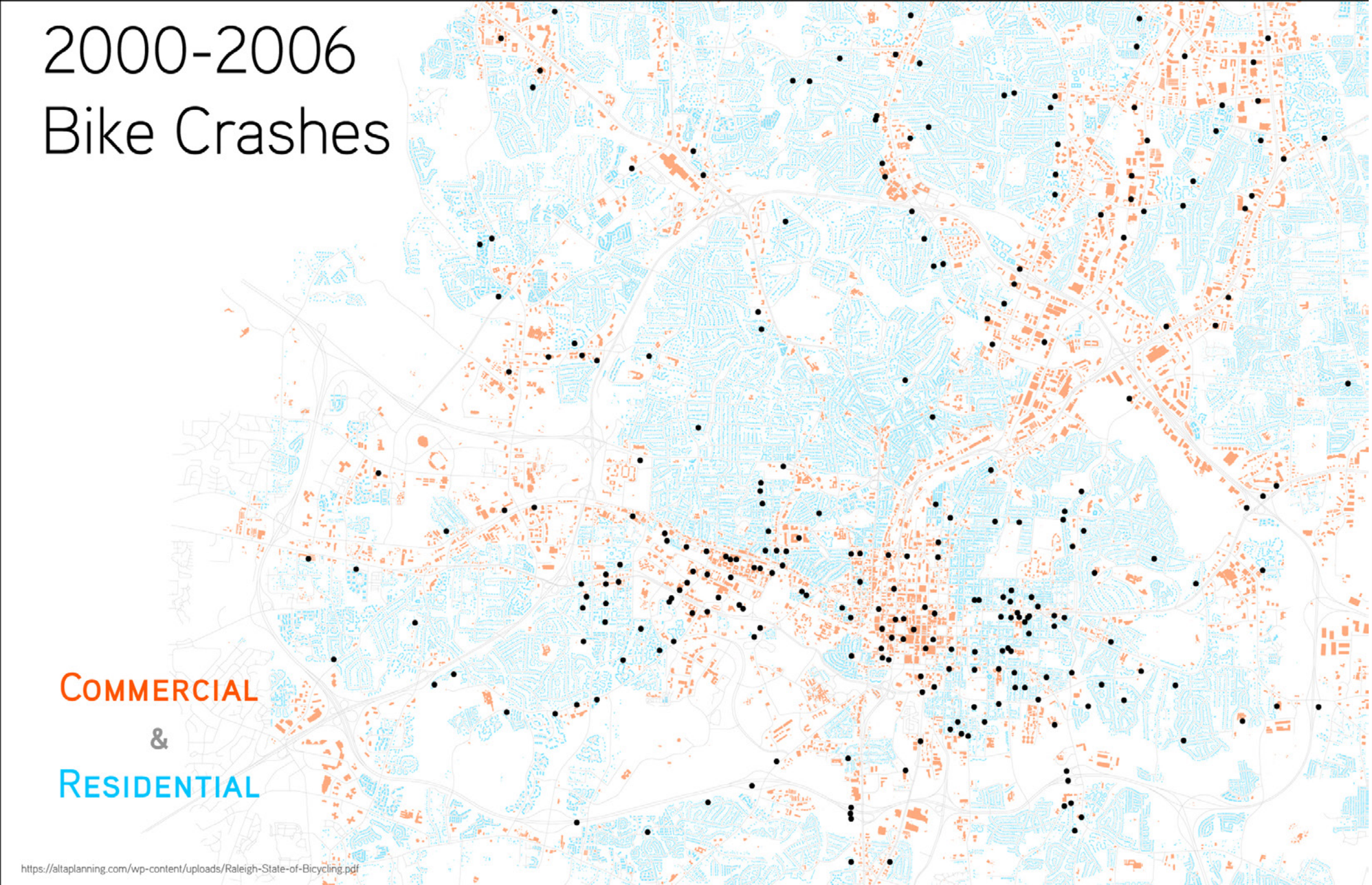
Influences on Bike Ridership
Raleigh, North Carolina

Clint Ronsick
NCSU 2019

2000-2006 Bike Crashes



https://altaplanning.com/wp-content/uploads/Raleigh-State-of-Bicycling.pdf

Goals and Priorties

According to Eric Lamb, the Transportation Planning Manager for the Raleigh Department of Transportation and a member of the Raleigh Bike and Pedestrian Advisory Commission (BPAC), the city of Raleigh has rather lofty goals for its bicycle infrastructure.[1] The city currently abides by the League of American Bicyclists rating system that gives different cities in the United States a rank on its bicycle friendliness of either Bronze, Silver, Gold or Platinum; Bronze being the lowest and Platinum being the most ideal.[2] The city of Raleigh has sought to attain a Rank of Gold from the League by drastically increasing their bike infrastructure from 5 miles of bike lanes and 67 miles of greenway in 2009 to 33 miles of bike lanes and 114 miles of greenway in 2016.[3] Despite these far-reaching changes Raleigh, as of fall 2015, has only been able to achieve a rating of Bronze. The League, on their rating sheet for Raleigh, provides specific tips on how Raleigh can achieve a silver rating that focus on bicycle education through public engagement and the implementation of state-of-the-art bicycle facilities.[4]

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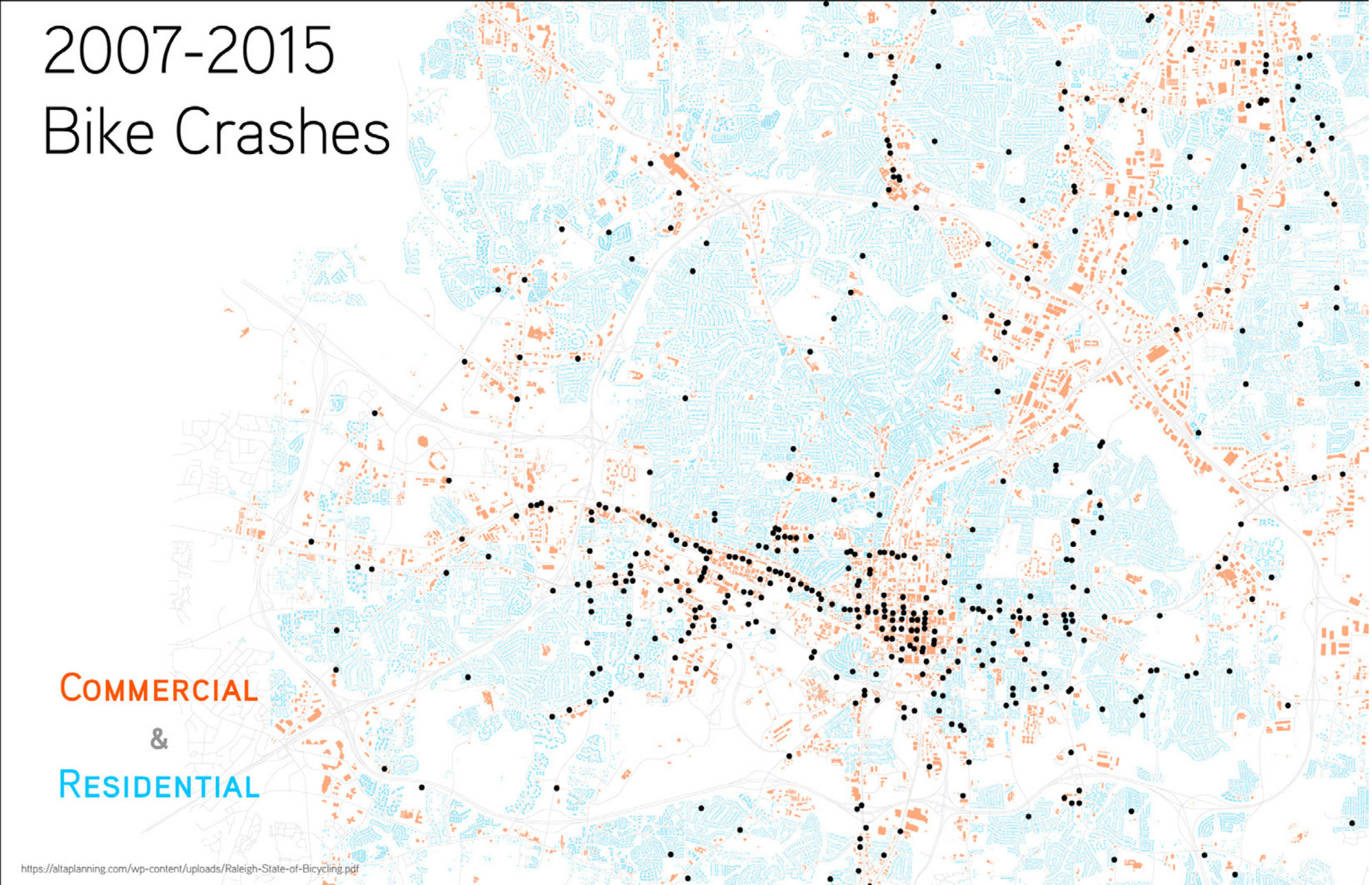

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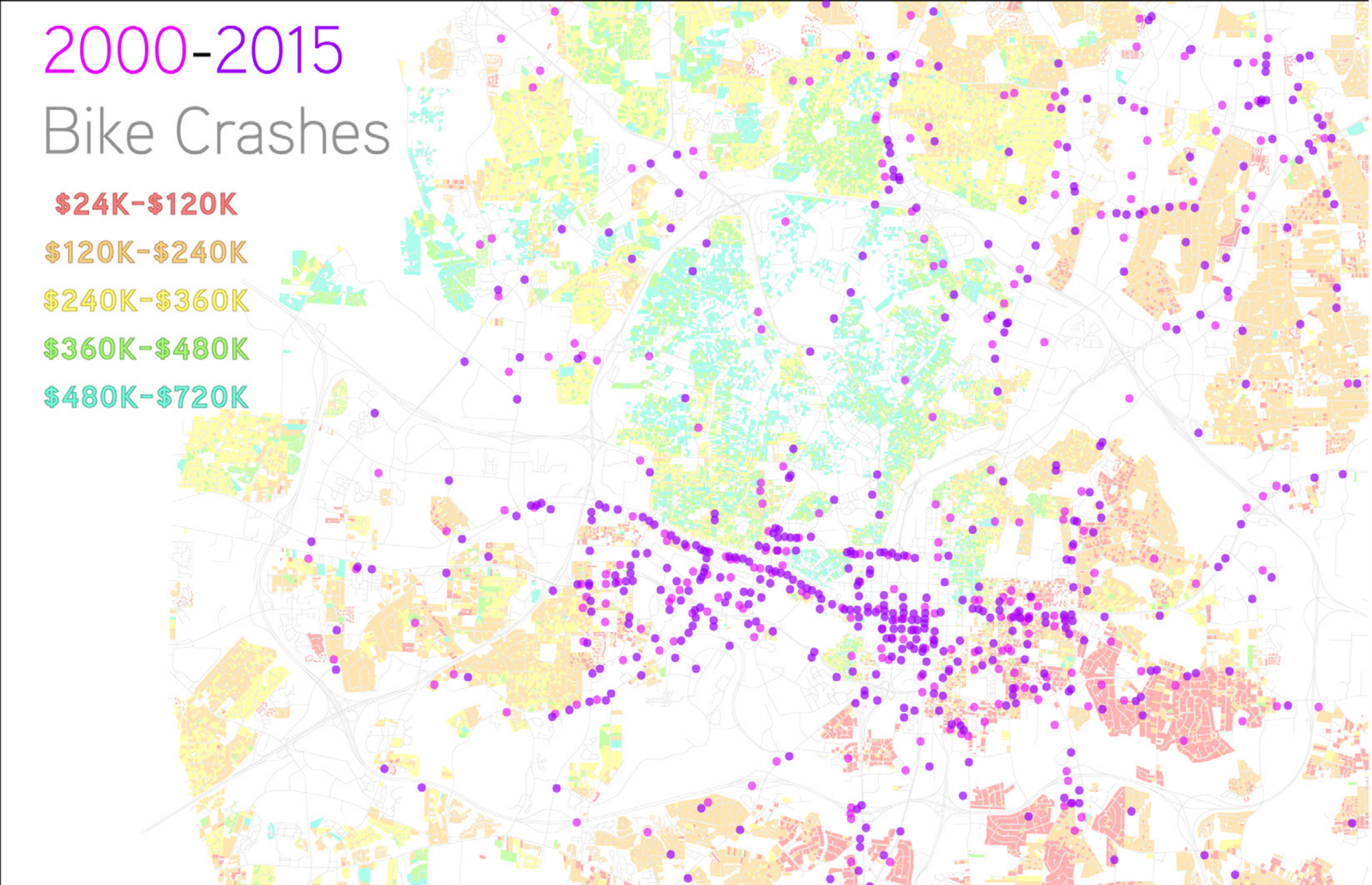

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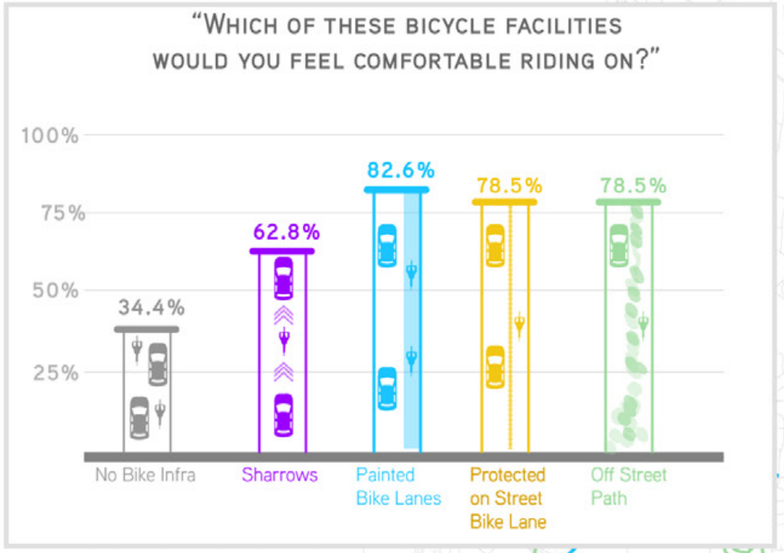

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2009 Bike Lane Typology

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The term "sharrow" refers to bike lanes that are designated with painted markings on the street that indicate to car riders that a particular road is meant to be bicycle friendly and ideally prompts more cautious driving.[6] Although this move does not provide any literal separation of bike and car, this perceived separation does evidently have an influence on users comfort with utilizing it with 62.8% of users indicating comfort with this bare minimum of bike infrastructure as apposed to the rate of 34.4% of users displaying comfort with riding on roads with no bike demarcation whatsoever.[7] The "sharrow" also has the added benefit of not requiring drastic changes to street widths. Painted bike lanes on the other hand have a comfort level of 82.6% of users but require an increase in street width. Separated bike lanes (the type preferred by BPAC) require the width of a normal painted bike lane but with a 3 foot buffer zone between it and the car lane next to it.

