northern section of the valley, in and around Mount Baker. Although this spate of investments come with its own peril, it should be noted that the efforts of the city of Seattle to include the existing population, both directly and indirectly through liaisons into the planning discussions show that community-based design is essential in the 21st century, even more so for an area like Rainier Valley, where a large section of the population remains underrepresented. In conclusion, it seems that the aggressive strategies adopted by the local government geared towards the existing population seems to be paying dividends as the policies planned have been pro-resident, but it remains to be seen whether they will benefit the locals or bring in more affluent population resulting in pushing the existing residents out to a different area or marginalizing in their own neighborhood.

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"It is no doubt ironic that the motorcar, superstar of the capitalist system, expects to live rent-free" – Wolfgang Zuckerman

5_SPATIAL MAPPING AND PRECEDENT

This chapter explores the spatial extent of underutilized spaces in a series of locations in the city that have similar characteristics in terms of urban development. The series of maps that are discussed in this section intends to highlight the issue of underutilized spaces being not just a peri-urban problem, but also a core urban problem. The latter half of this chapter builds on the findings from these spatial maps and explores the issue of efficiency on parking lot through a video-analysis study.

SELECTION OF STUDY AREAS FOR SPATIAL MAPPING

As explained previously in Chapter 2, the choice of study area is critical to this research. Based on the set of criteria discussed previously, the study area falls broadly in an inner suburb and outer suburb belt (Fig. 5.1). Based on literature reviews, urban sprawl and creation of large parcels of underutilized spaces has largely been considered a peri-urban problem. However, as this research postulates underutilized spaces are also present in the urban realm and spatial extent of these spaces in terms of both size and area increase as one moves away from the traditional downtown core (or central business district). The additional criteria of transit has been considered based on literature reviews that suggest that transit-oriented developments have been predominantly implemented to 'manage the land' or 'consolidate the land'. Hence, choosing the specific band of inner suburb/outer suburb allows the study area to be sufficiently far away from downtown, yet not too far that it enters the urban fringe or commuter belt. At the same time the second criteria allows for a consistency in terms of area studied yet affords a linearity in the study to test the hypothesis that underutilized spaces would increase as one moves away from downtown.

Based on the above two criteria the study areas have all been chosen around a ¼ mile and ½-mile radius around the transit stations in the south suburbs of Seattle. The four stations selected, namely Mount Baker, Columbia City, Othello and Rainier Beach are sufficiently far away from downtown Seattle, yet borders the city limits of Seattle on the south side. At the same time the land-use patterns exhibited around these stations are consistent (Fig. 5.2) thus allowing for testing the hypothesis around similar samples along a particular route, which being the Central branch of the Link Light Rail.

SPATIAL MAPPING OF UNDERUTILIZED SPACES

The spatial mapping of underutilized spaces was conducted on four categories, namely Vacant Lots, Parking Lots, Alleys and Triangular Wedges (which can be considered a subset of Vacant Lots) (Fig. 5.3). This work has been built from GIS data available from the City of Seattle with additional data obtained from King County. However, the latest data that is available from the City of Seattle is from 2009, hence to provide a more updated map of underutilized spaces and other urban built and non-built forms, this work have been substantiated by overlaying more recent data obtained from Google Maps and Google Earth from June 2016.

The maps exhibited have been produced around ¾-mile radius around each transit station. However, spatial mapping of underutilized spaces have been produced up to a ½-mile radius. As can be seen from the maps (Fig. 5.4-5.5), some of the key observations that can be drawn are explained below along with the exceptions to the hypothesis that states that these spaces increase in size and area as one moves away from downtown:

- When all the four categories are seen together it generally follows the hypothesis, with certain exceptions, primarily in Columbia City
- There is much higher percentage of vacant lots around all four stations than the other three categories studied. Since vacant lots is a legal term and many underdeveloped tracts of lands, such as the Chief Sealth Trail, are considered by the City of Seattle as vacant, hence a probable reason why there is a higher percentage.
- In terms of parking lots, Mount Baker has the highest percentage, which could be due to the land-use being zoned as manufacturing or neighborhood commercial. Moving south, however, the percentage of parking lots start to gradually increase towards Rainier Beach
- Columbia City has the least amount of parking; there could be two reasons for this. Firstly, Rainier Avenue South is the major thoroughfare in the neighborhood with more residential around the light rail station, whereas in the other three stations, around the light rail station, whereas in the other three stations, a lot of the commercial and manufacturing are concentrated in and around the light rail stations.
- The above reason also holds true when considering the percentage of alleys, where Columbia City has the highest followed by Mount Baker. The probable reason could be that both are more residential neighborhoods with a comparatively higher density. Meanwhile the density of both Othello and Rainier Beach are comparatively lower hence does not have many alleys.
- The final category of triangular wedges exhibit a perfect increase in percentage of underutilized spaces as one moves away from downtown. It should be noted here that this category is a sub-category of vacant lots that is created when the roads do not meet at right angles, hence the graph suggesting there is an increase as one moves away from downtown is predominantly a factor of how roads are planned based on topography and less on actual utility of these spaces.

