Investigating Pedestrian Safety Improvements, Rt. 301 Richmond

How the Combination of Zoning, Design, and Gentrification enhance de facto Segregation

A Thesis Prospectus Submitted to the

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

"We have come a long way from the days where there was state-enforced segregation, but we still have a way to go" (Ginsburg). Ginsburg shares this quote in an interview to contrast her colleagues, who often vote on the premise that racism is an artifact of the past. That being said, while zoning ordinances in the past were solely able to abet racial segregation, it is the goal of this research paper to determine if civil design and gentrification further enhance segregation. More specifically, how these variables enhance de facto segregation in residential areas. The Technical portion of this paper focuses on pedestrian safety, and what immediate changes can be made today as well as anticipation of future technological solutions. While the study area for the technical portion is an economically disadvantaged area; the subject of the STS prospectus is not directly related.

Technical Topic

The number of pedestrian injuries and fatalities keeps increasing year by year and according to the Governor's Highway Association, the numbers from 2019 are higher than they have been in the last 30 years (New Projection: 2019 Pedestrian Fatalities Highest since 1988, n.d.) (Annual Report, 2019). There is an ongoing societal responsibility to address pedestrian safety issues by considering alternative infrastructure changes, societal attitudes, and technological tools to keep vehicles and pedestrians from unwantedly crossing paths.

This project takes this broad focus on pedestrian safety improvements and focuses the lens on one corridor in Richmond, VA. The corridor, on Route 301, Jefferson Davis Highway, just south of the state's capital, has already sustained multiple pedestrian fatalities in the current calendar

year (as of August 2020). In the last year alone, two people have been struck and killed by a car on this stretch of the highway (Richmond Times-Dispatch, 2019) (NBC 12 Newsroom, 2020). From a pedestrian safety perspective, the corridor's characteristics are anything but safe: it's a high-speed roadway with long distances between cross-streets which lacks pedestrian infrastructure such as sidewalks.

Another reason for our focus on this area is that it is economically disadvantaged. The median household income was $41000 compared to $70000 for all of Virginia with 32% of the population of approximately 6000 living under poverty (Bensley, n.d.). This corridor also has businesses located on both sides of traffic as well as new bus stops that are inaccessible by pedestrians unless by vehicle or by crossing the large unmarked sections. As a result, there remains a critical need to address equity issues in terms of access to transportation and pedestrian services (Bensley, n.d.).

Under the supervision of Professor Brian Smith and Marie Audrey Nerette, with the help of Ben Doran, Kevin O'Meara, and Thomas Ruff with Timmons Group, Ryan Barnett, Hanna Custard, Christopher Hume, Andrew Taylor, and I will examine the corridor's current operating state, and then investigate improvements to alleviate pedestrian incidents as best as possible. Any improvements will be considered, from roadway geometry, design changes, signage, and operations alterations, to other Intelligent Transportation Systems (ITS) technologies and future Connected and Automated Vehicles (CAV) considerations, to softer solutions such as public information campaigns. This will result in a new roadway design (the Civil Engineering side) and a more generalized pedestrian safety experiment (the Systems Engineering side).

The project's initial steps lie in a systems framework approach. We must generalize the question at hand, determine the normative and descriptive scenarios, and generate goals before determining criteria for ranking alternative solutions. The team, an interdisciplinary team of students from the Department of Engineering Systems and Environment (ESE) and the Department of Civil and Environmental Engineering (CE), have determined the main goals of minimizing cost, optimizing the road's Level of Service (LOS) for traffic flow, minimizing pedestrian incidents and minimizing the effects of social and political forces on safety improvement (while minimizing the effects of potential alterations on social and political forces). All of this can be achieved by designing an appropriate complete road design, similar to what is seen in Figure 2 (Snyder et al., 2013). The ranking of alternatives will then be generated based on an ordinal system to be determined at a later date through correspondence with the client

(Timmons Group) and stakeholders which will allow for a clearer picture of the core value needed to make a decision.