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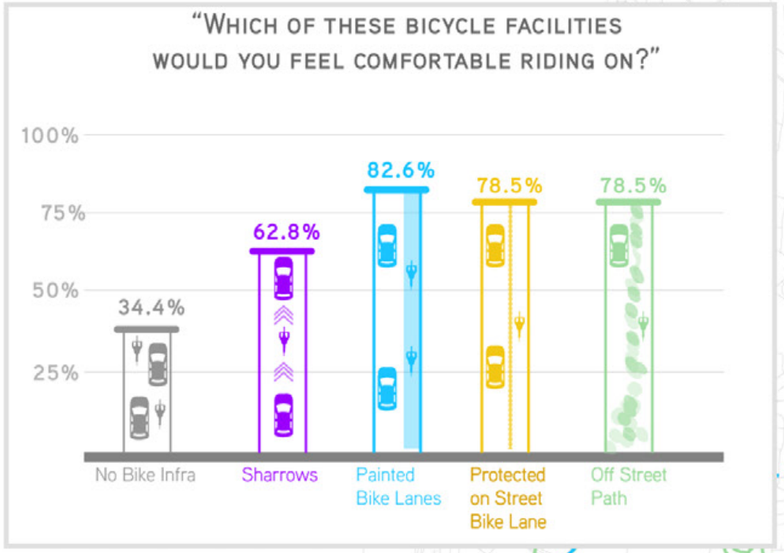

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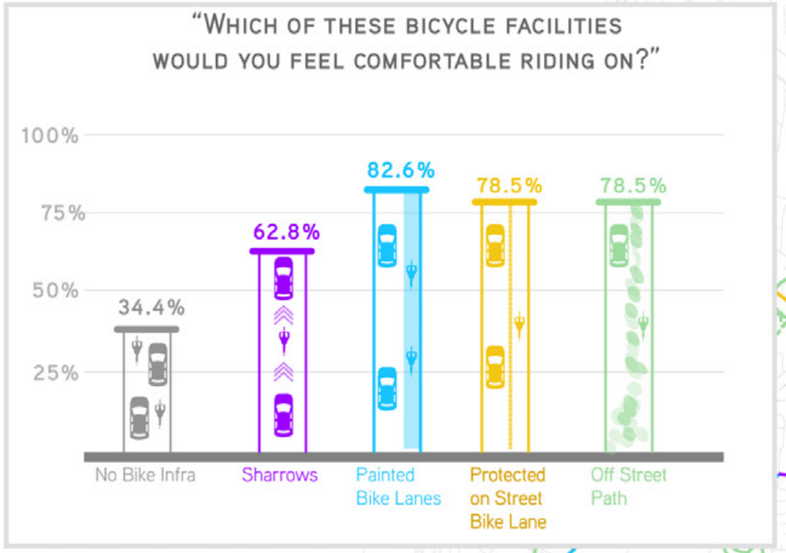

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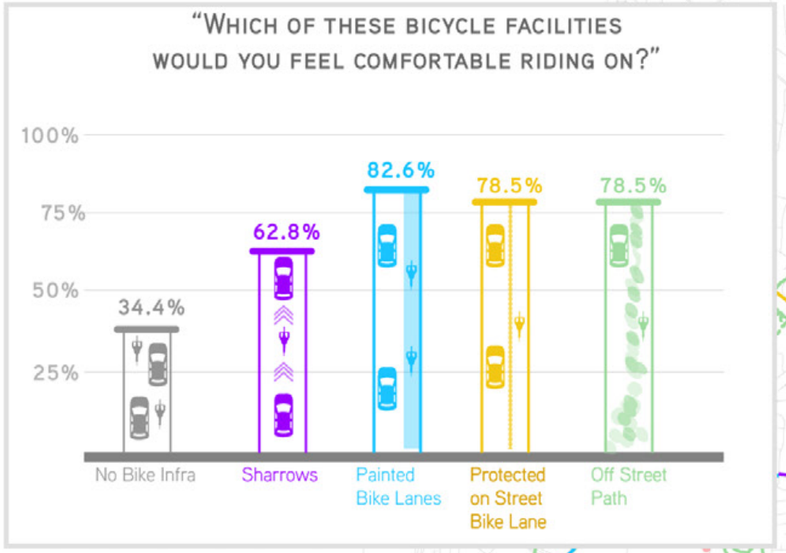

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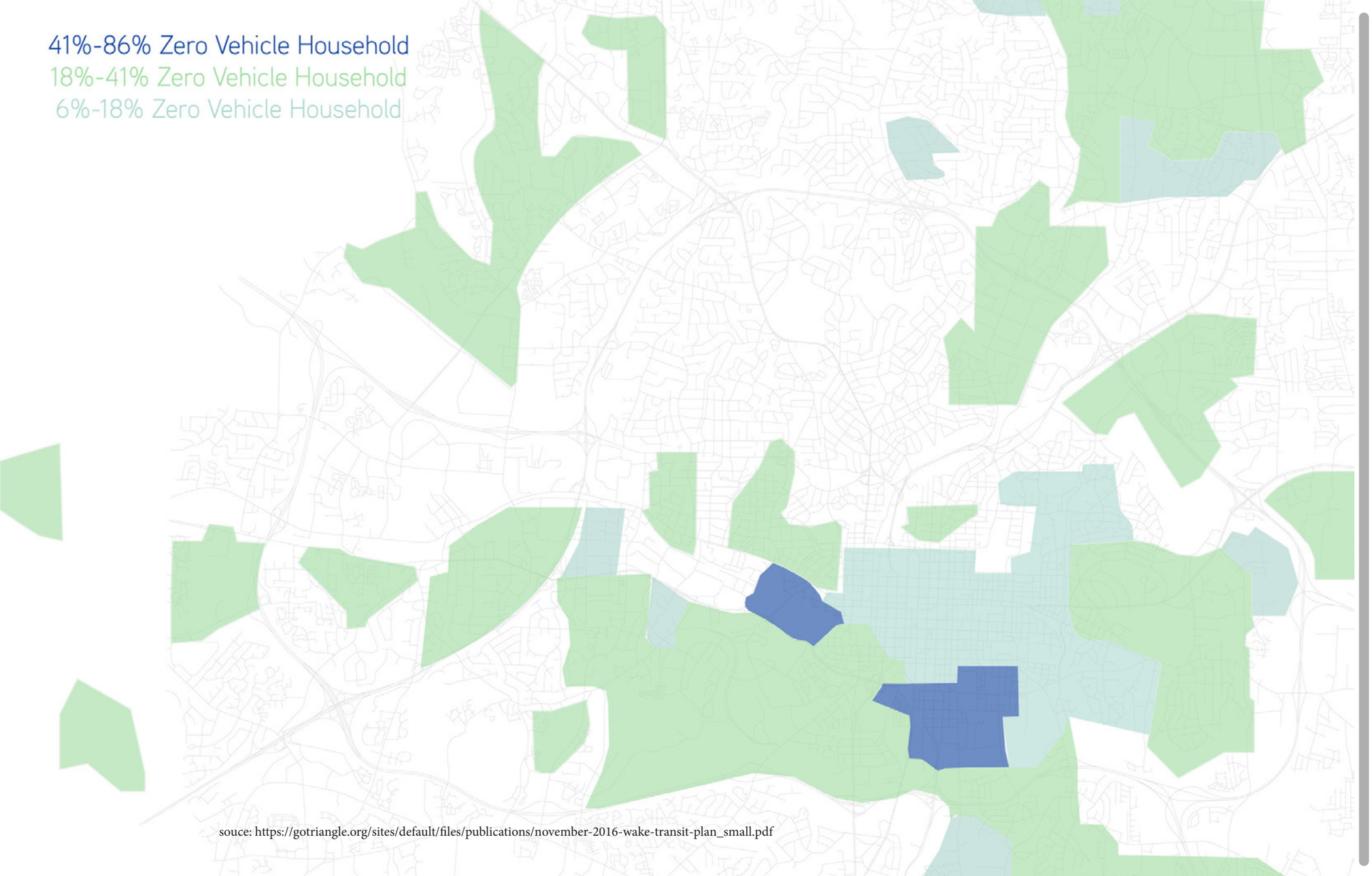

souce: https://gotriangle.org/sites/default/files/publications/november-2016-wake-transit-plan_small.pdf

Areas in Need

The League of American Bicyclists stipulated in its city report card for Raleigh that they should increase their efforts to "engage seniors, minority populations, low income populations and other demographic groups" in an effort to increase ridership for underserved populations. If vehicle ownership, poverty rates and access to bike infrastructure are cross-referenced underserved areas of Raleigh can thus be highlighted. The areas of Raleigh that have the lowest vehicle ownership often have more access to bike infrastructure and it can be extrapolated that those populations are able to make better use of said infrastructure.[8]

There is also a similar correlation, albeit in the reverse, between areas of high vehicle ownership and their low access to the bike infrastructure "web". Residents in these areas may have less incentive to go vehicle free due to the lack of the bike infrastructure that would make such a lifestyle feasible. Some of these "bike-lane-deserts" become increasingly concerning when overlaid with the cities planned Bus Rapid Transit (BRT) lines showing their dearth in access to said state-of-the-art bus facilities as well.

Part of the goals of increasing bike usage in the city, aside from decreasing the cities carbon emissions from personal vehicles and increasing the health of its residents would be to remove the financial burden vehicle ownership places on the population. This burden is of particular concern when it comes to the cities most impoverished populations. An overlay of a map of the 18 most impoverished regions of Raleigh along with maps indicating bike/BRT access and vehicle ownership filters these regions down to the area captured within the intersection of the Rock Quarry Road loop and I-40.[9] This zone has a combination of low access to BRT lines, low Access to bike infrastructure and high levels of poverty whilst also suffering the burden of high levels of vehicle ownership; a combination of influences that prompts further investigation.

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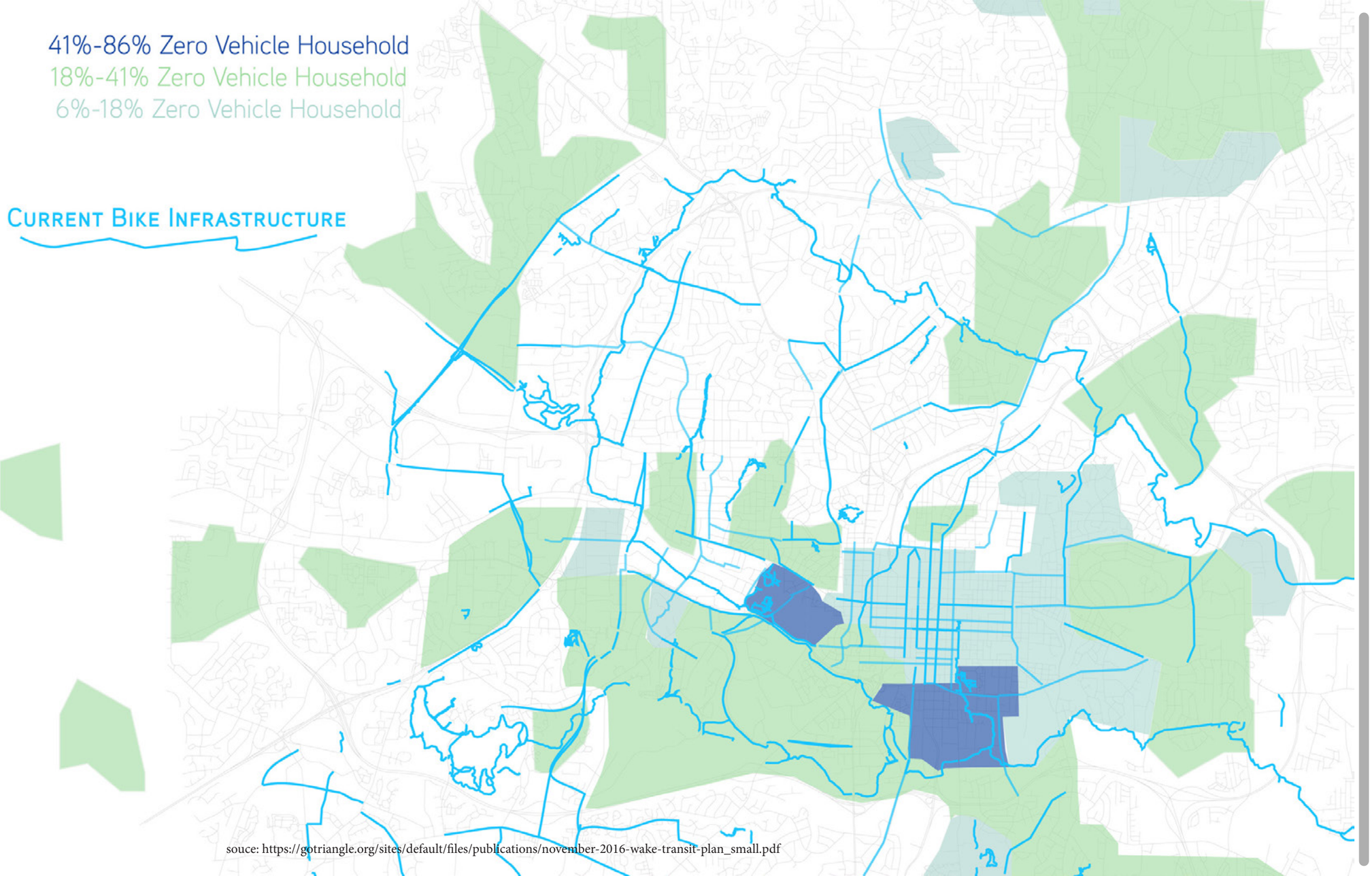