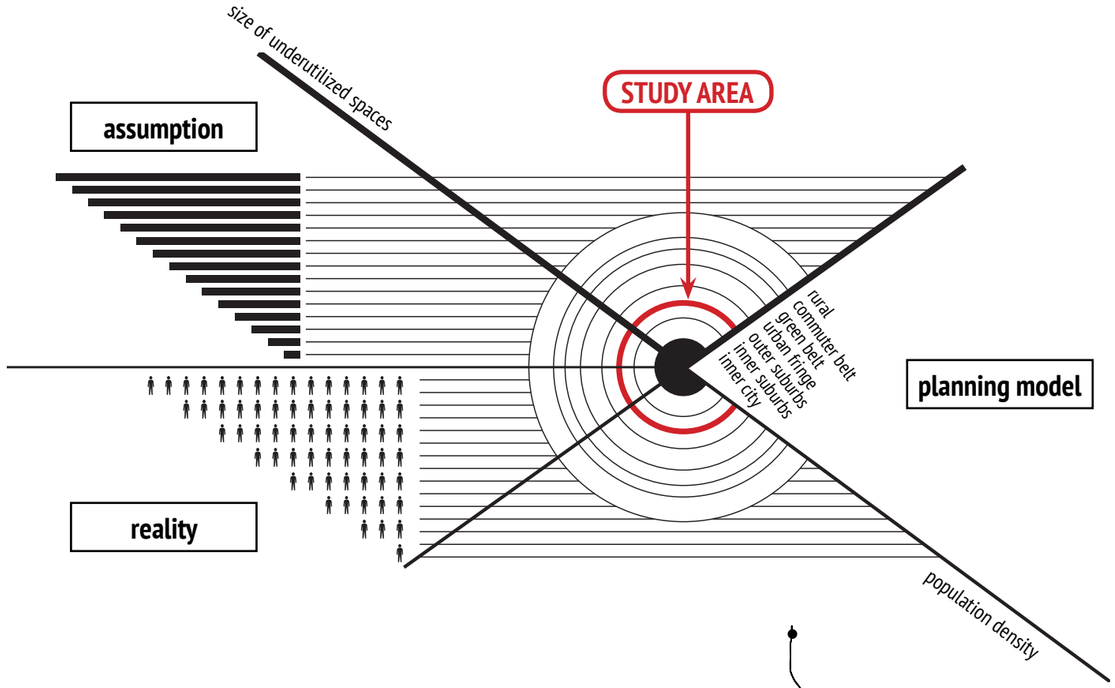

Figure 5.1 - Planning Model of Cities and Selection of Study Area

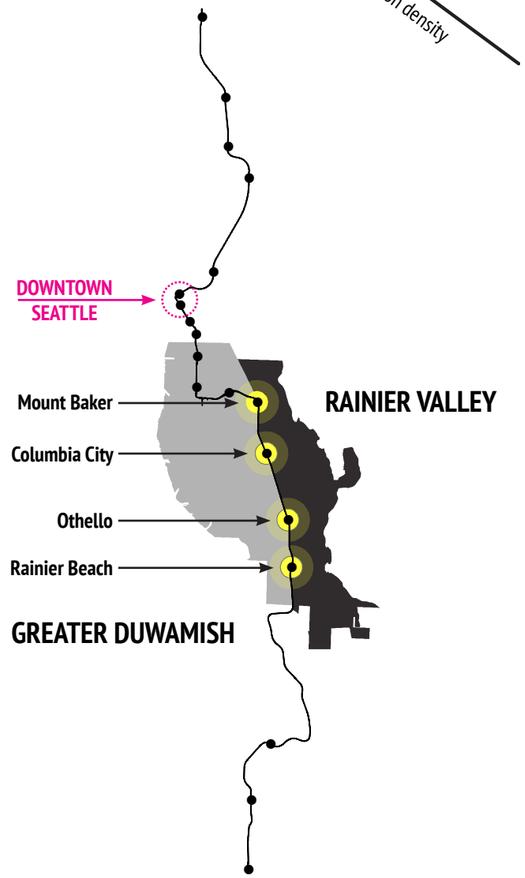

Figure 5.2 - Map of Link Light Rail through south Seattle

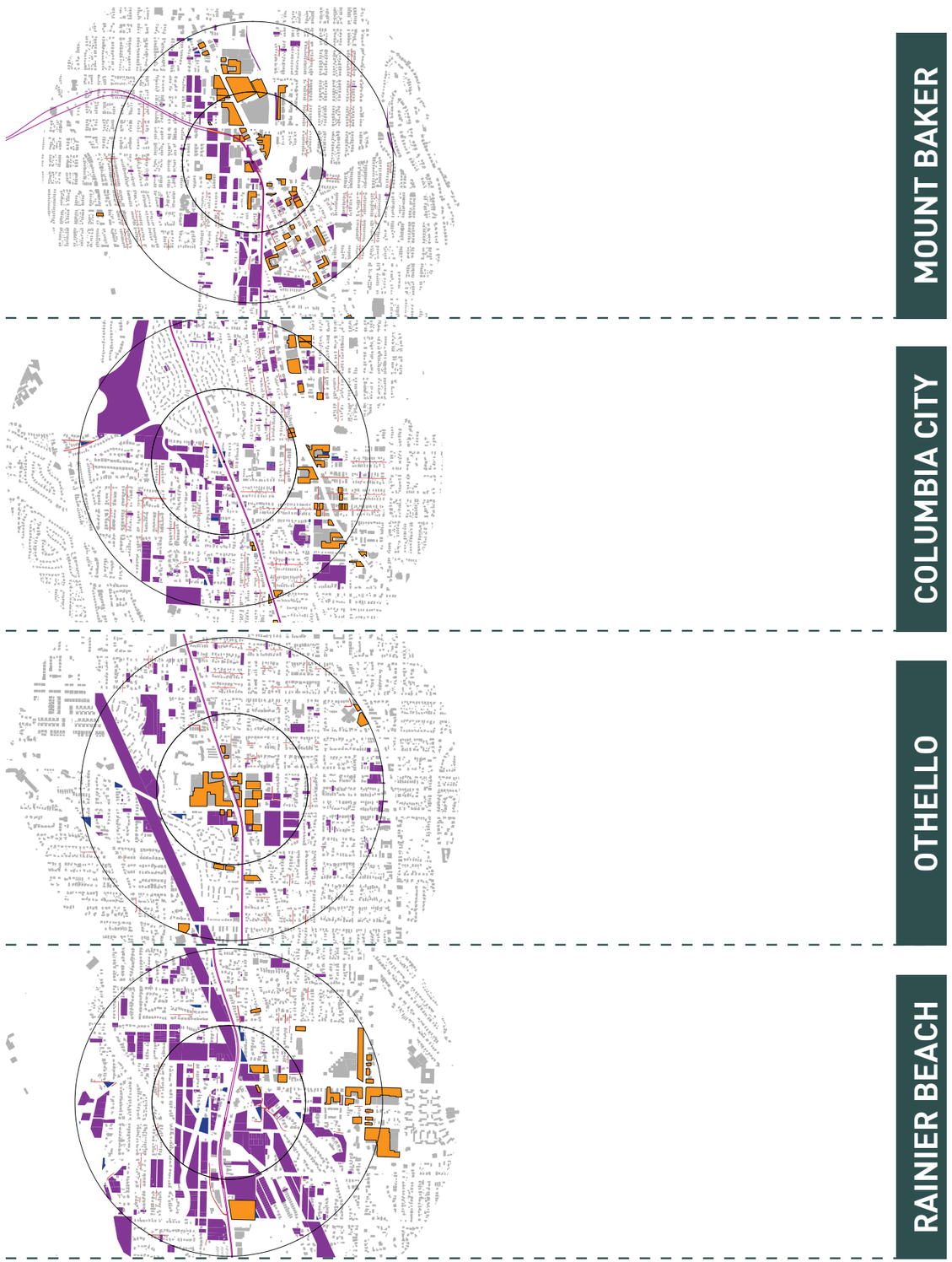

Figure 5.3 - Map of underutilized spaces in a 1/2 mile radius around transit stations in south Seattle

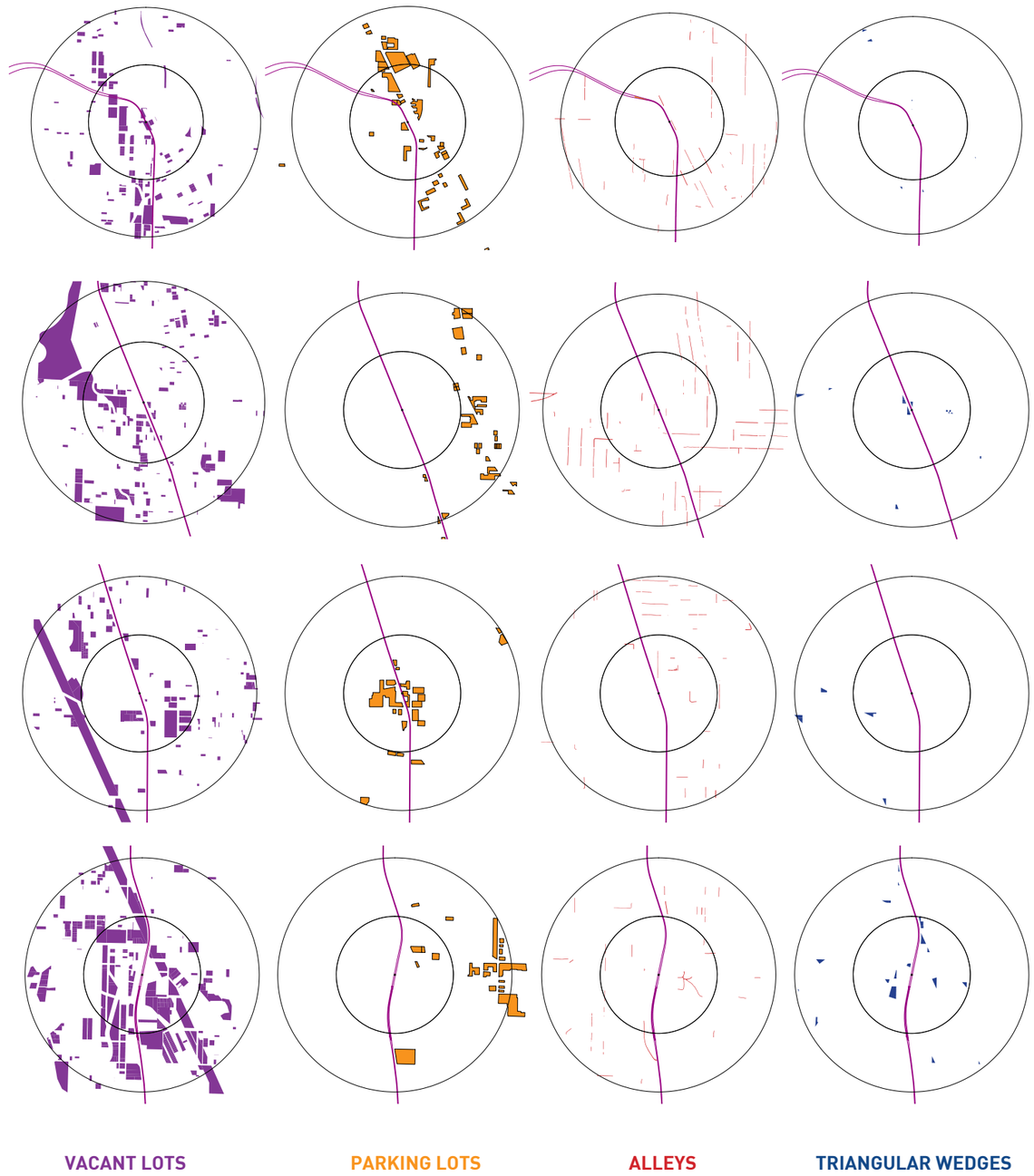

Figure 5.4 - Map of different underutilized spaces shown separately in a 1/2 mile radius around transit stations in south Seattle

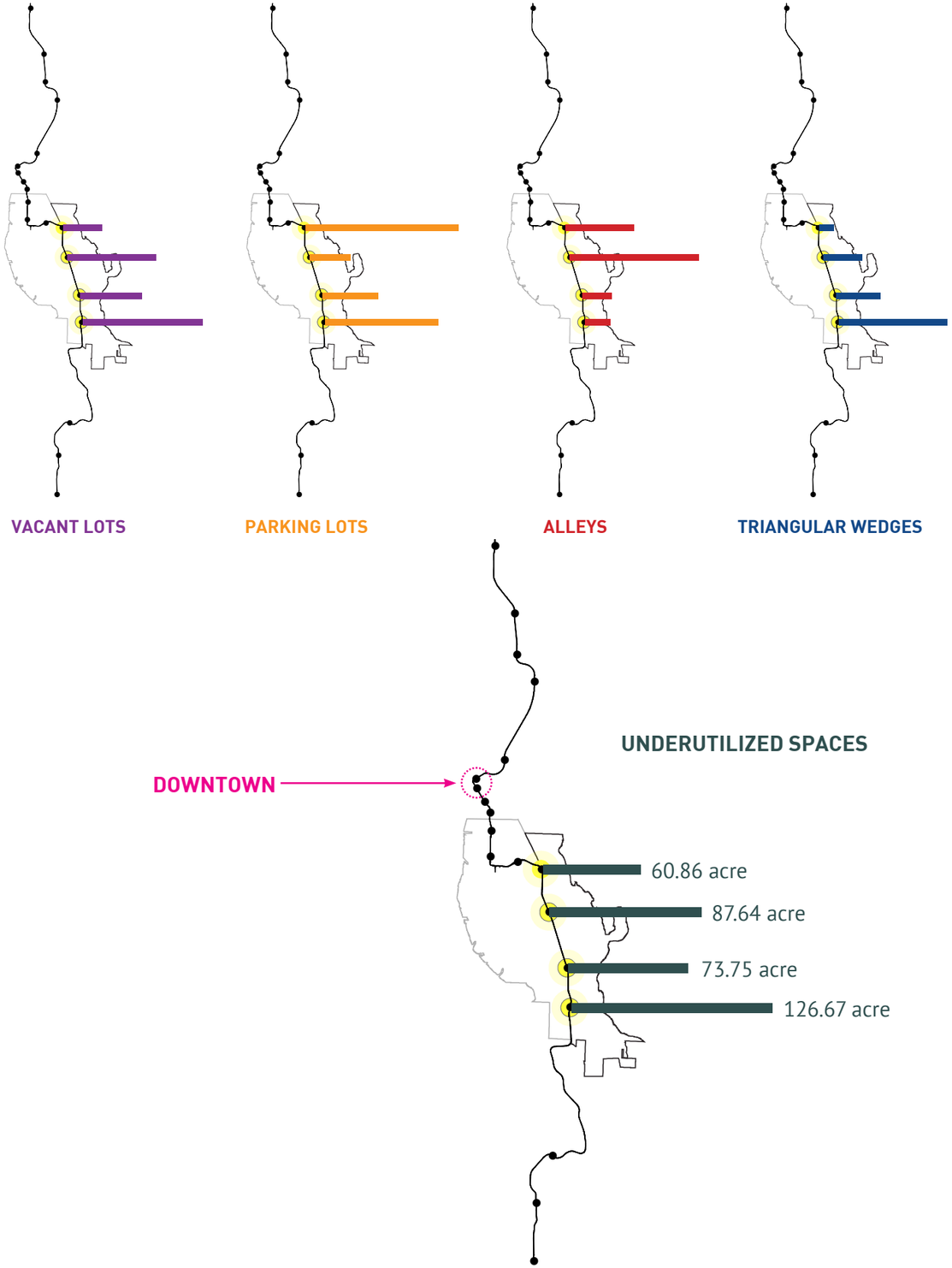

Figure 5.5 - Relative percentage of underutilized spaces in a 1/2 mile radius around transit stations in south Seattle

PARKING EFFICIENCY

The design intervention of this research is built on the findings from the spatial mapping of underutilized spaces; specifically the investigation is based on one of the exceptions discussed previously, which is the higher percentage of parking lots around the Mount Baker light rail station. As explained in the previous section, this area has the highest percentage around a transit station, which is contrary to the principles of transit-oriented developments where one of the chief characteristics is controlled, managed and reduced parking around the main transit station. Although, the usual pattern of TOD is not being followed closely around Mount Baker, it should be noted that the light rail station has been in operation for 8 years at the time of this research. It should also be pointed out that Mount Baker was previously an urban fringe of Seattle in the early 20th century, hence had a higher concentration of manufacturing, industrial and commercial properties that still exist now. The neighborhood of Mount Baker has grown around these establishments and the construction of the new light rail station has only recently started to begin the discussion of whether there is an immediate need of changing the zoning laws for the neighborhood, particularly in the ½-mile radius of the station. However, for the purpose of this research, Mount Baker has been chosen to solely explore the efficiency of parking lots by better utilizing their potential through diversifying and managing mixed-use program in the surrounding areas and not to design a masterplan for the neighborhood.

The issue of parking efficiency has puzzled researchers and policy-makers around the world. One cannot simply say that parking lots are a waste, because they are perceived to be used heavily. However, if one observes closely it is easy to understand that they are not used all the time, they are either being completely used or heavily underused. A wide body of research has not only investigated whether changing land-use functions around or within parking lots can mitigate this problem, some of these projects have been successful and is discussed in the following section.