The second stage of the project will involve research by the team on potential infrastructure improvements (CE students) and general technological adoption (ESE students). The CE students will begin developing a roadway plan under the given schematics and base map created through correspondence with the client Timmons Group; the ESE students will conduct a research experiment which attempts to determine the pedestrian reaction to autonomous vehicle feedback at roadway crossings. The plan developed by the CE students is applicable to the corridor in Richmond, however, the experiment conducted by the ESE students is more geared towards researching the future impact of autonomous vehicles on pedestrian activity. The study conducted by the ESE students will compare pedestrian reactions in crossing the road between

waiting for visual cues from a driver (a hand wave, nod, etc.) and technical cues from a mobile app when faced with crossing in front of an autonomous vehicle without a driver present. This will be tested in virtual reality to discover the connection between the pedestrian user app and the notification system, allowing the ESE students to gain insights into whether or not the notification system can be effectively used on autonomous vehicles to alert pedestrians. Again, although this study does not directly apply to the Rt. 301 Corridor in Richmond, may drive future pedestrian infrastructure safety development and as such attempts to reach the end goal of providing roads that are both safe for pedestrians and efficient for drivers.

While the focused goal of this project is to improve pedestrian safety on a corridor of Route 301 in Richmond, as the alternatives will ideally do, such concepts will be applicable to other corridors nationwide. These improvements, if possible, may allow for other jurisdictions to draw from what was suggested and make pedestrian safety improvements themselves, allowing for the overarching goal of determining ways to improve pedestrian safety to be at least partially achieved.

STS Prospectus

The recent death of George Floyd has sparked a global investigation and acknowledgment of systemic racism in several aspects of society. Historically, de jure segregation successfully instilled the idea that white was superior and black inferior (“What are”). Although de jure segregation was declared unconstitutional in 1964, de facto segregation remains a preeminent issue across the nation. De facto segregation is rooted in the same discriminatory practices as de jure segregation. Socioeconomic and political disadvantage successfully creates the same division as once was determined by race (“What are”). De facto segregation is well illustrated

through the history of zoning ordinances. Zoning ordinances were first established in 1916 in response to market failure. In the early 20th century, businessmen began opening shops on the popular Fifth Avenue street. The upscale residential place soon morphed into a commercial shopping strip. The upscale businessmen did not like that similar to what is modernly referred to as “fast fashion” began to capitalize in the same district as them. As these cheaper shops emerged, the clientele began to change and what was once an upscale shopping experience became mainstream (Schrager, Allison, et al.). The elite businessmen then argued that market failure occurs in response to increased competition which rations a form of government response (Clingermayera). While it is clear to see the economic drive for the technology of zoning, the social drive is also connected. The mainstream shops invited a lower class, which arguably drove the upper class away. Today, zoning ordinances are largely defined by their ability to create separation of differing commercial, residential and mixed-use property. However, in doing such, social factors of class and race are innately segregated, a direct connection to de facto segregation. Systemic Racism is defined by both systems and structures installed within society that disproportionately affect minorities. Confederate statues serve as obvious physical remnants of racism but are not the only physically constructed memorandums. Civil engineering design can abet segregation through the combination of zoning ordinances, design considerations, and gentrification.

Research Question

Zoning has faced lawful action that gentrification and design have not. The historic ideals of not accepting racial zoning led policymakers to formulate different ways of segregation. How does using stereotypes to influence design make it difficult to determine the intent to segregate? Is gentrification hard to link to segregation given census data and the innate diversity of major

cities? Both numerical as well as social patterns must be evaluated to understand the larger picture of how variables of zoning, gentrification, and design are prevalent and relevant today. These sub-questions will assist in determining the overarching question which is if there is a defined link between gentrification, zoning, and design?