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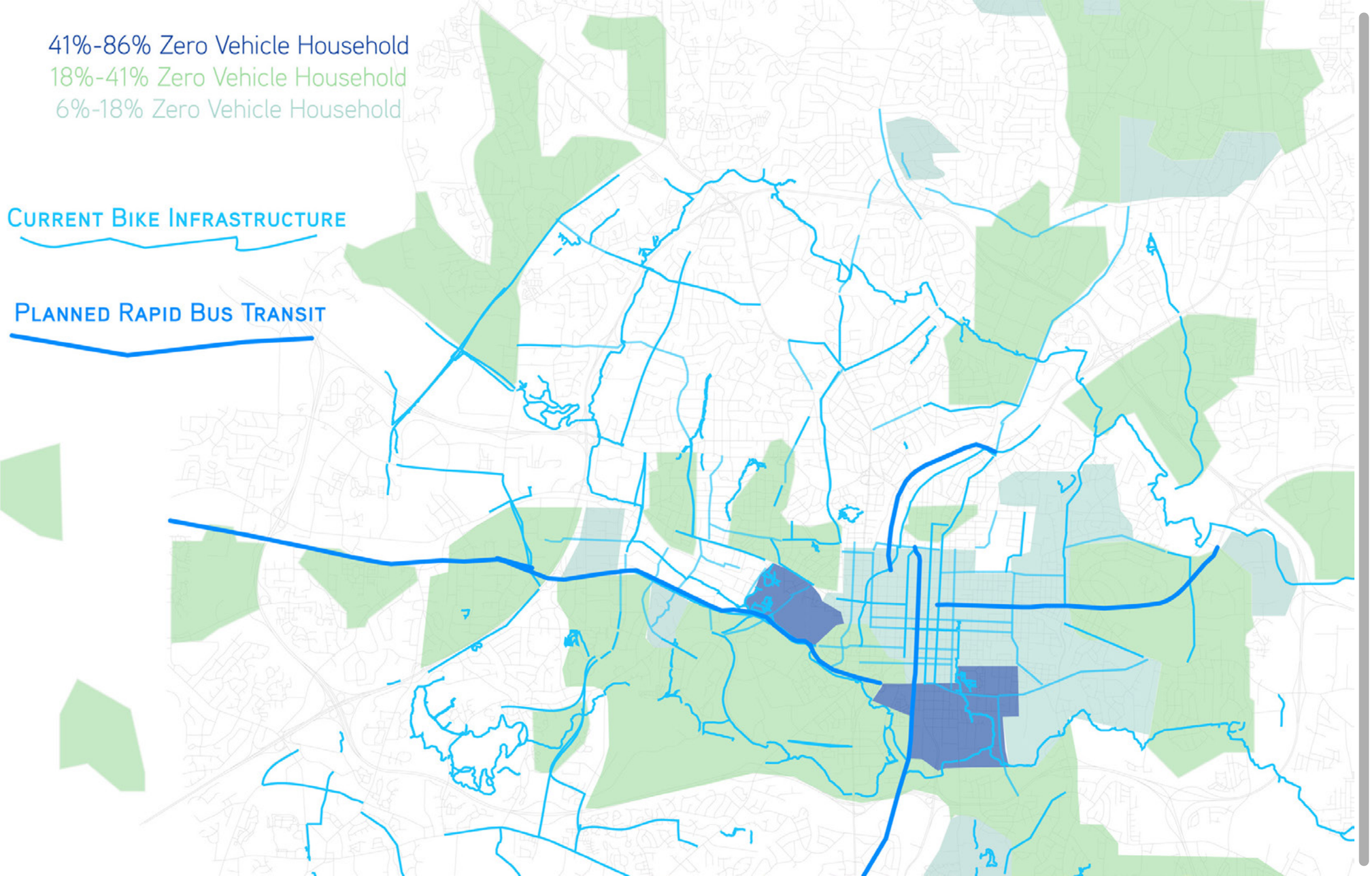

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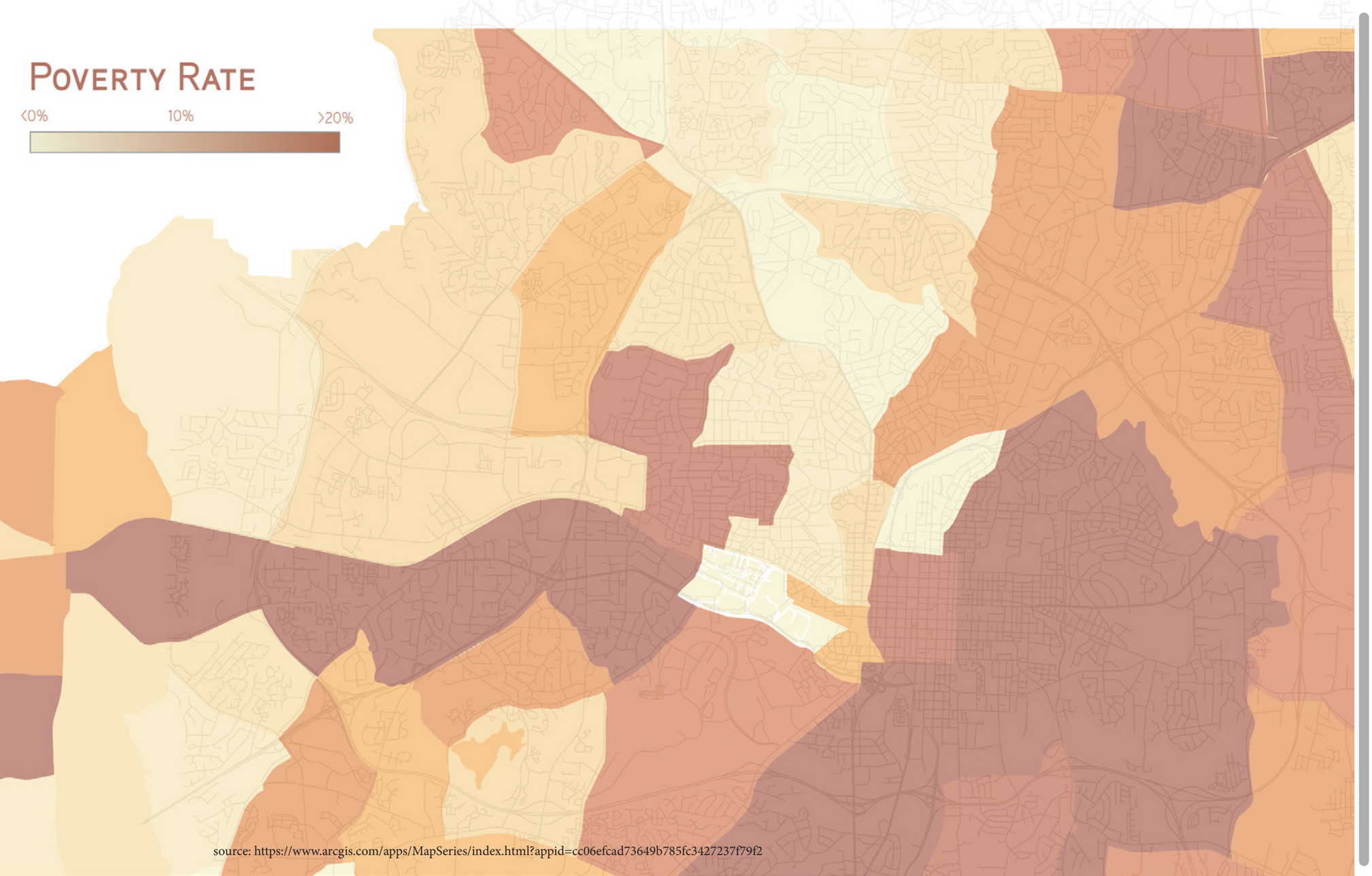

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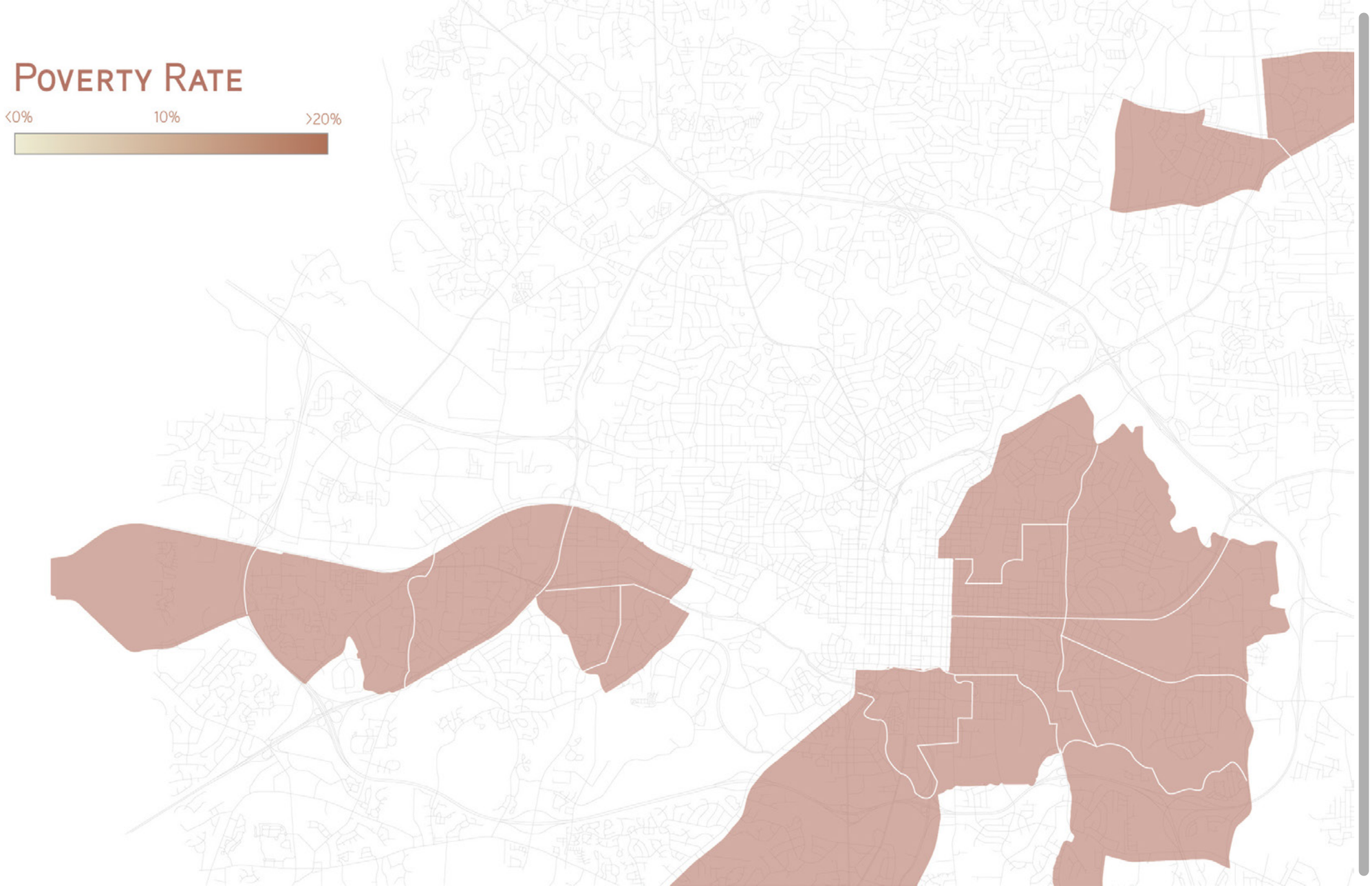

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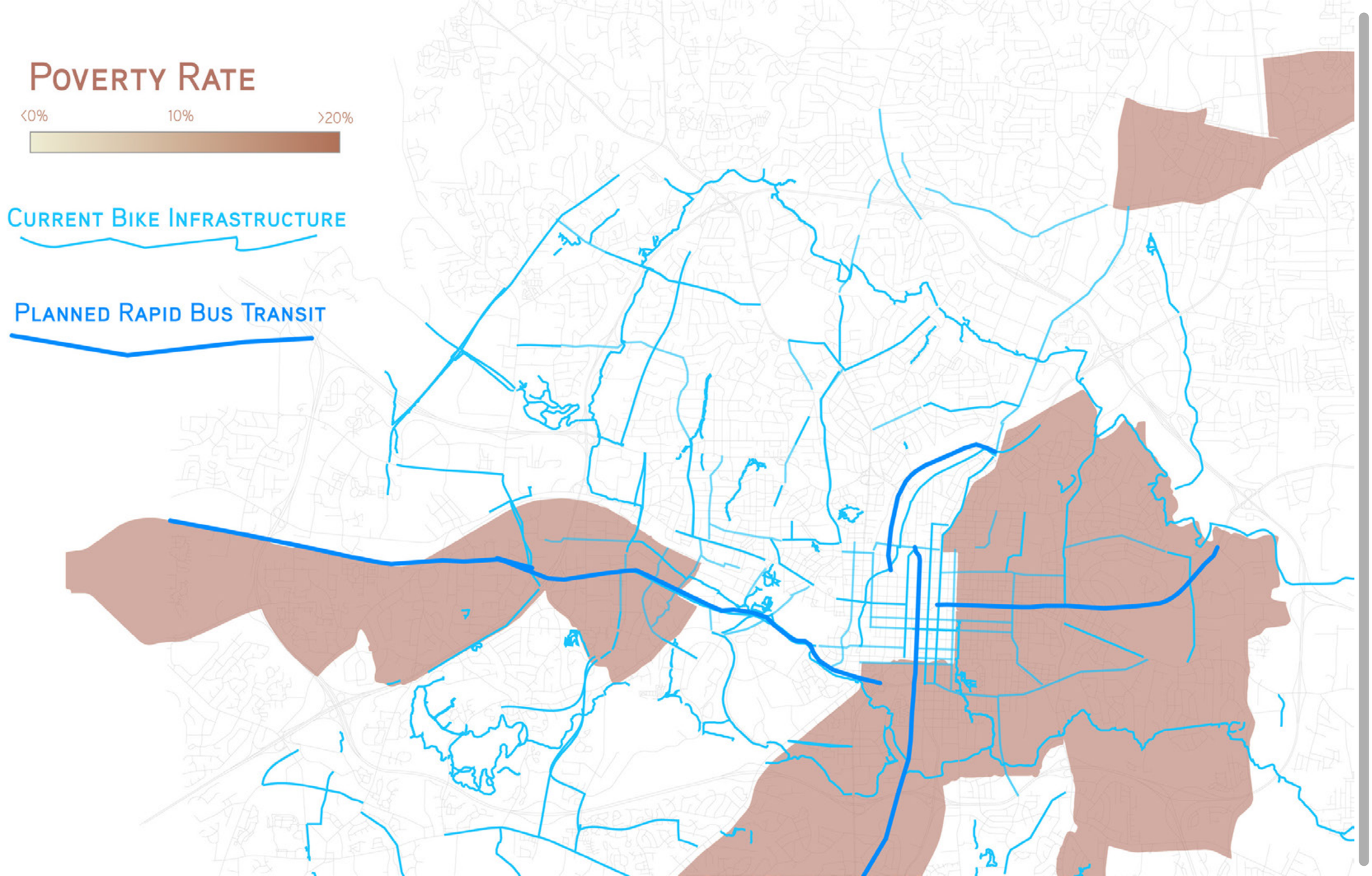