On the other hand, a different set of research has focused on the pricing of parking and cost involved in different types of parking which would effectively suggest why parking lots remained underutilized. Donald Shoup, distinguished research professor of urban planning and Georgist economic philosophy at the University of California at Los Angeles, comments that parking should remain free when occupancy is less than 85%. This is because at free pricing it is in the public good for marginal cost that adding another user becomes zero. However, with increasing demand, the public good becomes crowded and it takes time to find a vacant spot, hence increasing the marginal cost of increasing another user.[1] Shoup uses a research conducted by the Road Research Laboratory in central London in the mid-20th century to illustrate the relationship between pricing and parking congestion. A series of data gathered in London's Grosvenor Square before parking meters were installed (March, 1958), with parking meters at 6 pence per hour (April, 1959) and parking meters at 2 pounds an hour (August, 1965) highlight the decrease in congestion a simple policy change can bring (Fig. 5.6).[2] Although Shoup's work highlights pricing as an important component in parking design taking the example of curb parking, it should be noted that policy changes have great implications in shaping how we manage parking lots in the future.

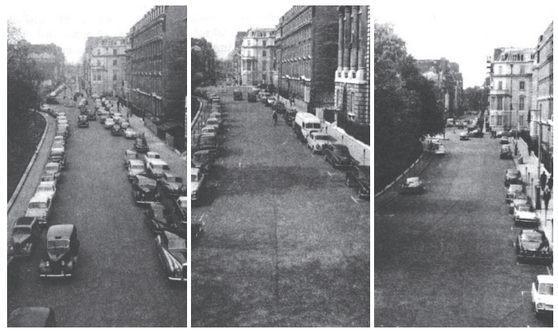

Figure 5.6 - Parking occupancy decreasing with increase in metered parking in London, from left to right, in 1958, 1959, and 1965

ALTERNATIVE PARKING STRATEGIES

Many projects around the world have started to explore variations in how a parking lot is used as well as where we park our cars. The following series of paragraphs examines how some of these solutions, both temporary and permanent, are looking at revolutionizing the use of parking lots.

TEMPORARY

Certain solutions that have been implemented through efforts of citizen groups or through design activism including temporary parklets. These parklets have gained popularity by activating parking spaces for a short period by converting them into spaces with an alternative function, such as seating areas, rest areas, to provide for greenery or public art or some other form of visual scenery. These parklets are usually considered a form of extended sidewalk by converting one, two or more parking spaces based on the function that would be provided. Even though they are considered functionally important in many cities such as San Francisco, CA as they provide shelter for pedestrians and improve the quality of life at the street level, they are constructed as temporary infrastructure so that they can be removed easily during emergencies. These spaces are usually thought of as public space and may provide alternative spaces such as bike parking and casual seating areas adjacent to an eatery.

The Pavement to Parks Program (Fig.5.7) implemented in San Francisco aims to reclaim pockets of unused land in the right-of-way and convert them into usable spaces (Fig. 5.8).[3] Similarly, Bell Street in Seattle, WA is another such example where parklets have been designed in conjunction with vehicular traffic needs to create a multi-functional street design (Fig. 5.9).[4] Many cities have, however, converted some of these spaces into private spaces that act as alfresco dining area for restaurants (Fig. 5.10). A separate development that has been started in recent years is the Park(ing) Day, where during every third Friday in September around the world metered parking spots are converted by artists, designers and citizens into temporary public parks (Fig. 5.11).[5] Although these solutions only provide

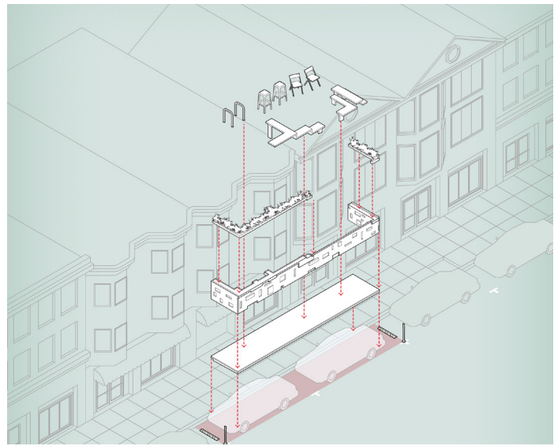

Figure 5.7 - The concept of Pavement to Parks Program in San Francisco

Figure 5.8 - A temporary parklet in San Francisco, CA

Figure 5.9 - Multi-functional street design of Bell Street in Seattle, WA

Figure 5.10 - Alfresco dining at Bulldog News in Seattle, WA

Figure 5.11 - Park(ing) Day event on a street in Tampa, FL

Figure 5.12 - Parking at Herman Miller factory in Cherokee County, GA

Figure 5.13 - Parking garage at the civic center in Santa Monica, CA

temporary respite by reclaiming parking spaces, they do provide lessons in understanding how certain spaces can be used for alternative purposes as opposed to having spaces dedicated only to parking.

ENVIRONMENTAL CONCERNS

Parking lots have long been known to increase environmental pollution. Being impermeable, they do obstruct the natural method of infiltration into the groundwater table and by draining off pollutants with stormwater runoff; they actually add harmful chemicals to the surrounding soil. Some of the more recent projects that are looking at parking lots in a different way are aiming to mitigate both the above concerns include the landscape for the Herman Miller furniture factory in Cherokee County, Georgia (Fig. 5.12). Designed by Michael Van Valkenburgh Associates (MVVA) the project required 10 acres of parking for cars and semi-trailers. MVVA's solution to the design for such a massive impervious surface involved letting the water drain off into constructed wetlands containing grasses, forbs and sedges; when dry these wetlands become meadows, while the edges transition into thickets of floodplain trees.[6] Similar projects such as the parking lots at the Detroit Institute of Arts Museum in Detroit, MI by Robert Irwin and the one at the Fiat Factory at Lingotto, Italy by Renzo Piano elucidate the importance of environmental concerns associated with designing of parking lots.

PARKING GARAGES

Surface parking has long been the established way of creating spaces for parking one's car. However, with increase in private car ownership and cars themselves becoming a more affordable commodity it has led to solutions such as multi-storied parking garages that aim to reduce the overall footprint of parking spaces by transferring the density of cars into one consolidated building. Although parking garages are a better solution where amount of surface parking is greatly reduced, it should be noted that amount of cars stored in a garage is less than what it

would be possible in a surface parking lot. While in terms of expenditure, covered parking costs 5 times more than surface parking, which could be 10 times if that parking is underground.[7] Keeping this mind, one can understand that building a parking garage comes at a greater cost than surface parking even though there are huge social benefits (Fig. 5.13).

MULTI-PURPOSE

Revisiting the concept of parking efficiency, it is easy to understand that both surface parking and parking garages are in both design and utility inefficient. Temporary solutions will, however, not be able to solve this problem because these solutions are geared more towards activating pockets of spaces rather than raising the utility/efficiency component. One such project has been able to take steps in the right directions. The 1111 Lincoln Road on Miami Beach, Florida designed by Swiss architects Herzog & de Meuron in 2010 elevates the concept of the single-use parking lot into a multi-purpose facility (Fig. 5.14). An open façade building with 360 parking spaces, it features seven floors of varying heights supported on zigzagging columns. Having no exterior walls and high ceilings in certain places it provides sweeping 360° views of the city of

Figure 5.14 - 11 11 Lincoln Road parking garage in Miami, FL

Figure 5.15 - Lincoln Road parking garage during normal business hours

Figure 5.16 - Lincoln Road parking garage being used for game of chess

Figure 5.17 - Lincoln Road parking garage during a private evening party

Figure 5.18 - Lincoln Road parking garage during a morning yoga class

Figure 5.19 - Park 'n' Play with play area on the roof of a parking garage

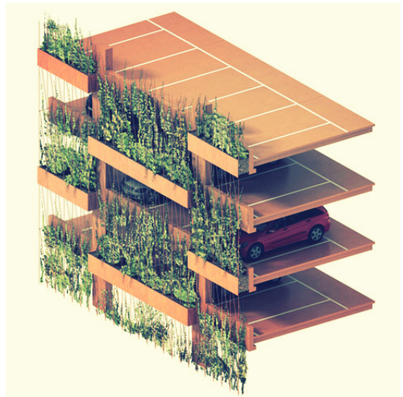

Figure 5.20 - Sectional axonometric view of facade with planters

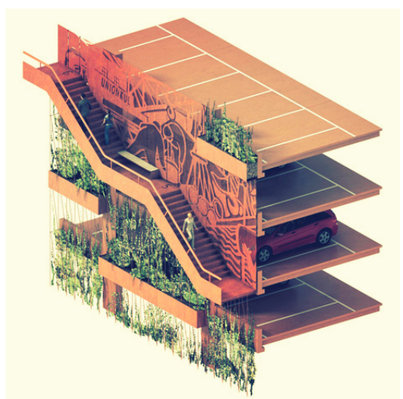

Figure 5.21 - Sectional axonometric view of facade with outside staircase

Miami and hence can be converted into a gathering venue for private events, such as wine tastings, dinner parties and yoga classes. Joggers have been known to use the building as well as tourists into the city (Fig. 5.15 - 5.18).[8] Parking for cars in this building is the primary function to support the adjacent Lincoln Road Mall as well as supporting some of the smaller retailers at the street level, however, the design has been conceived in such a manner that it can be used for multiple other purposes. Projects such as this, thus, have paved the way for treating parking lots for more than one use.

MULTI-USE

A similar approach has been taken in Copenhagen, Denmark where a parking garage has been conceived as a multi-use establishment, The Park 'n' Play concept by JAJA Architects for a competition organized by the City Development and Copenhagen Port for a new development in the Nordhavn area (Fig. 5.19). The concept by the architects involved a generic multi-car parking garage made of brick which is influenced by the historically industrial; area and is wrapped around by a staggered pattern of planting boxes and greenery to cover the parking spaces. This not only allows the garage to be broken up to prevent it from having a monotonous façade but also allows a massive staircase to be wrapped around the building to create a more humane experience. The staircase leads all the way up to the roof that has multiple play structures as well as areas that provide sweeping views of the city (Fig. 5.19 - 5.21).[9] Projects such as this are aiming to create a multi-layered structure in their program function thus allowing previously what would have been termed underutilized spaces such as parking lots into spaces with multiple uses.

UNDERSTANDING PARKING EFFICIENCY IN MIXED-USE FUNCTIONS: A CASE STUDY

As discussed before, parking lots are effectively defined by their efficiency and not so by their design. Although it can be argued that a well-designed parking lots that considers vehicular and pedestrian movement patterns as well as environmental concerns is a good example of well-functioning design, however, it is a measure of their efficiency that brings to the fore how utilized or underutilized they are. Traffic engineers consider that, "If fewer than 85% of the spaces are occupied, then the facility is underused".[10] To test this fact, this thesis has performed a video-analysis study of a particular parking lot in northeast Seattle and to check whether the occupancy levels are reaching the 85% mark.

The choice of this parking lot is critical, as it should meet certain criteria based on the topics discussed in the previous section.