Literature Review

Christopher Silver evaluates the racial origins of zoning, claiming social reformers used zoning as means to "not only exclude incompatible uses from residential areas but also to slow the spread of slums into better neighborhoods'" (Silver). Rather than accept that racial segregation was unconstitutional, policymakers proceeded to justify segregation through stereotypical statements. This concept that you may change the laws, but not ideals of individuals has manifested de facto segregation and systemic racism today. This being said, while Silver builds on the racist origins of zoning, there is no advancement of where zoning is today and how exactly it has left lasting impacts. A presentation by Richard Rothstein investigates the modern effects of zoning by looking at factors such as the education systems in lower-income neighborhoods as he believes that school segregation reflects neighborhood segregation (Rothstein). Zoning alone, however, cannot racially segregated residents, as discussed by lawful reasons by Silver. It is not zoning alone that regulates race but zonal segregation as an inexplicit goal with design and gentrification as the modes of accomplishing this goal.

Some of the most critical works concerning design surround Robert Moses, a renowned public official who primarily worked in New york. "Race Place and Play" by Marta Gutman, exposes some of Moses' innately racial driven designs through evaluation of WPA swimming pools. Gunman concludes that the construction of the WPA pools was "architects [embracing] a central

insight of modernism" (Gutman). Even more, Gunman remarks that the pools were built to extraordinarily high standards and racially integrated depending on location (Gutman). This link between modernism and integration depending on location alludes to segregation where needed, and seemingly defines modernism as building to suit the needs of the majority and exclusion through architectural design. Schindler also argues that there is a failure to recognize urban design as a form of regulation at all (Schindler). While there has been lawful attention to address zoning ordinances little has been done to less obvious tactics such as design (Schindler).

Gentrification also plays a role in supporting racial segregation. Unlike zoning, but much like design, gentrification serves to displace a group that is already a majority in an area. More specifically, gentrification serves the needs of the middle class in a predominantly lower-class area. A study done by Lance Freeman found that gentrification does not decrease neighborhood diversity; However, there is a weaker and less robust correlation between gentrification and race segregation (Freeman). Freeman considered factors of education, income, and race to generate a regression model, which illustrated a weak relationship between gentrification and racial segregation. Freeman concludes that given the "often pernicious effects of racial segregation attention should be warranted" (Freeman). Freeman's conclusion however lacks defense of why people leave, where they go and how this affects them in the long term.

STS Framework and methodology

There are a plethora of studies about the effects of zoning, gentrification, and design on social patterns; namely, the effects as they relate to race and socioeconomic spatial distributions. A majority of the present literature focuses on these variables as individual components. However, This research will examine how these components function together to strengthen de facto

segregation in modern residential areas. To formulate this research, Langon Winner's perspective and Social Construction of Technology (SCOT) theorem will be applied. Winner's perspective will allow for the analysis of artifacts and their politics. Namely, how did the invention of zoning impact social order and decision making? SCOT theory will be employed to consider how these artifacts affect minority communities, the problems they create, and the solutions, if any, that can be recommended.

A case study of a city such as Charlottesville will provide an opportunity to better understand if such a link exists. Explicitly answering if racial zoning is upheld through gentrification and design. Because Charlottesville is a college town, gentrification, as well as design, are often at the forefront of consideration to conform to the needs of students. To execute this case study, policy studies regarding planning standards as well as archive statistics will be essential in understanding societal trends. It will be interesting to unravel the community tension of any in the area. More than that, Charlottesville in recent years has been the stomping grounds of racial tension that will aid in understanding community opinions concerning racial segregation. A compilation of research and associate analysis will be presented in the final submittal form as a research paper.

Timeline

To stay on track a CPM schedule will be developed. The month of February will consist mainly of research compilation for the Charlottesville case study. Articles as well as archival data will be gathered and analyzed using either Landon Winner's perspective or SCOT theory. March will be comparing articles and analyzing data to apply directly to research questions. April will be largely drafting the research paper as the final submittal in May.

Conclusion

This past year, social media has displayed the magnitude of systematic racism as well as the passion and desire for change. The injustice of police brutality towards George Floyd was caught on camera. This one incident brought to light the question of how many injustices go unnoticed. While segregation has long been a societal issue; zoning, design, and gentrification are potentially technical tools that enhance the problem. The STS perspective will reveal how these technologies operate and their connection if any to segregation. The importance of addressing this issue is to remember that racism is not an artifact of the past, it has merely shifted its presentation.

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