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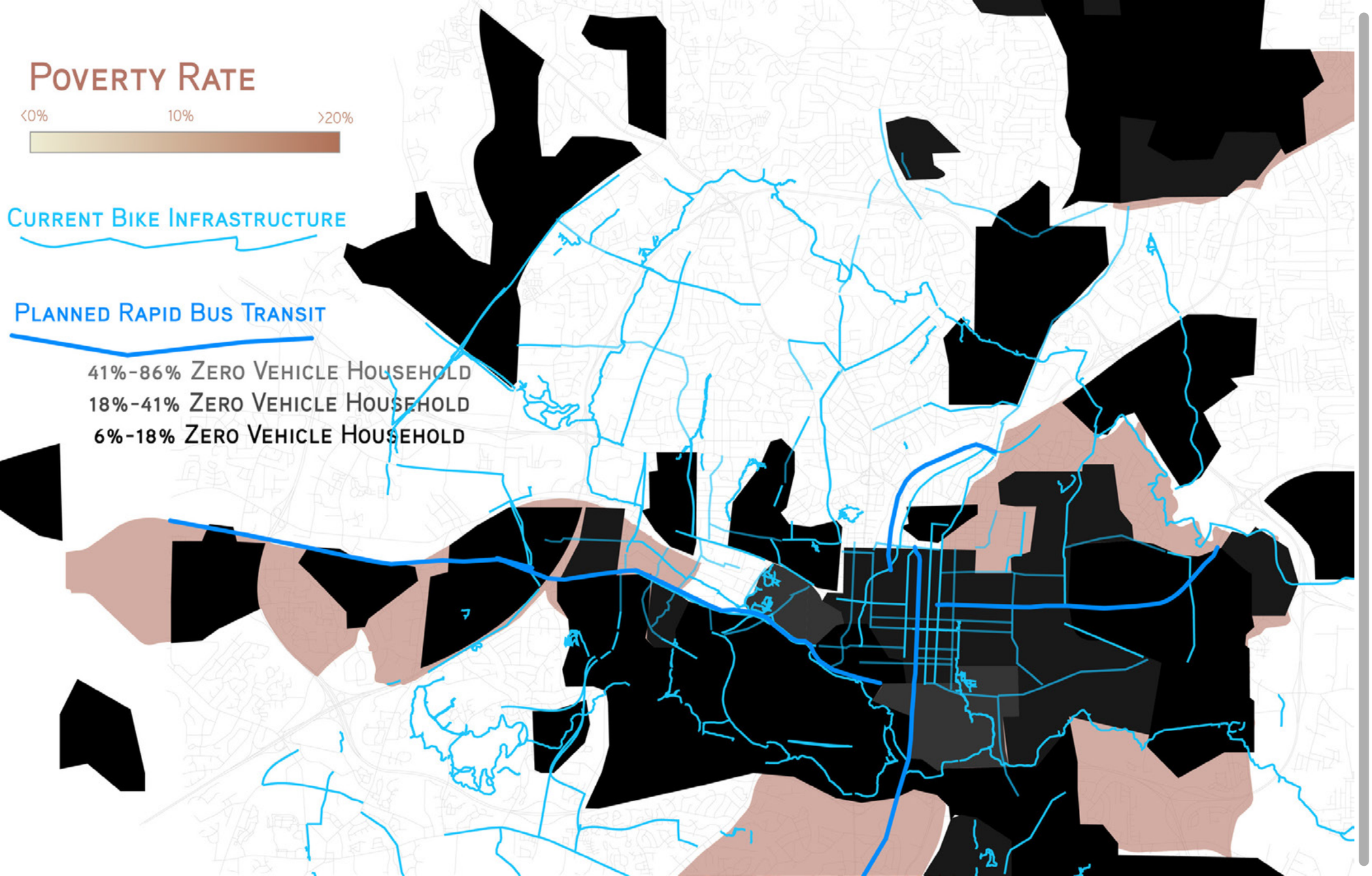

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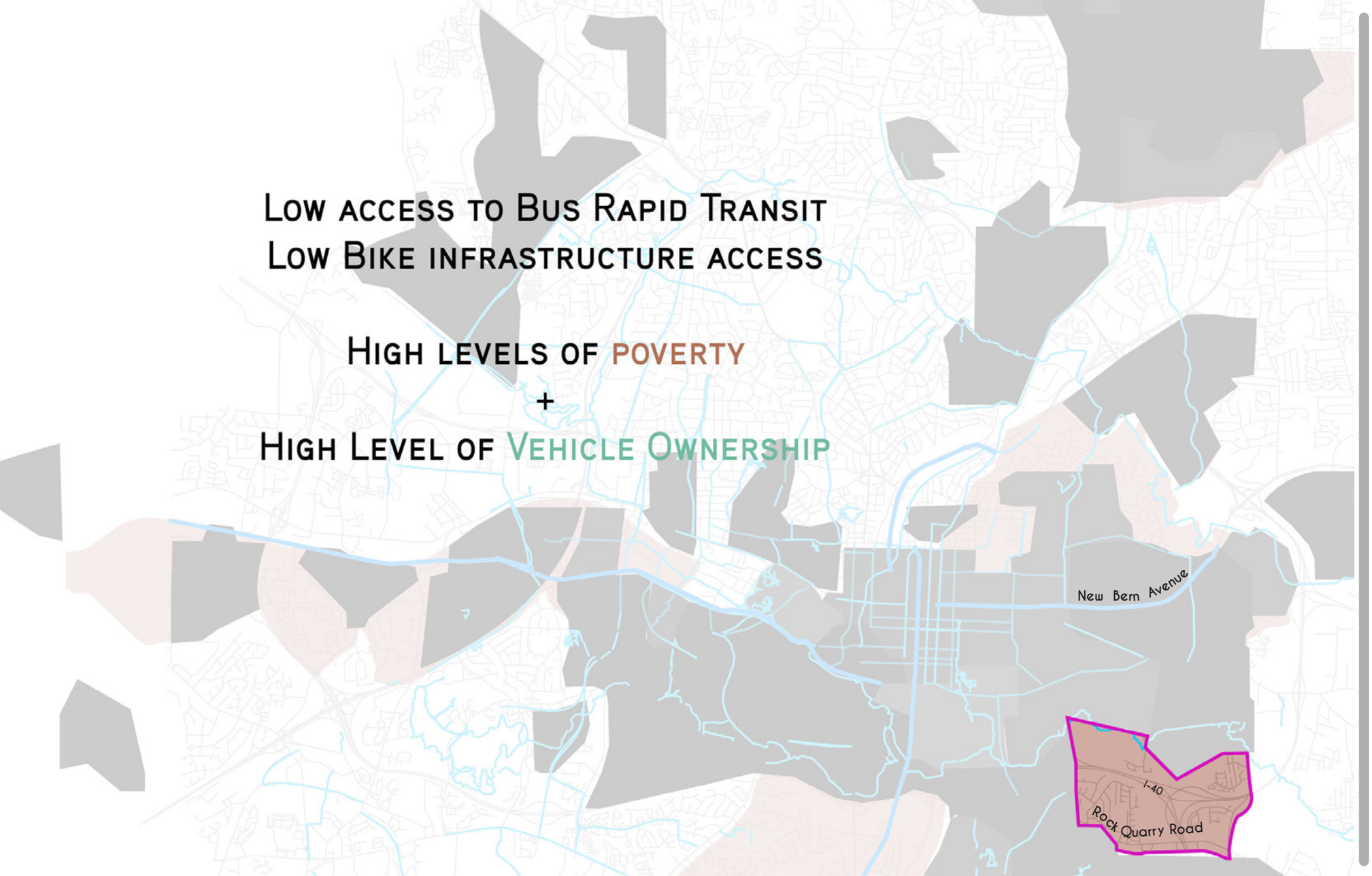
There is also a similar correlation, albeit in the reverse, between areas of high vehicle ownership and their low access to the bike infrastructure "web". Residents in these areas may have less incentive to go vehicle free due to the lack of the bike infrastructure that would make such a lifestyle feasible. Some of these "bike-lane-deserts" become increasingly concerning when overlaid with the cities planned Bus Rapid Transit (BRT) lines showing their dearth in access to said state-of-the-art bus facilities as well.

Part of the goals of increasing bike usage in the city, aside from decreasing the cities carbon emissions from personal vehicles and increasing the health of its residents would be to remove the financial burden vehicle ownership places on the population. This burden is of particular concern when it comes to the cities most impoverished populations. An overlay of a map of the 18 most impoverished regions of Raleigh along with maps indicating bike/BRT access and vehicle ownership filters these regions down to the area captured within the intersection of the Rock Quarry Road loop and I-40.[9] This zone has a combination of low access to BRT lines, low Access to bike infrastructure and high levels of poverty whilst also suffering the burden of high levels of vehicle ownership; a combination of influences that prompts further investigation.

8 Wake Transit Plan. (2016, November)
9 Triangle Income Inequality. (2018).



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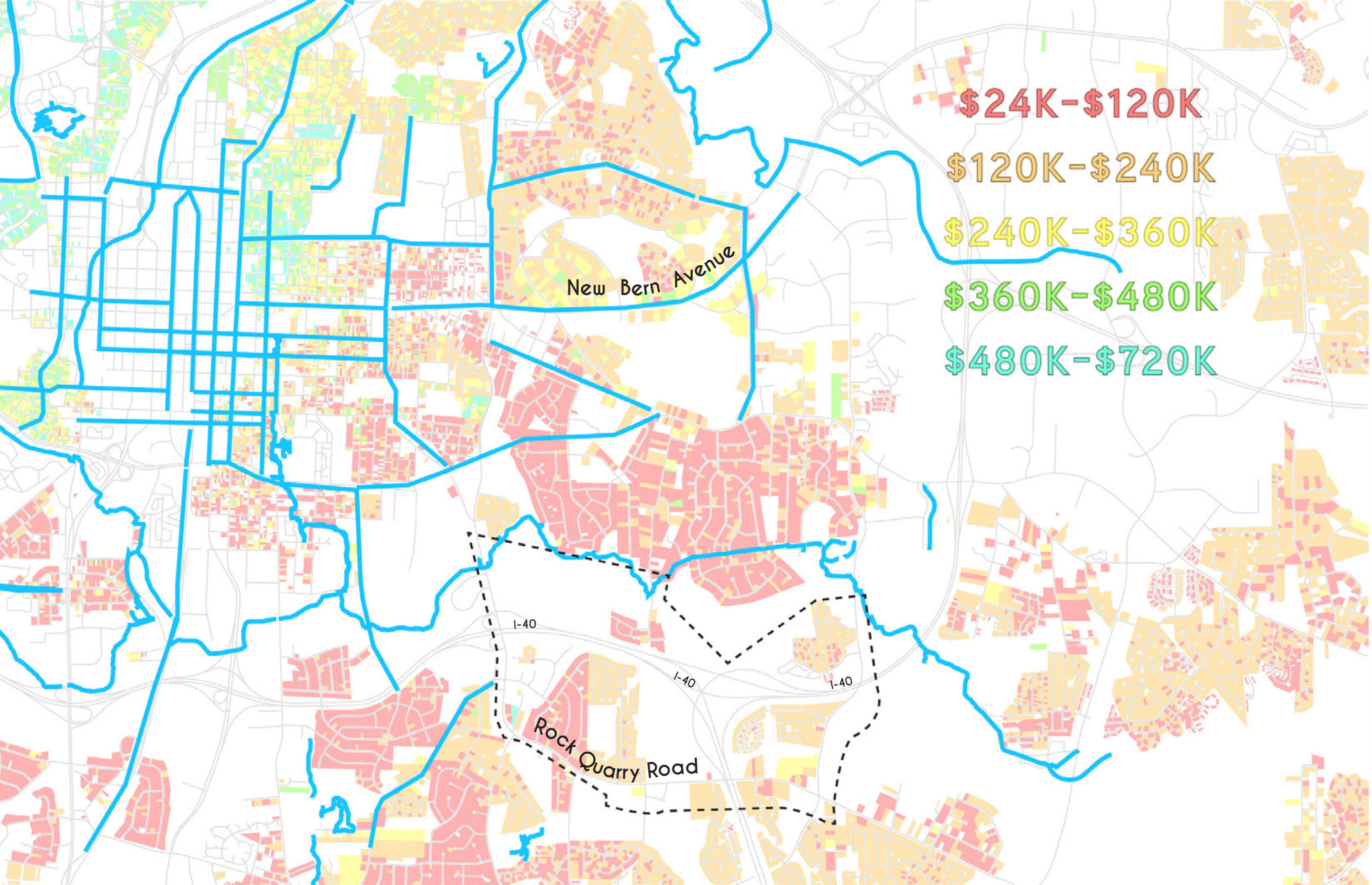
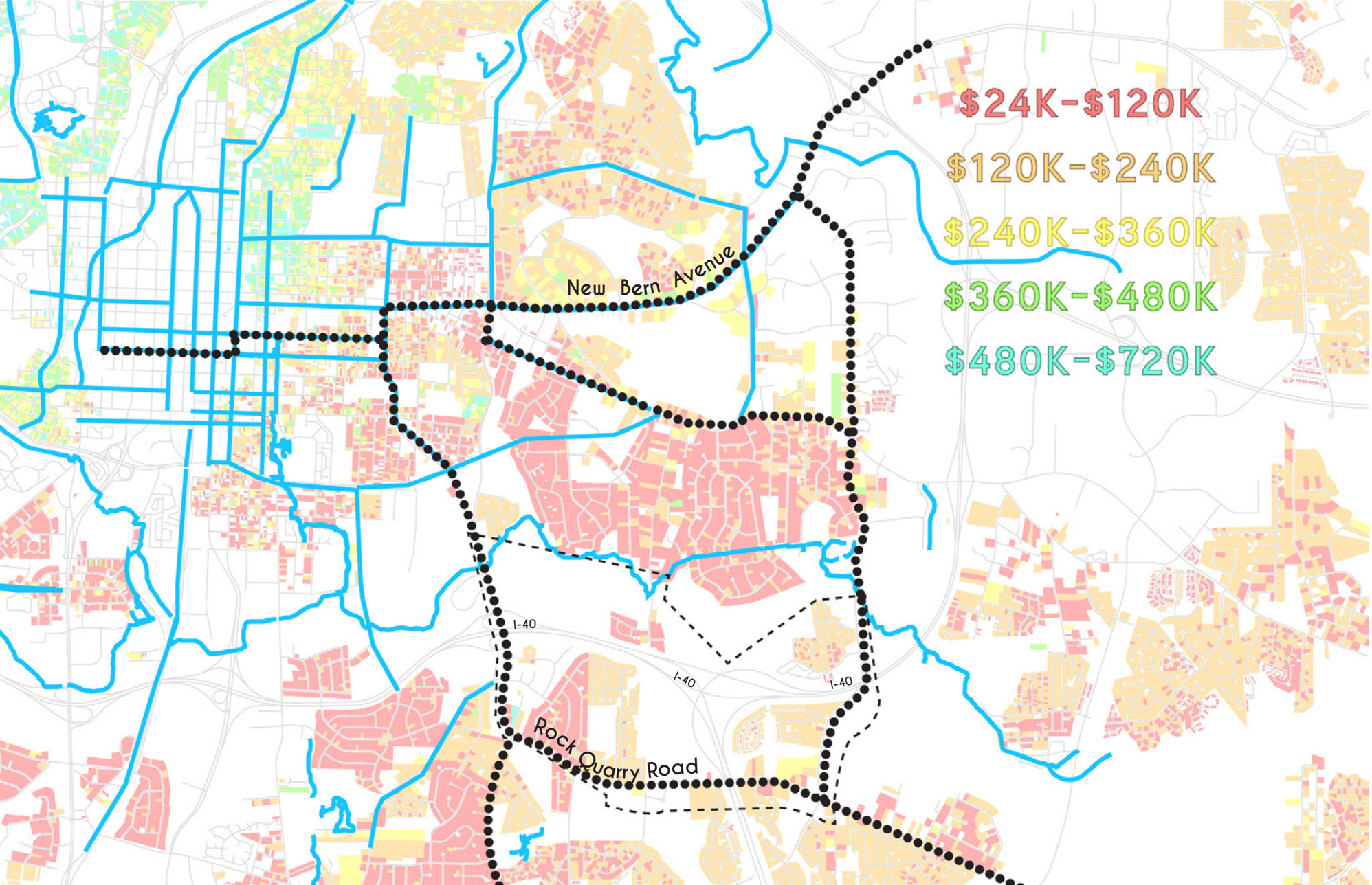