- It should not be a parking lot for a single use
- It should have occupancy both on weekdays and weekends
- It should be close to a commercial or business area

The parking lot chosen, however, meets only the above two criteria. As seen from Figure 5.22, it can be seen that the parking chosen as the study area is not the main parking lot for both the two main establishments surrounding it, which are the Blessed Sacrament Church and the University Child Development School, both of which have their separate primarily parking lots, which are more towards their entrances. This particular parking lot with a total capacity of 68 cars hence is used more as an additional parking that is shared by both establishments. Additionally, this lot acts as a park n' ride for people going to work in downtown Seattle by taking public transport from a bus stop about a block from the study area. As a result, this parking lot has the potential to be served by multiple establishments as well as functions that do not necessarily overlap.

The video-analysis study conducted on this parking lot was done over a period of 5 days between 2pm on a Thursday till 11am on the following Monday, a total time of 93 hours spread over weekday and weekends. The analysis was broken down into equal time segments of 1 hour and 15 minutes each. The methodology of this study included counting the number of cars leaving and entering the lot at any given time and thereby counting the percentage occupancy of the lot at the end of every time segment. These data have been tabulated together and shown in comparison with business hours for both the church and the school (Fig. 5.23). The occupancy levels have been broken into five segments and the yellow line drawn on the graph indicates the 85% occupancy mark as discussed by Donald Shoup.

As illustrated on (Fig. 5.24), the analysis based on the study shows the following observations:

- Occupancy closely coincide with business hours for both church and school.
- Occupancy during church hours rapidly increases and then rapidly decreases, especially during evening, thus indicating that the church activities contributes more to the occupancy than the school, which is a child development school.
- Occupancy during weekday mornings increase primarily due to school hours during drop-off for students, but remain relatively high till 4-5pm due to the conversion of the lot into a park n' ride
- Occupancy levels climb gradually on weekday mornings and reaches a high of 100% between 12.30 pm and 3pm on weekdays. At the same time, cars enter and leave the parking lot at the same time, indicating a higher demand than what the supply can meet. This is due to presence of surrounding businesses and students being picked up from school.
- Weekend occupancy levels are much lower than weekday levels when the lot is not used as a park n' ride and the school remains closed. The church however remains open on weekends and draws in considerably higher occupancy both around Saturday and Sunday evening mass hours.
- Evening mass hours on weekends show a rapid rise in occupancy from 0-5% to about 95% in one time segment before dropping sharply to under 10% again in the next time segment.
- Sunday morning occupancy levels are overall consistent with church mass hours with similar numbers of cars entering and leaving the lot during any time segment, thereby keeping the occupancy levels between 25-65%
- As seen from the graph, the 85% occupancy benchmark is, however, reached only twice during weekends and about 5 times during weekdays. Translating this number into percentage this means, the parking lot reaches the number of 85% only 5% times during weekends and 22% during weekdays.

In conclusion, although this parking lot has multiple uses associated with it, it falls well below the 85% limit and classifies as a poorly functioning lot, or in other words, an underutilized facility. This research, therefore, postulates that the 85% mark is a relatively high number and reaching the figure is possible only a few times over the course of a day. This means that the facility will be either grossly underutilized (under 10%) or well utilized (more than 85%). This research, hence, wants to highlight the simple fact that any car would ideally require atleast 2 parking spaces within a city, namely one at the place of work and one at their place of residence. Added to this is the fact that cars remain stationary 95% of the time.[11] This ideal scenario means that any parking space therefore would be able to achieve a maximum occupancy level of 50%. Based on these, this research attempts to improve the occupancy levels, but not to achieve the 85% mark, but a more realistic target of 50%.

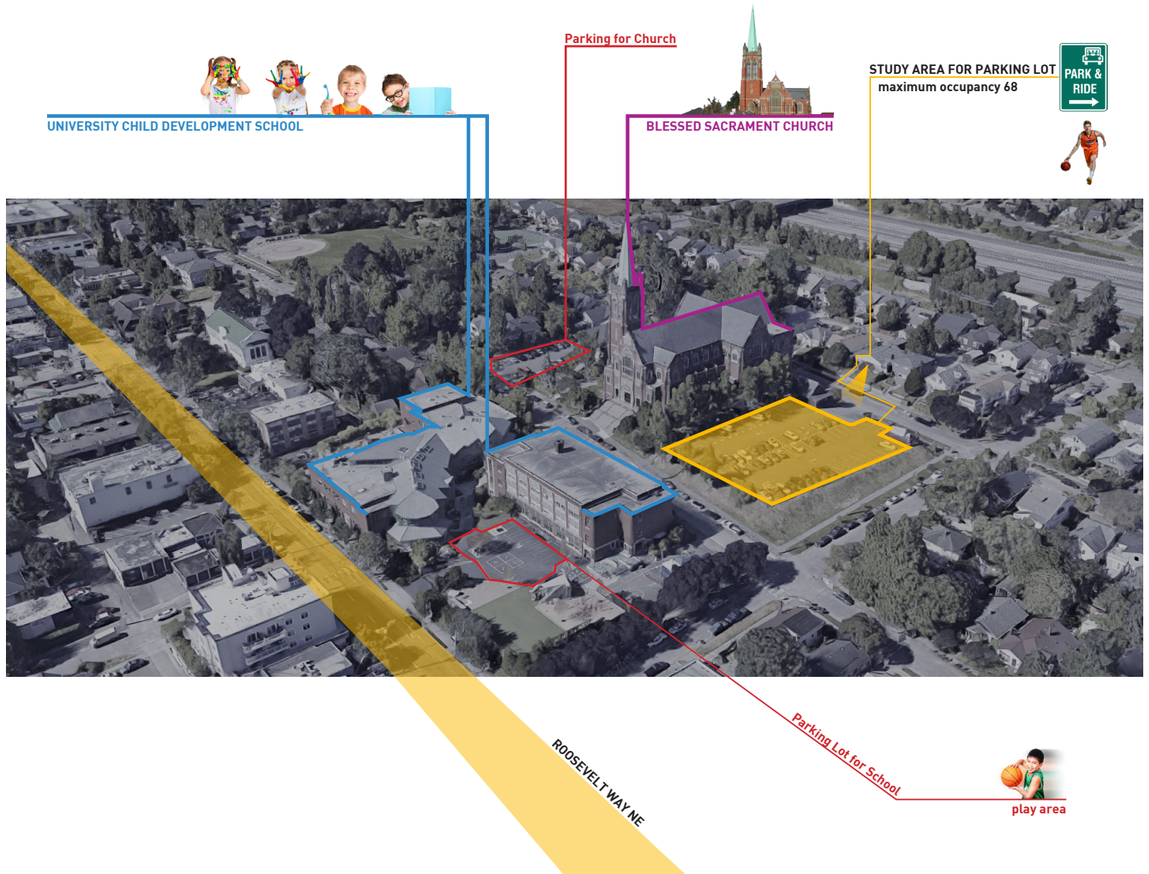

Figure 5.22 - Location of parking lot studied to determine the parking efficiency in mix-use functions

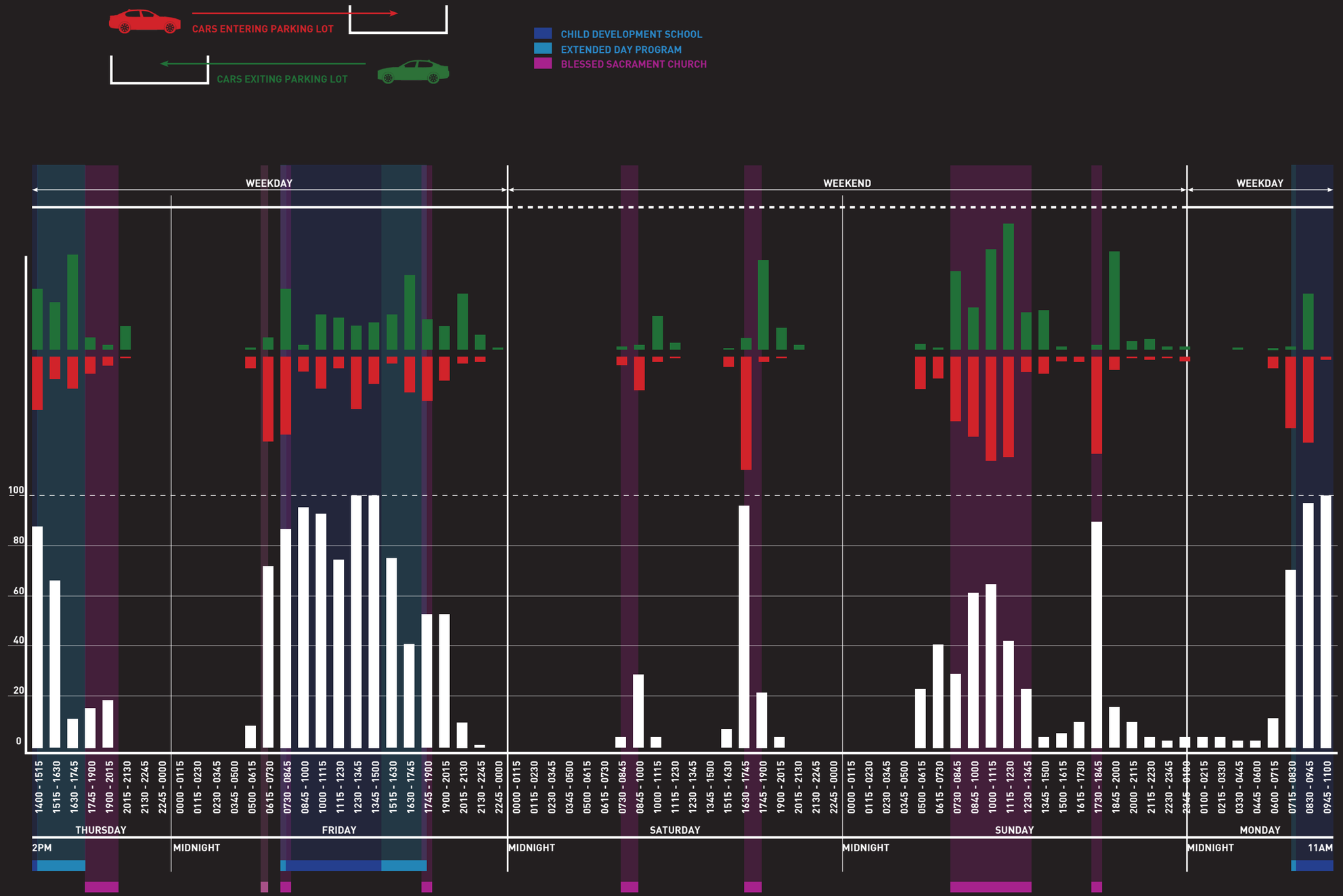

Figure 5.23 - Video-analysis study of a parking lot in north-east Seattle to understand parking efficiency

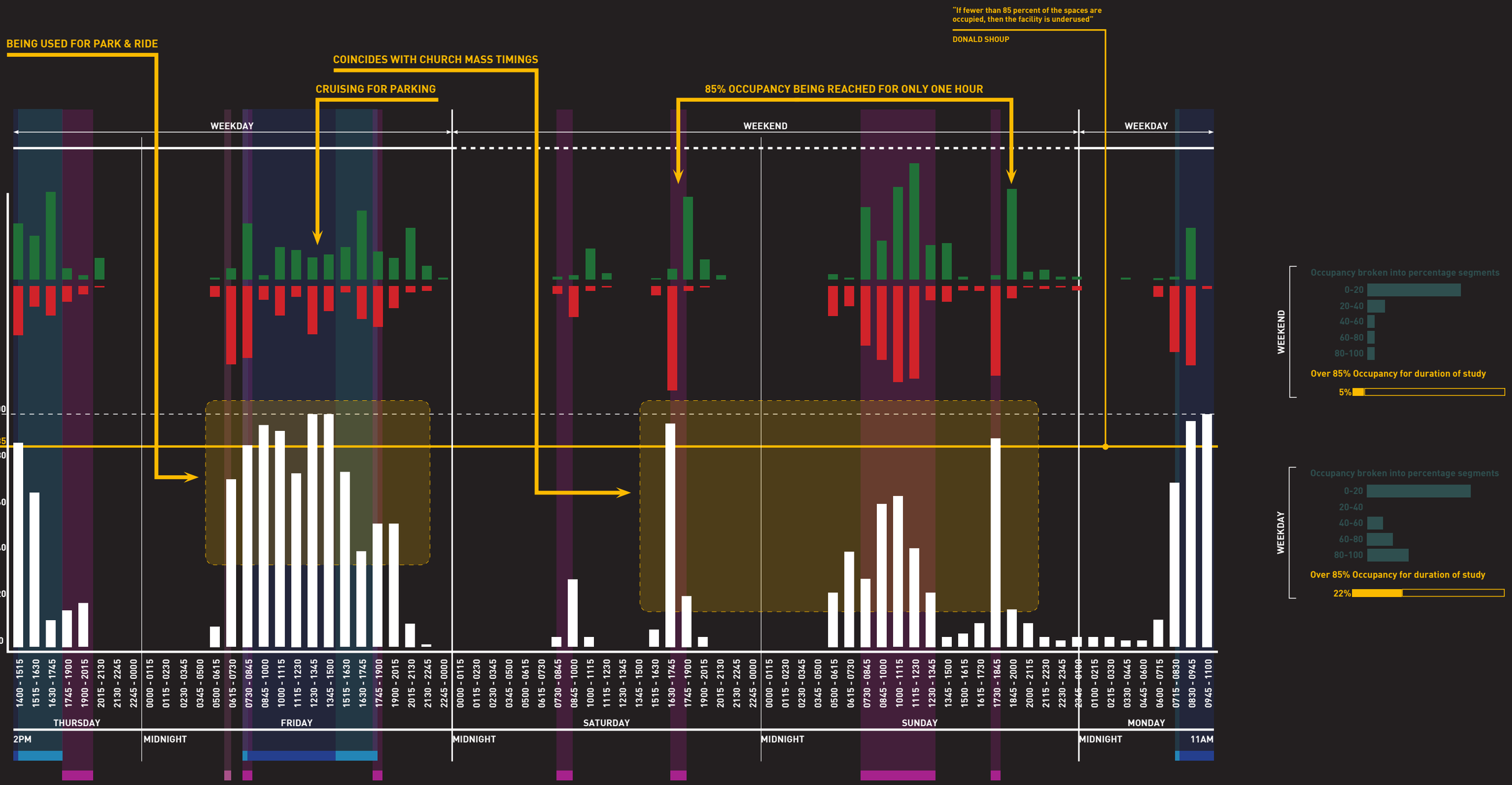

Figure 5.24 - Video-analysis study of a parking lot in north-east Seattle to understand how multi-use functions can improve the parking

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"It is the prerogative of the designer to integrate these disaggregated spaces into the urban fabric and assign meaningful functions with a view towards social engineering" – Alan Berger

6_DESIGN INTERVENTION

This chapter discusses the potential of underutilized spaces in urban regeneration through a contextual example of parking lots around the Mount Baker light rail station in south Seattle. As discussed before, underutilized spaces are varied and they are contextual. This research explores what is the potential of parking lot in one such location through a mixed-use development.

DESIGN FRAMEWORK

Designs for underutilized spaces have predominantly been activating the spaces for some short-term purpose some that is provisional. While other solutions have taken more, concrete form and are more enduring. However, is it right to convert them into an entirely different place in terms of their function?

This research identifies that diversifying the program over time not only provides a framework for the design that can be applied both for activation of the space but also allows these scattered voids to become part of the more functional urban fabric, in the traditional way (Fig. 6.1).

This thesis proposes that the framework for design involves a diversification of program over time (Fig. 6.2). It starts with determining the site extent and analyzing spatially the zoning laws it and the spatial extent of underutilized spaces as well as understanding the demographics of the people living around it. This allows the designer to formulate a masterplan of tentative design strategies in a systematic process that includes framing the scattered mass, establishing landmark points and increasing the access and activity to these spaces. The purpose of the masterplan is not to design based on that but to have a framework of what can be designed in those spaces. The next steps involve identifying some target parcels and designing for them before they are constructed. At this stage, the most important step is to determining the performance of these parcels once they are constructed by referring back to the masterplan. As seen from Fig. 6.2, this process is devised in the form of a Gantt chart, which indicates that these steps do not follow one after the other but they overlap and the most important step is the determine their performance. If the performance of the parcels are low, over a period that means that the masterplan that was devised initially is not working properly and one needs to return to the initial steps of background research and begin working towards a new masterplan. This framework, hence, allows for changing the larger design periodically based on changing conditions, while at the same time remains contextual to one place.

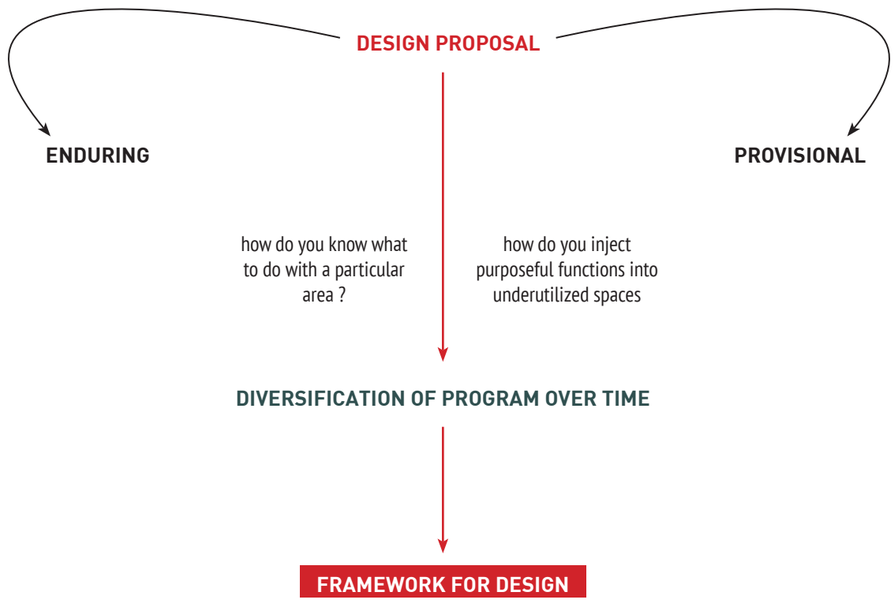

Figure 6.1 - The different types of design proposals

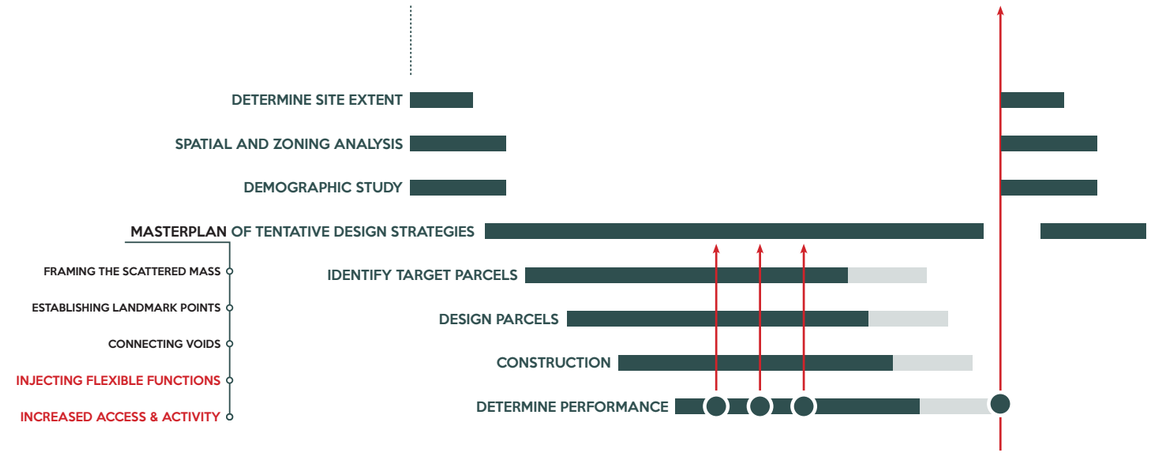

Figure 6.2 - The proposal for the framework for design and how it can evolve through stewardship over time

FINAL STUDY AREA

The final study area that has been chosen for this research is around the Mount Baker light rail station where the two major arterial roads of Martin Luther King Jr Way South and Rainier Avenue South intersect (Fig. 6.3). This study area falls inside the newly identified Mount Baker Town Center that is part of the larger North Rainier Urban Village (Fig. 6.6). This area is predominantly a single-family residential zone with the neighborhood commercial being concentrated towards the light rail station (Fig. 6.7). At the same time, the central area has a higher percentage of underutilized spaces, predominantly within a ¼-mile radius of station (Fig.6.8-6.9). This could be because this area surrounding the station is currently zoned as manufacturing and industrial thereby contributing to large amount of parking lots and vacant lots.

For the purpose of this research, however, a smaller study area has been selected which envelops the immediate area surrounding the light rail station, where possibilities of creating mixed-use developments and higher densities are highest (Fig. 6.10). Some of the existing establishments that influence the selected study area has been illustrated in Fig. 6.11 to indicate that any design intervention planned within a selected area can be influenced by surrounding program. This is important, especially in terms of parking lots, which can be programmed in such a fashion that they can be used by multiple establishments, instead of being used by just one.