East Raleigh Opportunities

Upon closer inspection of a finer gradient (looking at specific property values of residences) the housing within the Rock quarry loop has a mixture of values as compared to the more dense concentrations of low-value-housing to its north and southwest. This observation would necessitate creating a loop of bicycle infrastructure that would connect these different areas and jointly connect them to the bicycle infrastructure web through its four corners.



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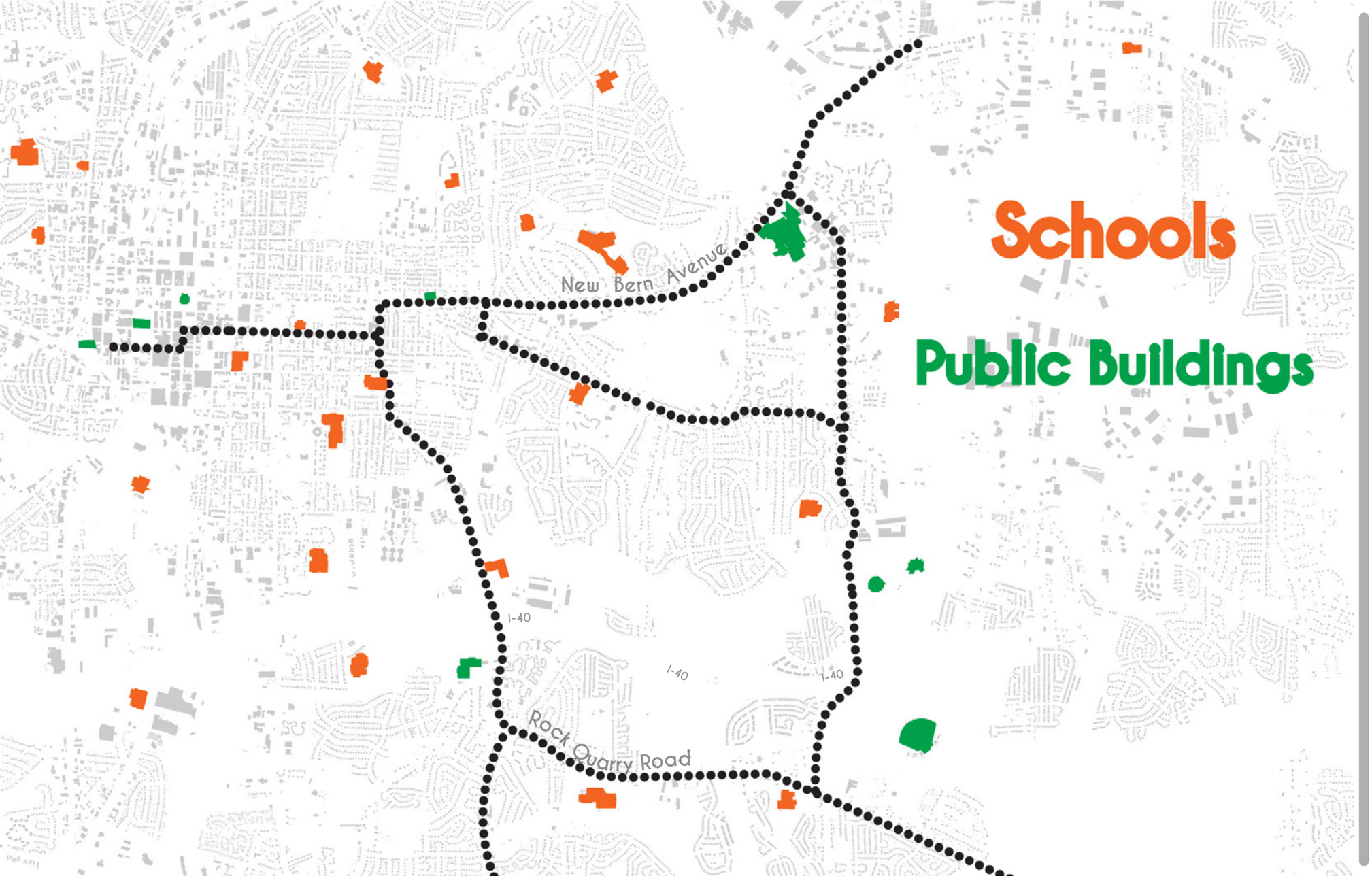
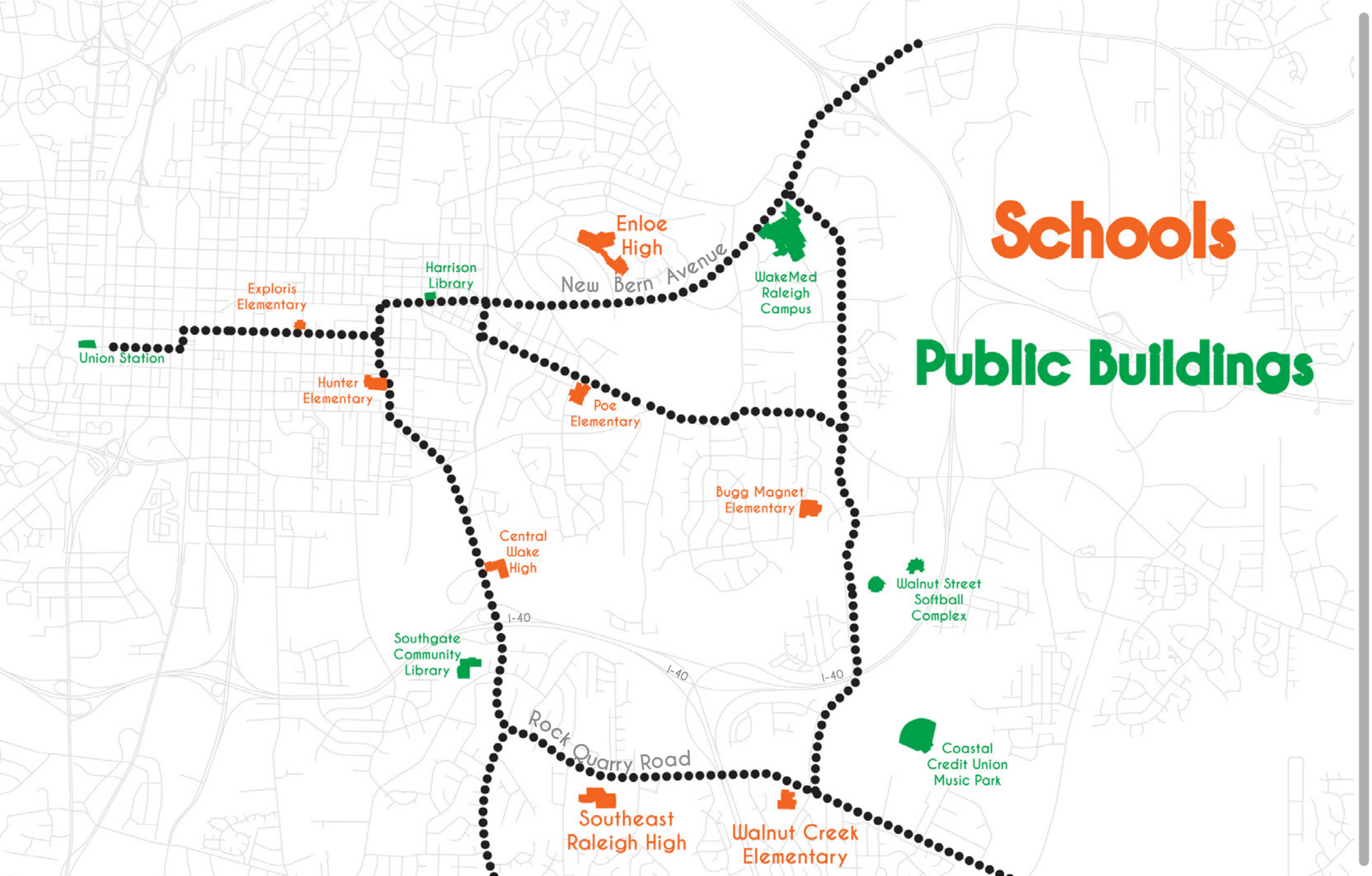


Infrastructural Waypoints

Other infrastructural features that help determine the route of the proposed loop would be the plethora of schools and public buildings along its projected paths. Aside from being very relevant daily destinations for commuters, these public assets can be also used as organizational hubs for the same kind of public engagement that the League of American Bicyclists stipulated in their 2015 recommendations to the City of Raleigh. Many of these existing public buildings are also the most likely candidates for bike centric facilities to be installed. According to Eric Lamb, Raleigh Union Station has been the subject of conversation for the installation of public bike-focused facilities such as storage lockers and shower rooms. The same idea could also be applied to other such notable public buildings along the proposed East Raleigh bike loop.