Figure 6.3 - Overlooking the Mount Baker light rail station at the intersection of Rainier Avenue S (left) and Martin Luther King Jr Way S (right)

Figure 6.4 - Overlooking Martin Luther King Jr Way S running parallel with the elevated light rail tracks

Figure 6.5 - Overlooking parking lot for Starbucks and US Bank adjacent to the bus transit center, the light rail station is in the background

Figure 6.6 - Mount Baker Town Center area and the light rail station

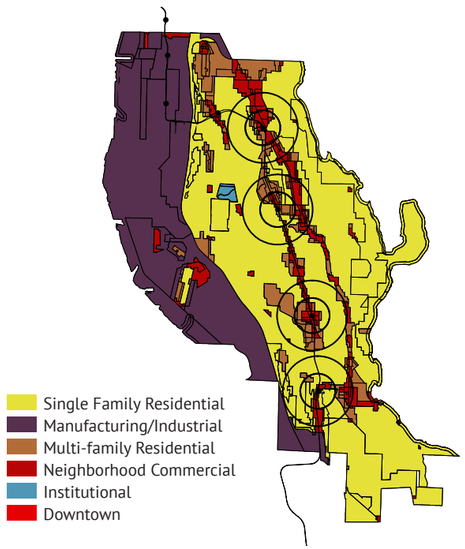

Figure 6.7 - Existing land-use zoning in south Seattle

Figure 6.8- Map of underutilized spaces around Mount Baker light rail station

Figure 6.9 - Different types of underutilized spaces lie all around the Mount Baker light rail station, most of which underlines the human inactivity there

Figure 6.10 - Final study area selected around Mount Baker light rail station

Figure 6.11 - Final study area selected around Mount Baker light rail station and the surrounding establishments

TEMPORAL ANALYSIS OF PARKING LOTS

This research takes into consideration the spatial extent of the parking lot in this study area by undertaking a temporal analysis. Data obtained from Google Earth from 2002, prior to the construction of the light rail station shows that parking lots and vacant lots dominated most of the selected area (Fig. 6.12). Similar GIS data obtained from City of Seattle shows that in 2017, almost eight years after the construction of the station there has been marginal change both in terms of underutilized spaces as well as in the built fabric (Fig. 6.13). Based on the data obtained from the Mount Baker Urban Design Framework as proposed by the City of Seattle for the year 2030, Fig. 6.14 shows that there may be major change, not just in the selected area but the entire Mount Baker Town Center. This change will be in the form of newer buildings with increased densities and increased height (Fig. 6.15). Based on the plans proposed by the City of Seattle, would this mean more parking? The proposal by the upcoming developments and the planned future for more residents in the town center would not only mean more requirements for parking spaces, but more importantly for underground parking lots (Fig. 6.16). This is an alarming situation, as underground parking requires ten times more expenditure than surface parking and covered parking requires five times that of surface parking. Being in a predominantly poorer section of the city, this current trend indicates signs of gentrification and displacement of existing residents. Therefore, this requires a major change in the planning and design of parking lots as explored by this research in the following sections.

Figure 6.12- Map of parking lots around Mount Baker (2002)

Figure 6.13- Map of parking lots around Mount Baker (2017)

Figure 6.14- Map of parking lots around Mount Baker (2030)

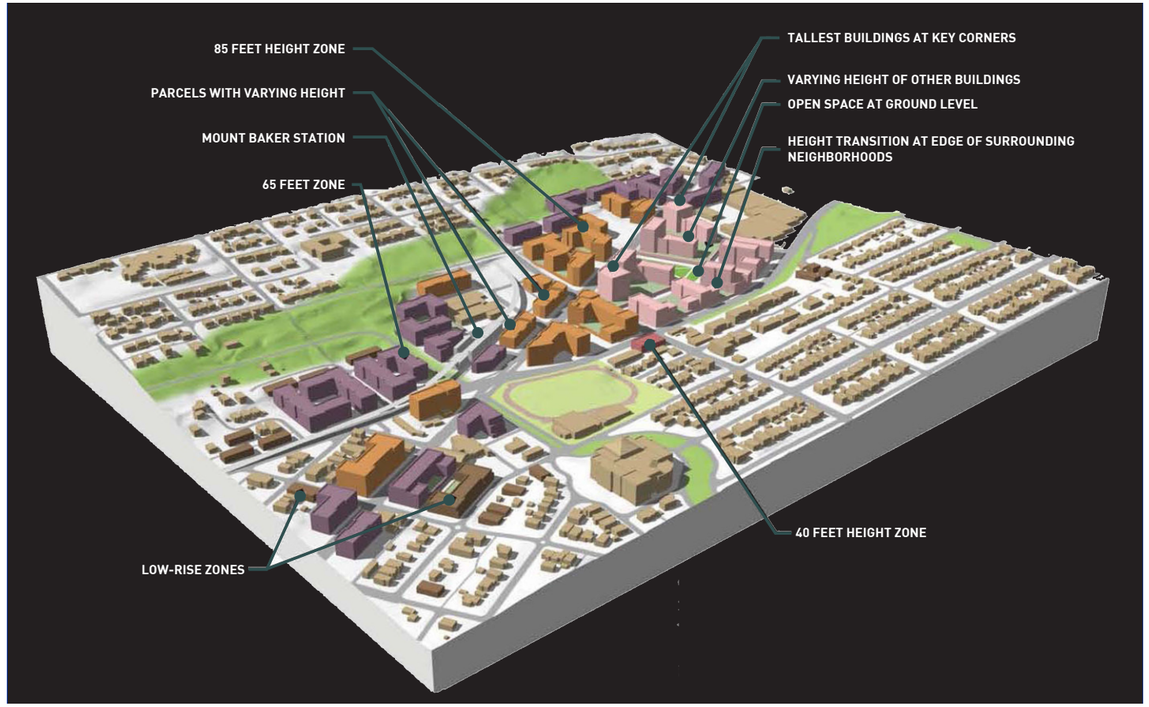

Figure 6.15 - Proposal for the larger Mount Baker town center by the City of Seattle

Figure 6.16 - Potential map of underground parking, based on City of Seattle planning projections (2030)

PARKING LOTS OF THE FUTURE

Today, the parking lots are designed for the sole purpose of parking cars and more often than not serves single establishments. Hence, the term underutilized for these spaces. So what can be done to reduce or better manage these spaces in the future? This thesis proposes that one solution for this problem could be by targeting auto-oriented mixed-use. Also keeping surface parking can be beneficial, primarily for reducing cost expenditures but also to use these spaces for multiple other activities. The strategies proposed by this thesis have been considered not to provide 100% occupancy at all times but to devise a program such that an occupancy level of 50% or closer can be achieved. It should be noted that occupancy here not only means occupancy through cars but also through other activities (Fig. 6.17):

- Different uses for different times of the day so that different establishments with different business hours can stake claim to that one parking lot.
- Zoning incentives in auto-oriented business centers so that higher densities can be achieved which in turn serves the parking lot.
- Improving walkability through design so that more people are willing to park their cars and walk to their point of destination rather parking at the destination.
- Design based on peak demands and not on square feet of space as is the norm today through better management such that total parking needs can be optimized.

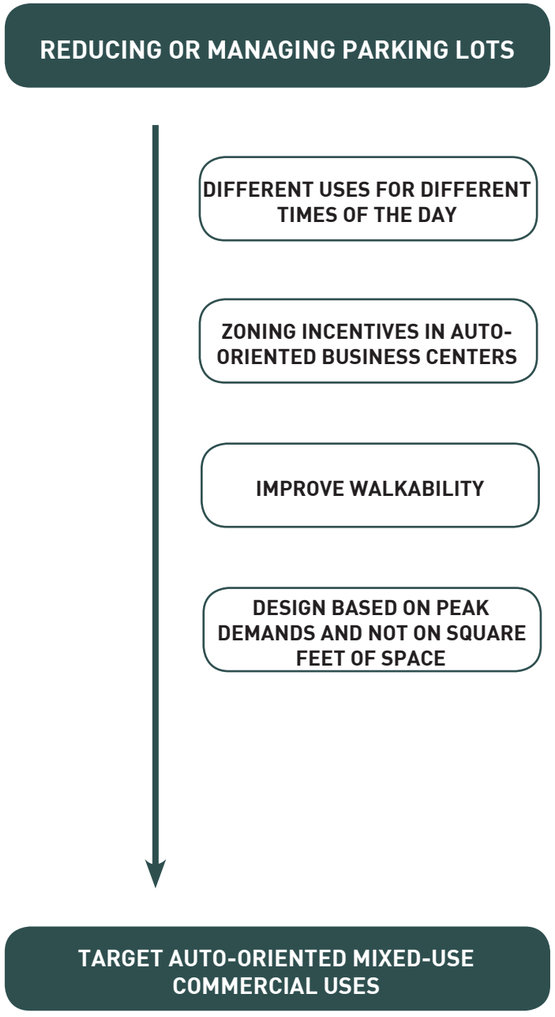

Figure 6.17- Strategies for management of parking lots

DESIGN FRAMEWORK

As stated previously, underutilized spaces can become the solution for a city to reverse urban decay of form and fabric by fostering urban regeneration and as explained earlier this regeneration can be contextual and should not be in the form of prototype design solutions. For the purpose of this research, this hypothesis has been tested at the study area around the light rail station around Mount Baker in south Seattle. This area has the highest potential for development and opportunity in the city and as a result, the City of Seattle in conjunction with local urban designers and community members have taken the initiative to increase height and density in this neighborhood in anticipation of the future changes. This area is known to be largely auto-dominated, hence a high percentage of parking lots, which goes against the grain of transit-oriented development. In order to address these pressing concerns and changing urban landscape, this thesis presents a restructuring of planning strategy concerning how parking lots can be used in the future. It should be noted that this visioning strategy is aimed to producing the scaffold for design in the future and not to suggest an exact design solution for this study area.

Figure 6.18 shows the buildings that the City of Seattle is planning for the future, along with the buildings this thesis proposes and the existing buildings that should be retained.

Highlighted in the same image are the four parking lots that are either being expanded or modified. These lots has been conceived as surface parking lot with some having the potential to be converted into multi-story parking garages. Each of these four parking lots has been conceived separately with regards to their target population and usage. However, separate strategies have also been posited based on how functions can be spread out among the different lots so that these lots can be utilized for collective functions. The new buildings that have been proposed include a combination of commercial offices closer to the existing bus transit center, convenience store next to the light rail station, live-work spaces and mixed-use residential along Rainier Avenue South and consolidation of the church buildings along MLK Jr Way South.

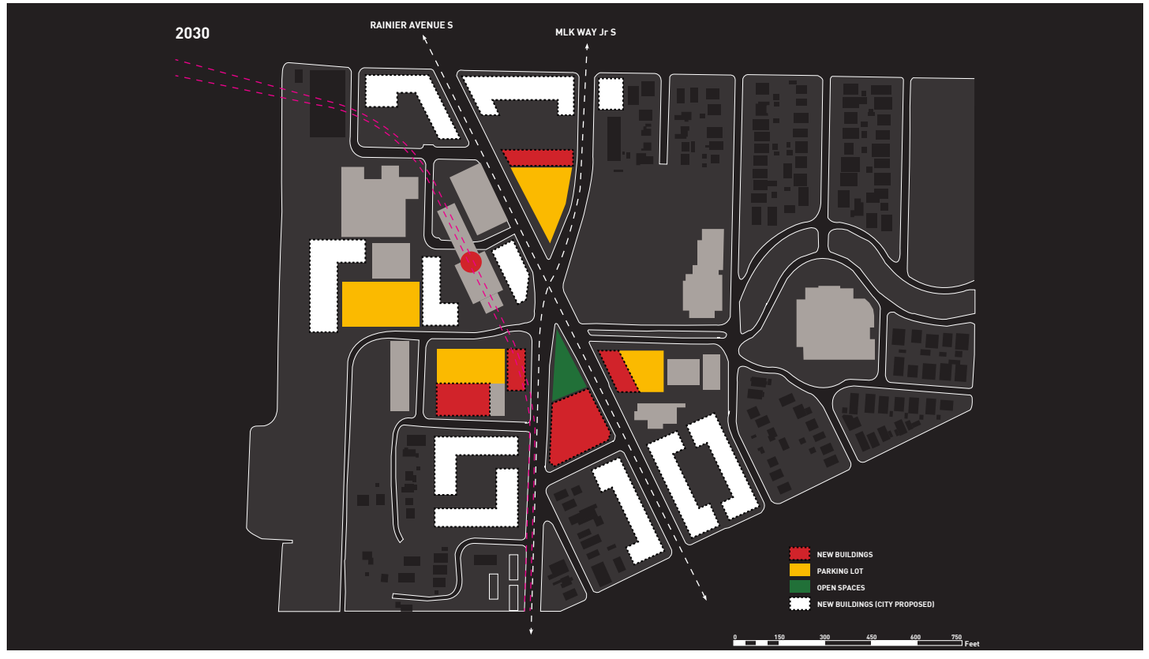

Figure 6.18 - Proposed planning scenario for Mount Baker in 2030

The individual strategies proposed for these lots have been explained at length below and have been substantiated with projected occupancy levels for a period between Fridays to Mondays of any given week:

- The parking lot on the east side has a target population that is comprised of the Franklin High School, live-work spaces, the Puget Sound Scout Shop and other proposed mixed-use businesses along Rainier Avenue (Fig. 6.19).
- The parking lot on the north side has a target population that is comprised of new commercial offices and other local businesses. However, this space being at the heart of the projected Mount Baker Town Center has the potential to act as a gathering space or event space, including informal night market and weekend farmers' market (Fig. 6.20).
- The parking lot on the west and south side have been considered together and their target population comprises of the Way of Holiness Church, Kings Hall community center, convenience store and local businesses as well as for light rail commuters using the lot as park and ride (Fig. 6.21).