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New Bern Avenue

Union Station
Bike Maintenance and Rental Facilities

WakeMed Raleigh Campus
Bike Lockers, Shower & Changing Rooms

Southgate Community Library
Bike Storage Lockers/Pods

I-40

I-40

I-40

Rock Quarry Road

Coastal Credit Union Music Park
Covered Bike Parking Pavillions

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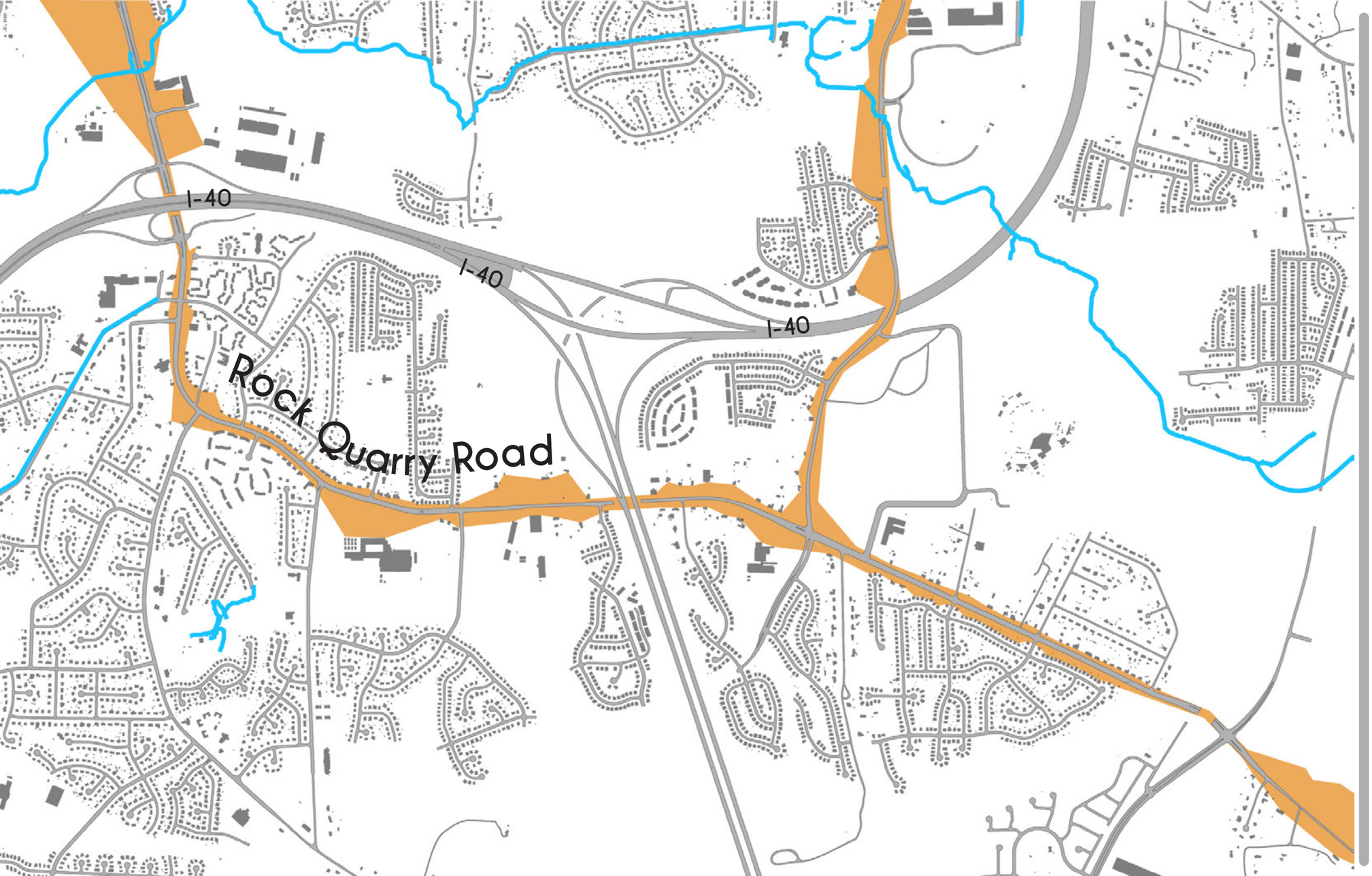
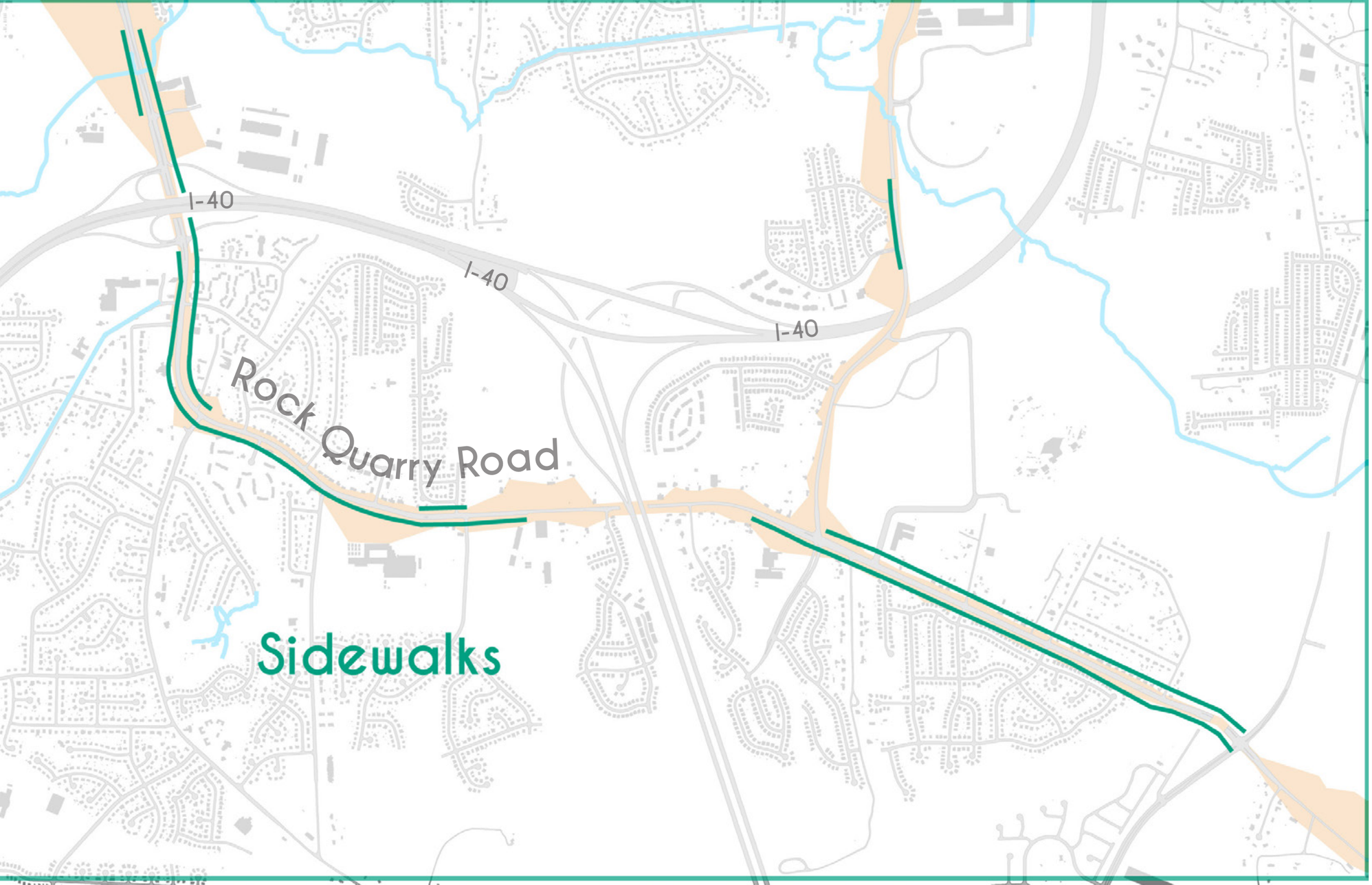


Rock Quarry Proposals

Zooming in on neighborhoods along Rock Quarry Road there are some notable restrictions on the potential expansion of bike infrastructure. For example there are a lot of areas that have very tight dimensions between the built infrastructure (as illustrated in the orange filled-in region) on either side of the road that make it difficult for the expansion of street widths necessary to make way for the cities desired separated bike lane infrastructure. There are also some severe restrictions on the opportunities for bike lanes where Rock Quarry Road meets I-40 in the form of a bridge over I-40 to the west and a tunnel under I-40 to the east. These two intersections act as "pinch points" that makes street widening measures either challenging or unfeasible.

The sidewalks all along Rock Quarry Road have a lot of discontinuity that causes a hazard for bike users and pedestrians alike. Completing these sidewalks and introducing sharrows on Rock Quarry road, however, could create more organization and separation between car riders, bicycle users and pedestrians.



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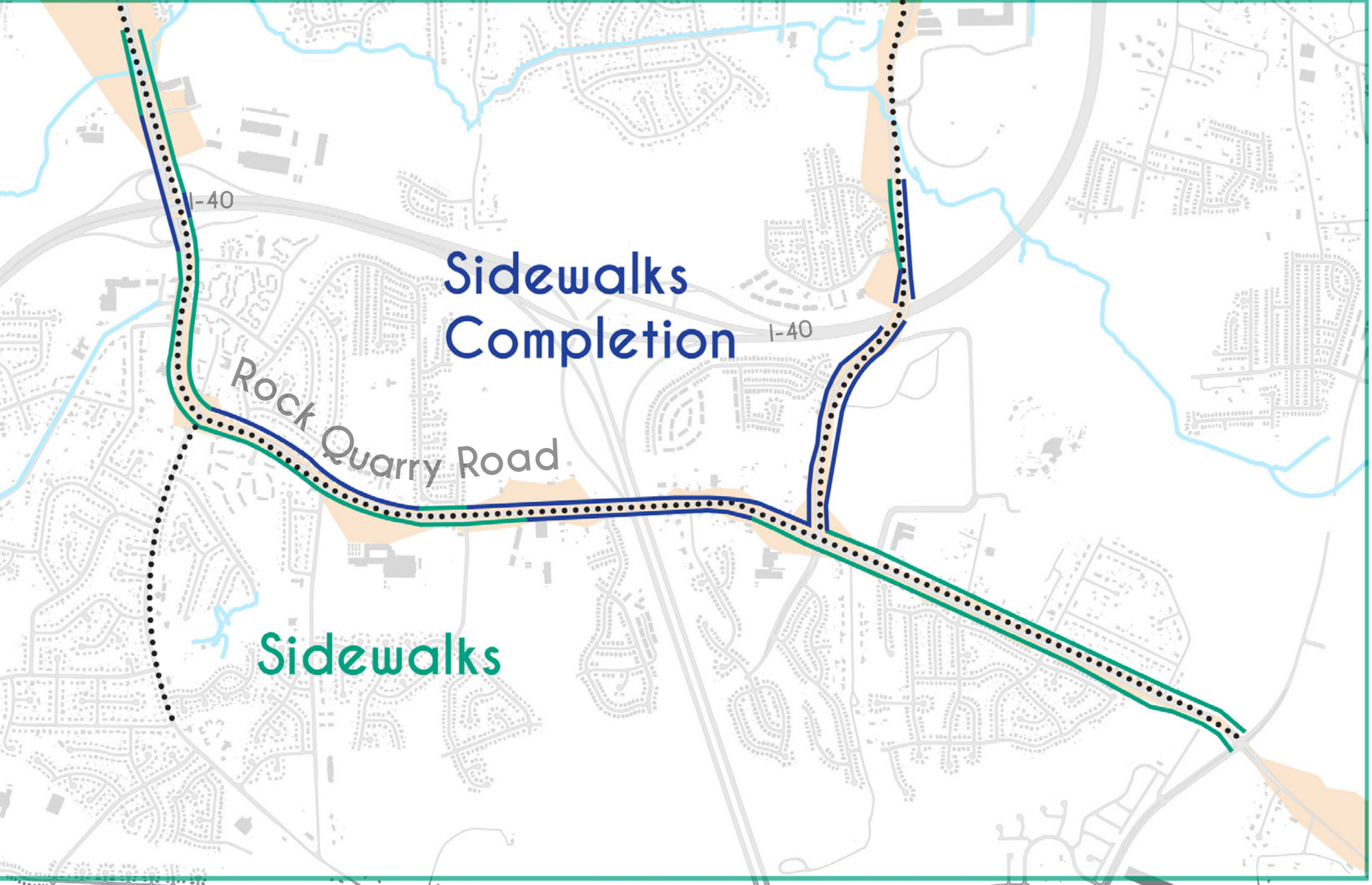

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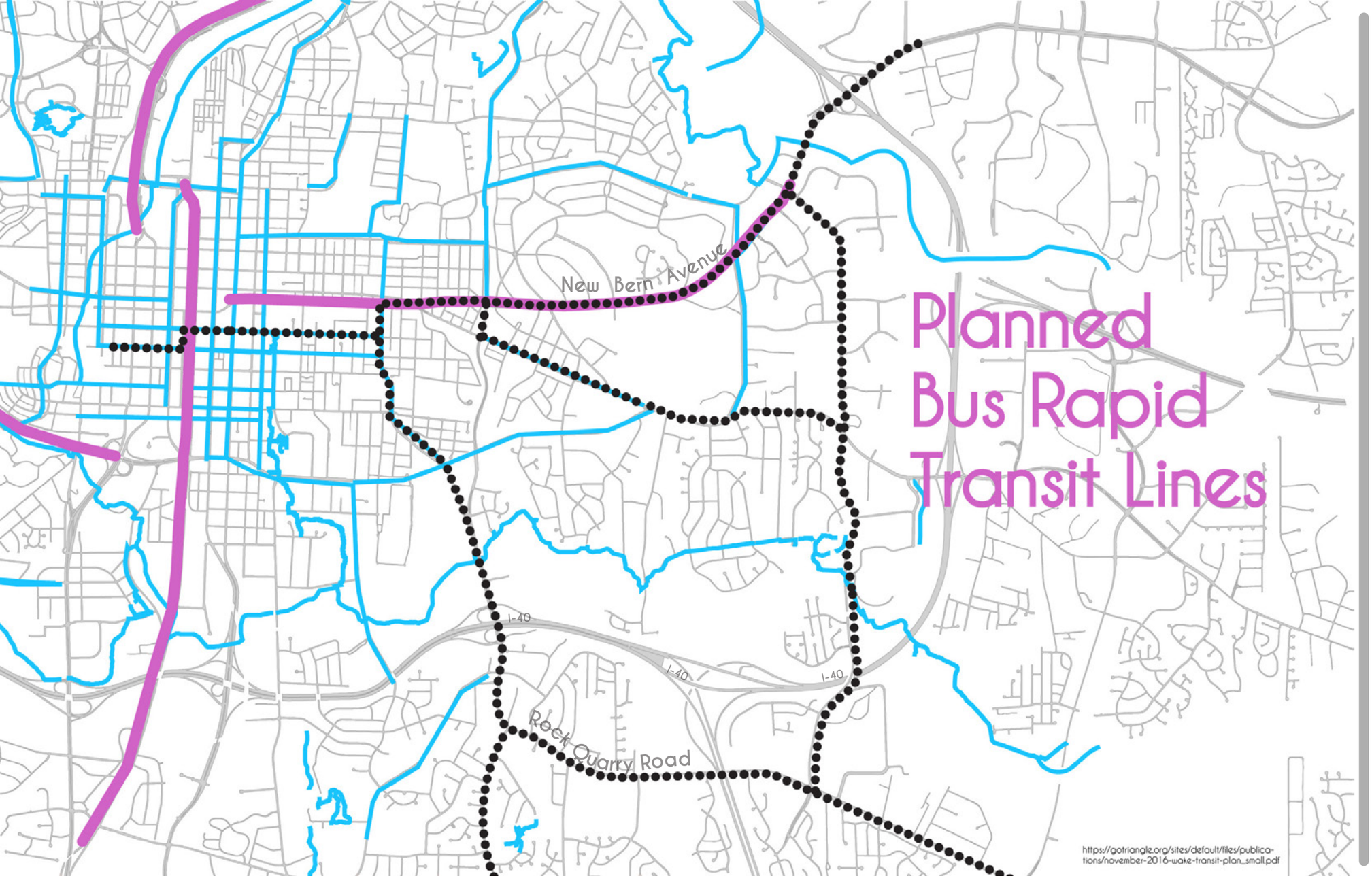

New Bern Ave/BRT Conflict

Another area of concern worthy of analysis would be New Bern Avenue. This is partially because of the cities plans to install one of their four main Bus Rapid Transit lines along New Bern and the potential conflict that this presents to the bike infrastructure along this road. BRT lines, by their very nature, affect the cross section of the street as they not only eat up two lanes of traffic specifically reserved for bus rapid transit but also, by the specific model that the city of Raleigh is looking at, eat up a section betwixt these lanes to be used as pickup/drop-off station.[10] According to Eric Lamb, the conflicts between the BRT lines and bike lanes will, in the vast majority of cases, result in a removal of whatever bike infrastructure overlaps with the proposed BRT lines. This is due to narrow margins along existing roads that limit the widening of the street as seen both along Rock Quarry road as well as much of Raleigh within the original, centuries old, building grid.

On closer inspection, however, there are opportunities for New Bern Avenue to challenge this assumption and to demonstrate how car, pedestrian, BRT and bike traffic can harmonize along the same urban corridor. Not only do the building properties along New Bern Avenue have a very wide distance from the road itself, but there is also a rather generous buffer between the road and property lines (parcels) themselves. This means that much of the road expansion could not only avoid disruption of the adjacent built environment but also avoid the implementation of "eminent domain"; a government action that could generate a myriad of issues and controversies.

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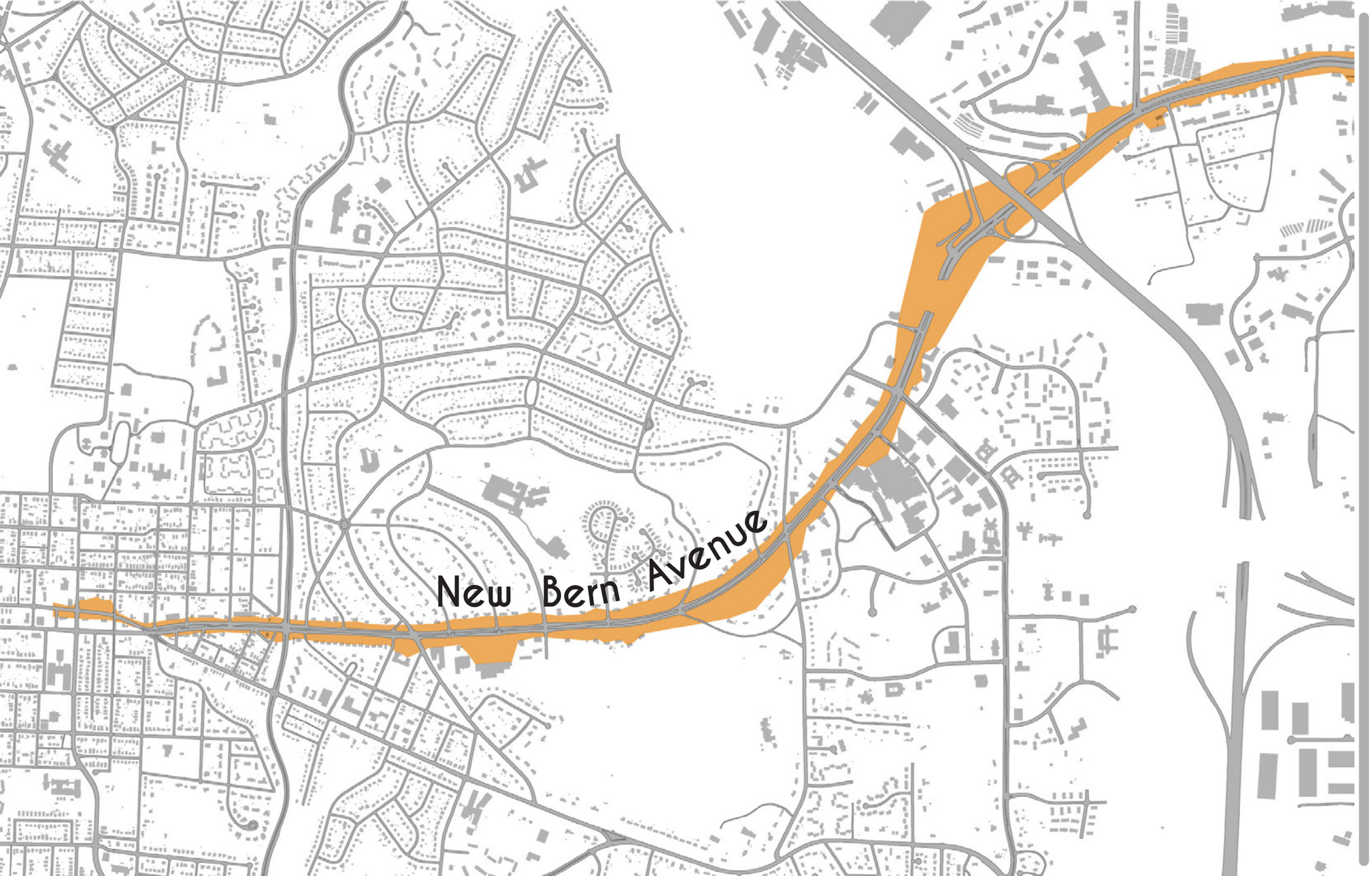

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Downtown Entrance

Widening Corridor

Wake Med Bike Intersection

New Bern Proposals

There are three general areas of finer grained analysis along New Bern used to describe the current condition and some of the feasible actions that can be taken to harmonize the currently disparate modes of transport.

1. The Downtown Entrance

This zone is indicative of the issues that arise where the older building footprints and parcel distances narrows when approaching downtown as seen in **Section A**. These areas have a lot less wiggle room because of these smaller buffer zones between the street and property lines. Furthermore, expanding within these buffer zones would also overtake parking lots that are important to the businesses adjacent to them. Therefore, encroachment on these areas, while avoiding eminent domain, would still infringe on important assets that these businesses would rely on. It is for this reason that areas such as this transition to possible sharrow infrastructure that would not require disruptive street widening projects.

However, fewer than 500 yards away, in **Section B**, both the distances between buildings and the property lines increases drastically which makes room for more expansive street widening actions to be taken that meld the different transportation modes.

2. The Widening Corridor

This area is indicative of the conditions present amongst most of New Bern Avenue whilst also being close in proximity to one of the public assets of Enloe Highschool (as demarcated in previous diagrams). As seen in **Section C**, the topography in this area would require some subtle re-grading in order to introduce further hardscape and sidewalk. There would, however, be plenty of room to do it in.

3. Wake Med Bike Intersection

The public asset that one can assert as the main destination for New Bern Avenue would be the Wake Med Campus, which could act as yet another organizational hub for public engagement for bike infrastructure as well as a location for useful bike-focused amenities. In cross section, however, it does function as an example of some of the limitations that topography has on the expansion of road infrastructure.

As seen in **Section D**, despite the total 43 feet of distance between the Wake Med Parking deck and the road, the topography within this zone is not conducive to street expansion and would best be served with the designation of a sharrow in order to not put too much strain on possible sidewalk installations.

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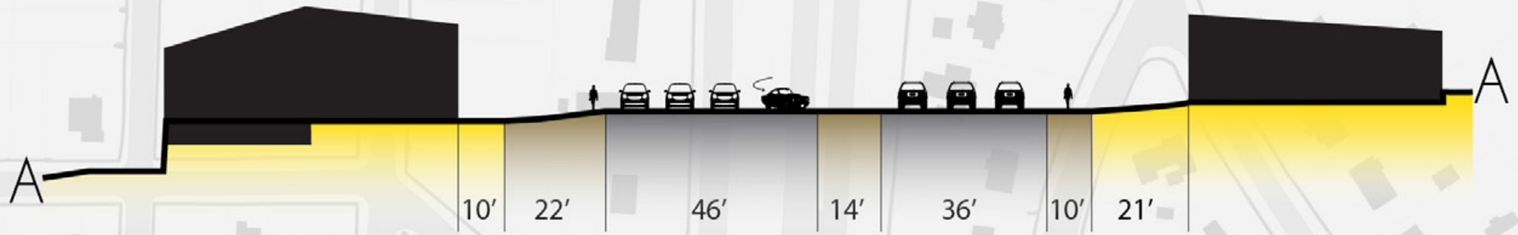

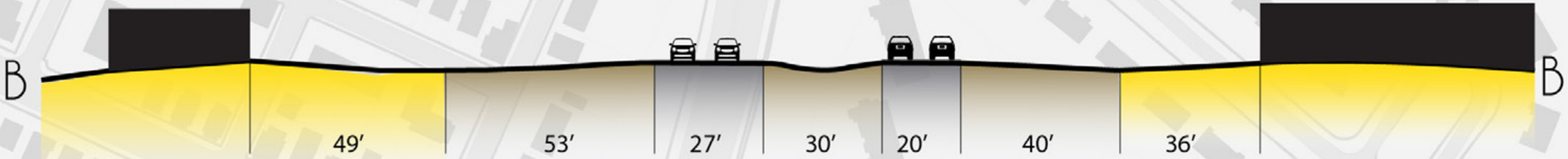

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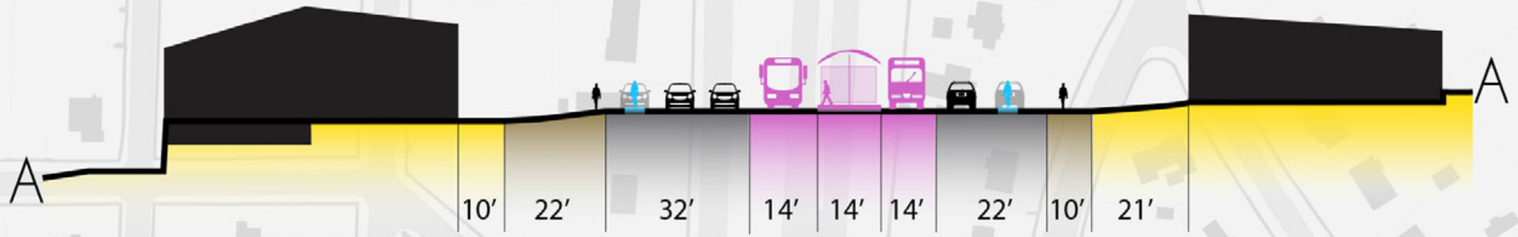

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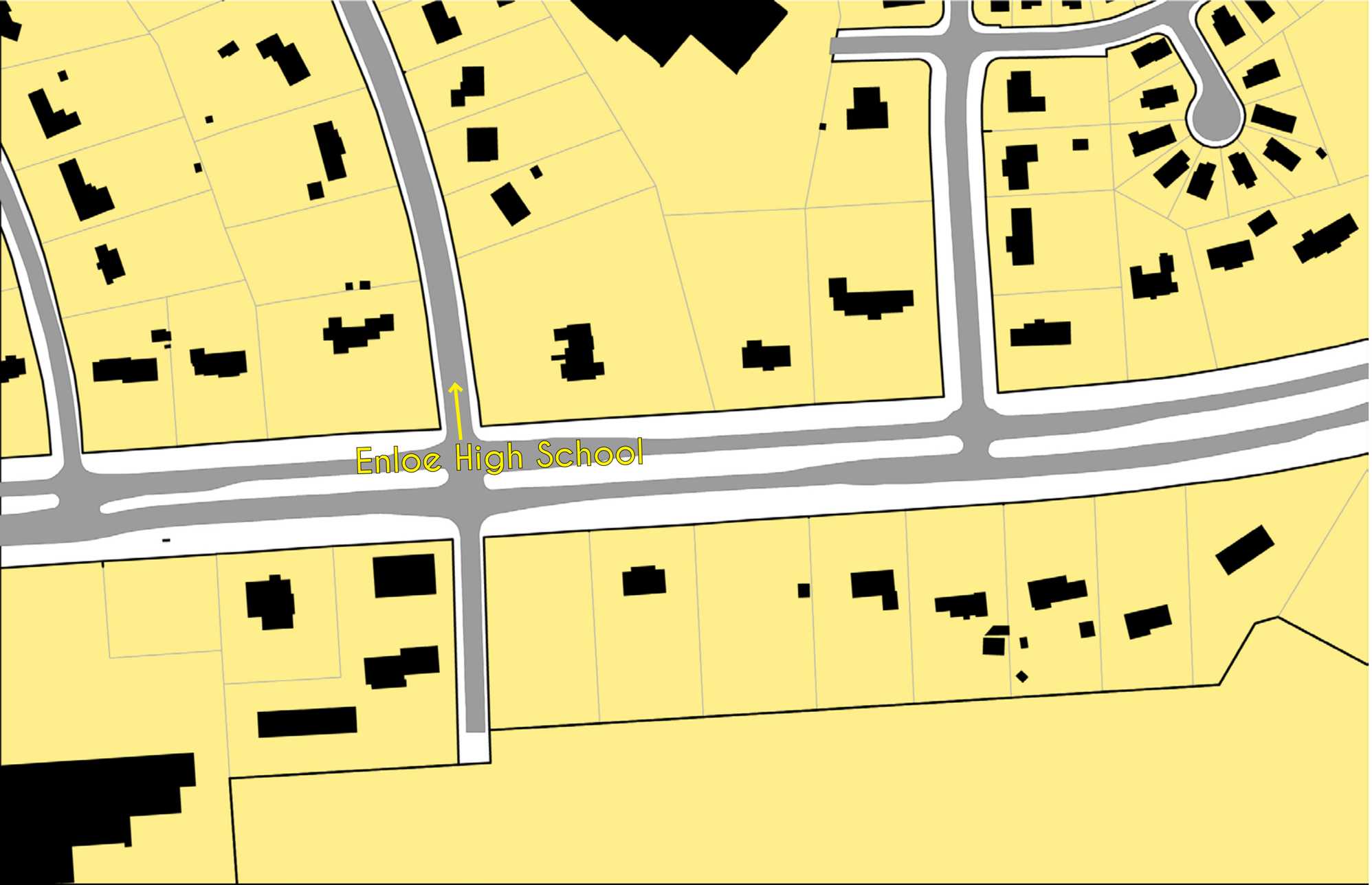