Seen separately, these parking lots exhibit varying occupancy levels, the combined figures for the west and south lots exhibit higher numbers while the north lot has an exceedingly low occupancy especially on weekdays. However, the true potential for these spaces in urban regeneration can be achieved if these lots work in conjunction with each other. Figure 6.22 shows what these occupancy levels would like if seen together and compared against the multiple uses that have been proposed earlier for each of these lots. Some of the strategies that can be applied if these lots function collectively include situations such as having a Saturday farmers' market on the north lot during Saturday mornings being one of the more centrally located out of all the four. At the same time, people visiting the market can park their cars on the other lots. Effectively this means that by adding a function on a weekend allows one parking lot to be used for a function other than parking cars, while at the same time transferring the cars to the other lots, thereby proposing an overall usage of all the lots at the same time, which in this case is not just about parking cars. Similar strategies have been

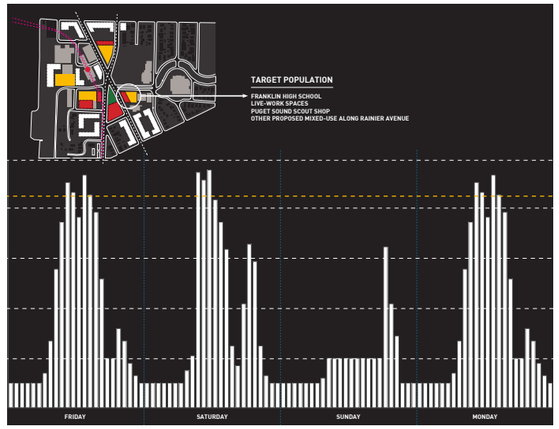

Figure 6.19- Parking scenario for east lot

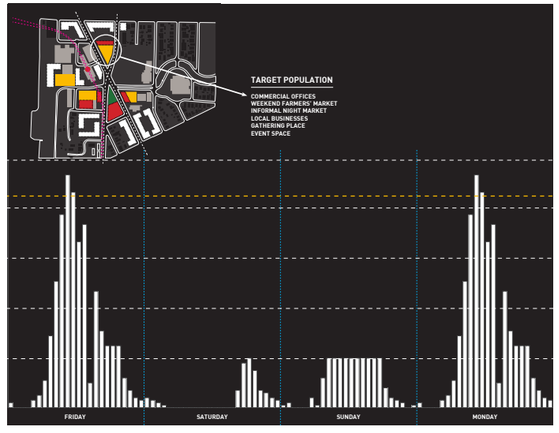

Figure 6.20- Parking scenario for north lot

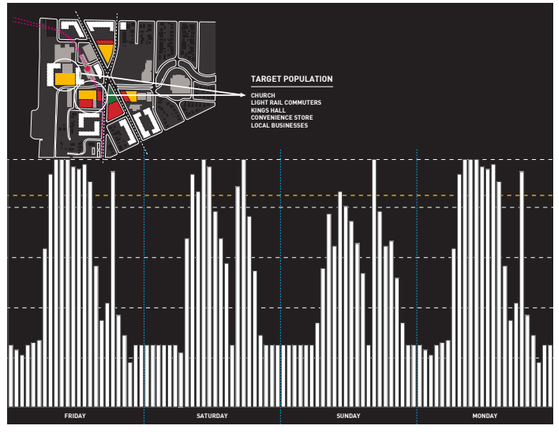

Figure 6.21- Parking scenario for west and south lot

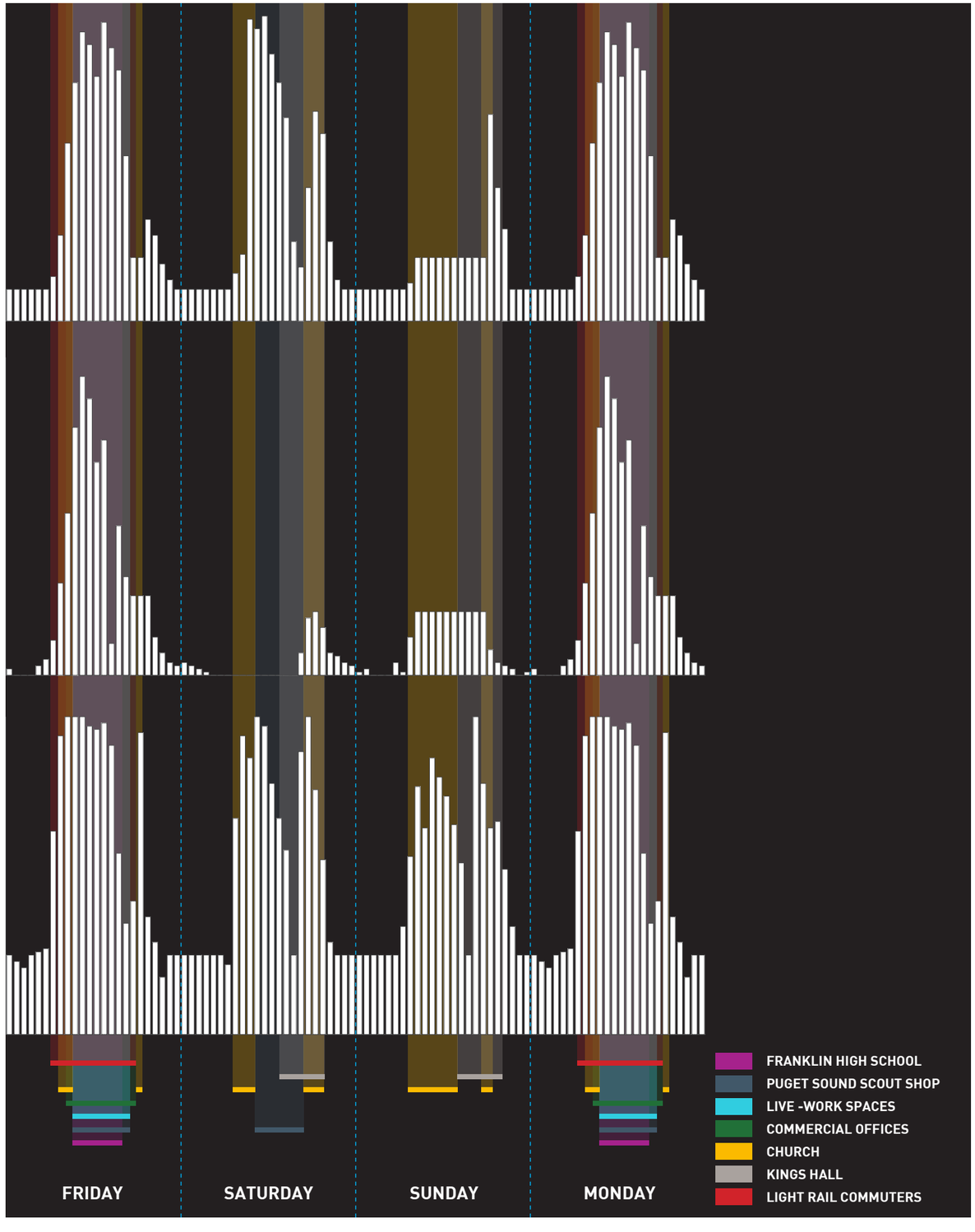

Figure 6.22 - Occupancy levels of all parking lots seen together

used for parking cars for light rail commuters and churchgoers, while some lots convert into basketball court (near the school) or into some form of gathering place, during which the parking occupancy is restricted to a certain percentage, such that space is reserved for other activities. This restriction is placed such that other cars do not cross certain limit during off-peak hours but transfer the utility of the lot into other community functions.

If all these graphs for all the four lots are combined together (Fig. 6.23), it can be seen that the occupancy levels breach the 85% mark only a few times and almost exclusively on weekday afternoons. However, if one observes the 50% mark, it can be seen that most of the occupancy levels either cross or hover around that mark, achieving about 42% occupancy during the course of four days shown here. The target here is not to increase occupancy closer to the 100% level, but attempt to achieve closer to the 50% benchmark. What is not visible from the graph is that some of the lower occupancy levels actually coincide with periods of the day when other informal and formal activities occur on these lots, which may not be parking cars but some other function that attempts to serve the surrounding community. Thus, it can be conclude that these spaces are still underutilized, but with the potential of improved efficiency.

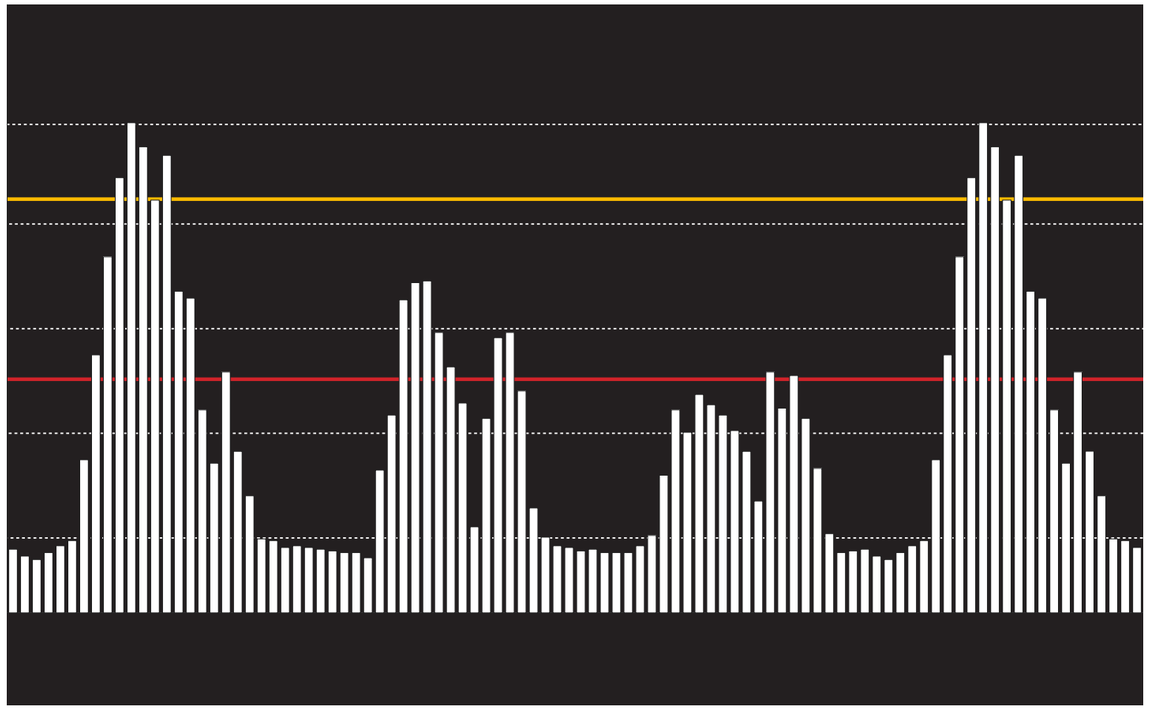

Figure 6.23 - Combined occupancy levels of all parking lots

IMAGE CREDITS

Figure 6.6. WAGDA, "City of Seattle GIS Data," Washington State Geospatial Data Archive, 2017, https://wagda.lib.washington.edu/.

Figure 6.7. Ibid.

Figure 6.8. Ibid.

Figure 6.12. Google, "Map of Seattle," Google Earth, March 20, 2014, https://www.dezeen.com/2014/03/20/jaja-architects-designs-a-car-park-covered-in-plants-with-a-park-on-its-roof/.

Figure 6.13. Ibid.

Figure 6.14. Ibid.

Figure 6.15. Office of Planning & Community Development, "Mount Baker Town Center: Neighborhood Design Guidelines" (Seattle, WA: City of Seattle, August 23, 2016), 8.

Figure 6.16. Ibid.

7_DISCUSSION

The basis of this research rests on the idea that underutilized spaces have the potential for urban regeneration. As explained previously through the case of the poverty-stricken yet emerging neighborhood of Rainier Valley and rapidly changing city of Seattle (Chapter 4), this ability varies in different neighborhoods and the ability of underutilized spaces in providing urban regeneration is inherently contextual. This potential of underutilized spaces is, thus, higher in a changing neighborhood such as Rainier Valley. At the same time it should be noted that design interventions that are either provisional or enduring (Chapter 6) do not have the capability to bring about sustained change in a neighborhood. As seen from different examples of parking lots (Chapter 5), which are one of the highest percentages of underutilized spaces, temporary solutions and solutions that are smaller in scale tend to identify single function. They are restrictive in nature and due to the singular functionality tend to gravitate towards the realm of under-utility. Hence, this research identifies that to retain the capacity of underutilized spaces for urban regeneration, planners and designers should prepare programs that allow for a diversification of functions.

Diversity in functions forms the basis of this research investigation and attempts to underscore the fact that spaces such as parking lots tend to be either fully utilized at one time and grossly underutilized at other times (Chapter 5). Functional diversity can be over either a day or over a period of a week and should be mixed-use instead of being restricted to single uses (Chapter 5-6). Unlike other underutilized spaces discussed previously (Chapter 3.A), parking lots and alleys are considered functionally essential in the operation of a city. Parking lots, in particular, are seen as important elements in the urban fabric and their utility in daily life cannot be ignored. However, at the same time, it is easy to understand that they are not being utilized to their full potential.

This research cautions that despite parking lots being considered as underutilized spaces, solutions in converting parking lots into spaces for urban regeneration should not be carried out through a complete overhaul in their functional purpose. The primary function of a parking lot is to park cars and this function should always be part of any discussion undertaken when re-imaging future designs. However, to better utilize them in the future, solutions should be engineered in such a fashion so that other functions can be allowed on those spaces. The example of parking lots in the proposed Mount Baker Town Center around the Link Light Rail station (Chapter 6), suggests that erasing these lots to make way for more housing is not the answer. Rather, they can be allowed to exist by restructuring the functions of the different buildings using them.

The city of Seattle considers the neighborhood of Mount Baker as having one of the highest potential in developing future economic opportunities (Chapter 4). This has been based on access and proximity to varied civic opportunities, but primarily centered on the light rail station, which acts the fulcrum for future developments. The plans proposed by the city are thus geared towards generating a housing demand, which is expected to be the highest among any neighborhood in the city. This proposal allies closely with the larger policy framework of merging the characteristics of transit-oriented developments with the already existing urban village framework that Seattle operates under. Hence, it can be concluded that the future plans for this part of the city is geared towards a more mixed-use development in anticipation of the newer residents that are expected to arrive.

The opportunities in the Mount Baker neighborhood has also largely increased due to the influx of new funding opportunities by multiple government and private organizations that have identified the potential of the light rail station being at the center of this major shift. The gradual shift in public transport policy in Seattle favoring a mass transit system such as the light rail aids in building on transit-oriented and mixed-use framework. As a result, a robust upgrade in zoning ordinances have been proposed for this area. From being a large hub of manufacturing and industrial center inside the city limits, changing demographics have necessitated the creation of mixed-use residential form of development.

The demographics of this neighborhood is markedly different from the rest of Seattle and exhibits one of the highest ethnic diversity within the country. In addition, the majority of this population were born outside the United States, hence are not fully integrated to the local way of living. Furthermore, it should be noted that the population is also largely bordering around the poverty line and the majority of the residents are in their youth. Given the planning policy of the city of Seattle as discussed in the previous section, a major change in the demographics is expected with more new residents expected to occupy the majority of the newer housing facilities. What this means for Mount Baker and the rest of Rainier Valley is a future that has a mix of different immigrant populations with disparate economic conditions. However, in order to keep in mind the needs of the existing residents, the city of Seattle have conducted numerous design charrettes and listening sessions to incorporate the requirements of this vulnerable population into the future planning considerations.

The strategies proposed by this research investigation have been based on field observations and choices of the people in that neighborhood that suggest that developing informal functions would be beneficial to the community, especially given the fact that informal economies have had a major impact in developing countries from where this population originates. In addition, field study suggests that a fair amount of the residents operate local businesses that principally cater to the residents. There is also a fair proportion of the youth struggling to hold permanent jobs, both within and outside the neighborhood. This situation, thus, necessitates that creation of programs that support informal jobs would ideally allow the community to develop more local jobs and allow the neighborhood to alleviate the issue of joblessness. While at the same time provide avenues for far greater community interaction.

This research investigation posits that through diversified mixed-use functions underutilized spaces can act as catalysts for urban regeneration. The potential for multiple functions and mixed uses already exist in this portion of the neighborhood and future investments could be channeled towards adapting their designs around these parking lots. An already vibrant and diverse neighborhood, Mount Baker has the potential to evolve around its neighborhood core by formally developing informal functions. Through a policy of injecting flexible functions into parking lots that not only revolve around utilitarian purposes but also attempts to develop a sense of community togetherness, this portion of the city has the capabilities of developing an identity entirely its own.

One of the key challenges highlighted by this research is that design or planning interventions of underutilized spaces has to be contextual. These interventions also depends upon the kind of underutilized spaces (viz. parking lots, alleys, etc.) and the geographic location where the intervention is being undertaken. The latter not only provides an understanding of the demographics in the surrounding area but also the nature of the interventions that can be proposed. For the case of Mount Baker neighborhood, parking lots are the most dominant type of underutilized spaces and as seen from previous discussions it is an ethnically diverse and vulnerable immigrant population that surround it. Based on field observations it can be concluded that a potential source of socio-economic empowerment for this neighborhood would be developing more local businesses as well as some informal economies. These observations are based on the country of origin of the immigrant community, majority of whom are from developing countries, where informal economies have proven to be a successful economic model. This allies closely with the planning and policy framework of the city of Seattle for this neighborhood which calls for more mixed-use developments and a higher density by following the transit-oriented development model. Therefore, the solutions discussed by this research are cognizant of these changing socio-economic conditions and attempts to provide design interventions that are contextual to this neighborhood.

The solutions underlined by this thesis are not meant to be binding but offers a different perspective of what parking lots, and in the larger discussion other underutilized spaces, in the future can offer. The proposal, however, recommends that in order to understand these spaces as tools for urban

regeneration efforts should be made on a planning scale and site-scale urban design solutions should be built from that framework. More importantly, solutions cannot be generic and designer should refrain from implementing prototypes everywhere. As seen from the smaller section of Mount Baker and the larger neighborhood of Rainier Valley, of which it is a part of, the challenges they present are entirely different from the rest of the city of Seattle. Hence, attempts should be made towards design solutions that revolve around contextual planning or urban design framework and are built off of the needs of the surrounding community.

The proposal put forward by this thesis can be broadly divided into three types of parking lot uses – heavily used, nominally used and unused. This categorization can once again be understood over both a period of a week and a period of a day. The word 'use' here has been projected in terms of parking cars, which, as can be seen from previous studies (Chapter 5) is the primarily purpose of parking lots. Each of these categories have a time constraint attached to it. For example, a parking lot tends to become 'heavily used' during the morning and afternoon hours and become 'unused' towards the night. Any other time of the day they become 'nominally used' when the number of cars parked fluctuate from a higher than average to lower than average, also these figures vary over the course of a week. The maximum potential for injection informal functions into these lots fall in the category of 'nominally used'. Hence, strategies have been devised to adapt to these changing occupancy conditions. At the same time, surrounding buildings play an important role in the occupancy of parking lots. If buildings have programs that tend to follow these three categories, only then can the utility component of parking lots be improved. Other strategies such as restricted parking volume for a time of the day allows a certain number of cars to park, but at the same time allows the remainder of the lot to be utilized for informal purposes such as a play court, thereby bringing about a duality in functions. Again, if businesses around these lots are closed during a weekend, then these lots can be converted into 'unused' lots, however, this allows developing a larger gathering area such as a farmers market.

Hence, to revisit the three categories, one can say that if buildings and parking lots were programmed properly in conjunction with one another, then these categories would not exist. This means they would ideally be used at all times and the parameter for used or unused would not just be parking occupancy, but societal functions as well. The purpose of this research attempts to provide a solution to just that in the hope that rapidly changing neighborhoods such as Mount Baker can thrive in the future without losing its core identity.

NEXT STEPS

The recommendations outlined here stand to ensure that the future of Mount Baker remains intact to its core identity of diversity, affordability and flexibility, but at the same time takes advantage of the changing economic conditions of the city of Seattle. The following program outlines the next steps that could be taken to determine the performance of underutilized spaces and how the framework for design can evolve based on future needs:

- Revisit the design interventions of the said parking lots with reference to the surrounding building programs as per the projected changes to the Mount Baker Town Center in the future
- Develop design proposals for parking lots based on future needs and capacity requirements that are local in nature and caters to the existing residents
- Diversify informal functions periodically such that they do not become fixed function for a particular area
- Develop similar proposal for a different neighborhood to understand whether the recommendations hold true to establish an explanation of whether these design interventions can be generic or has to contextual

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