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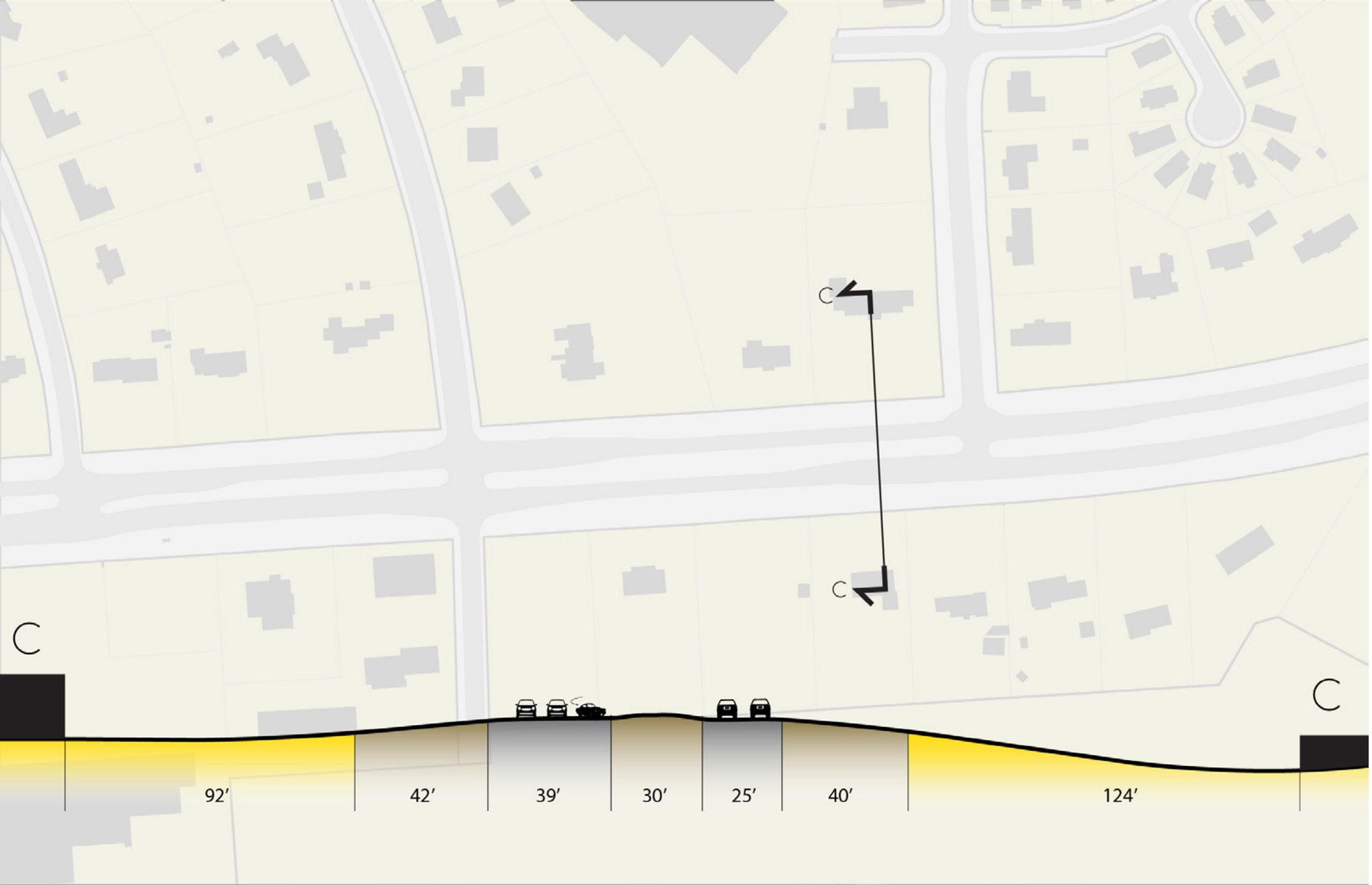

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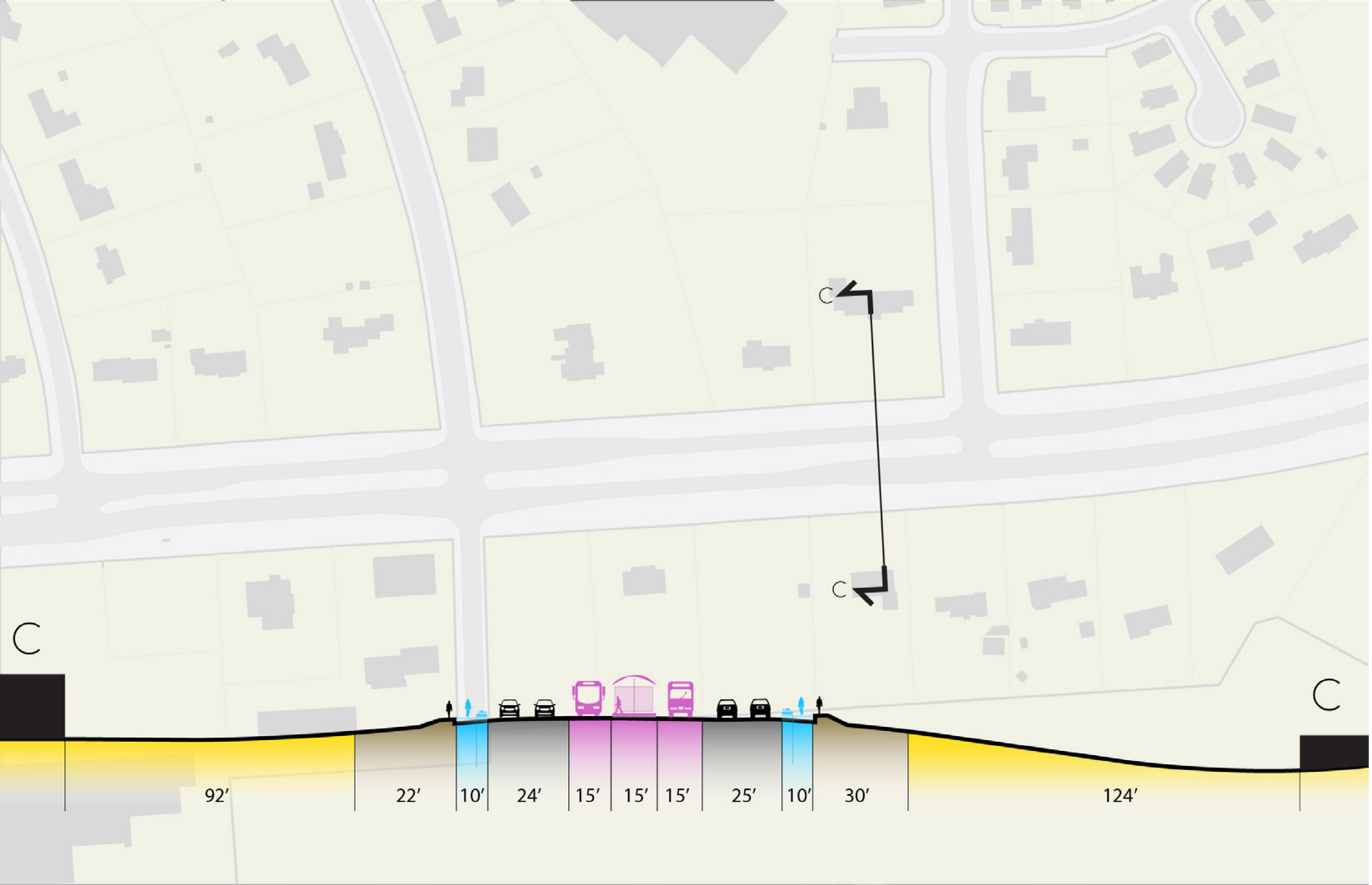

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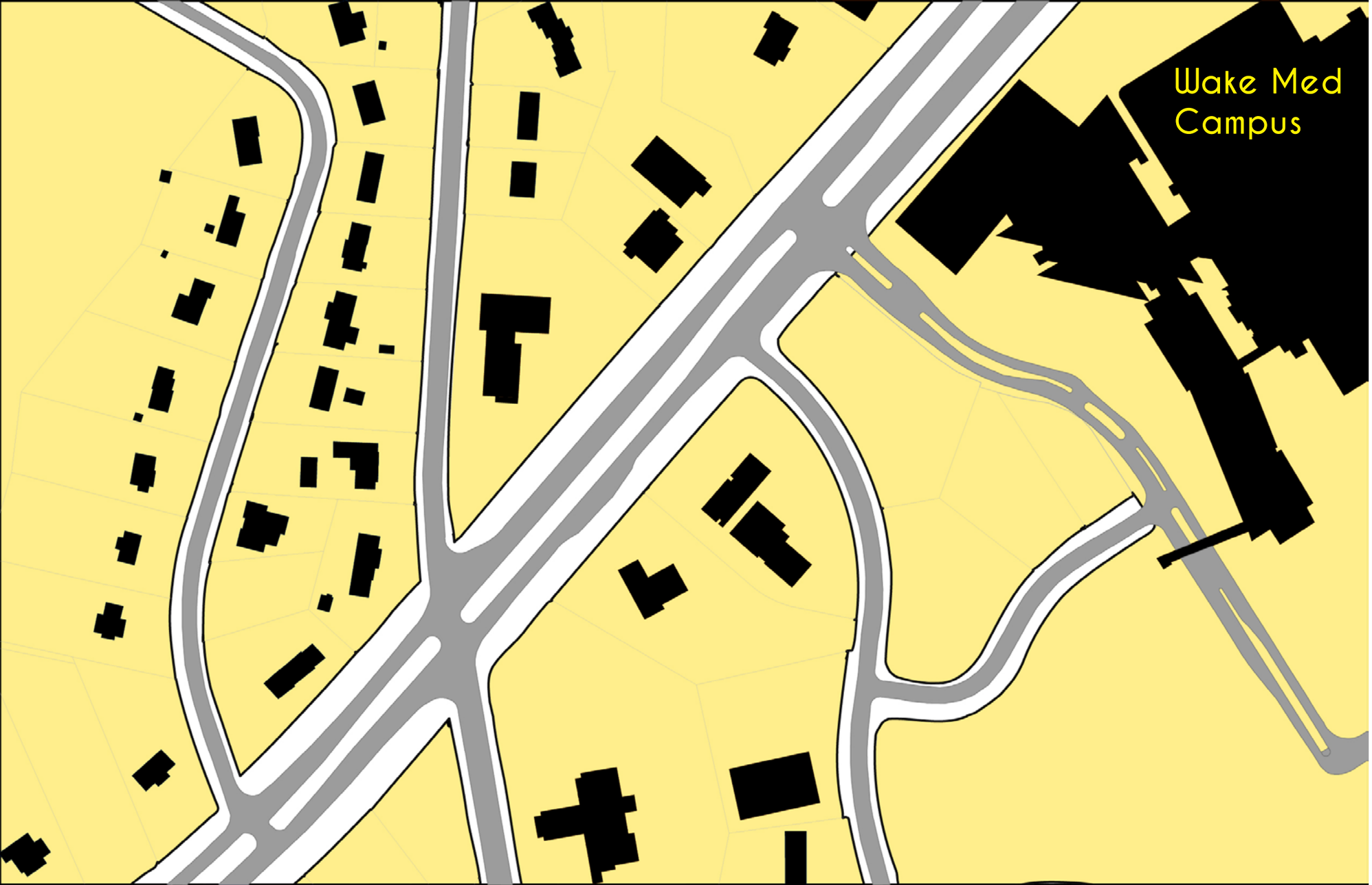

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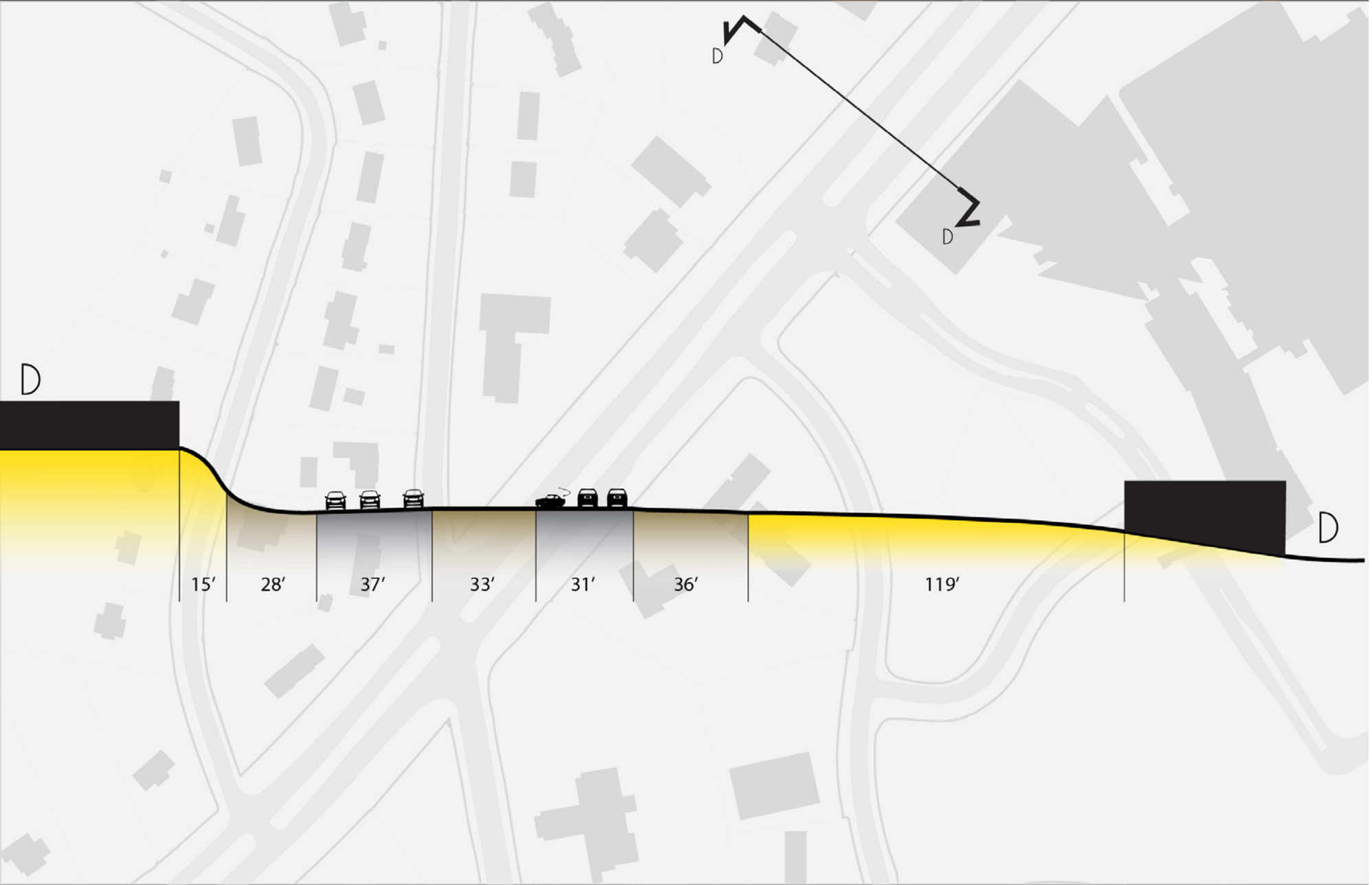

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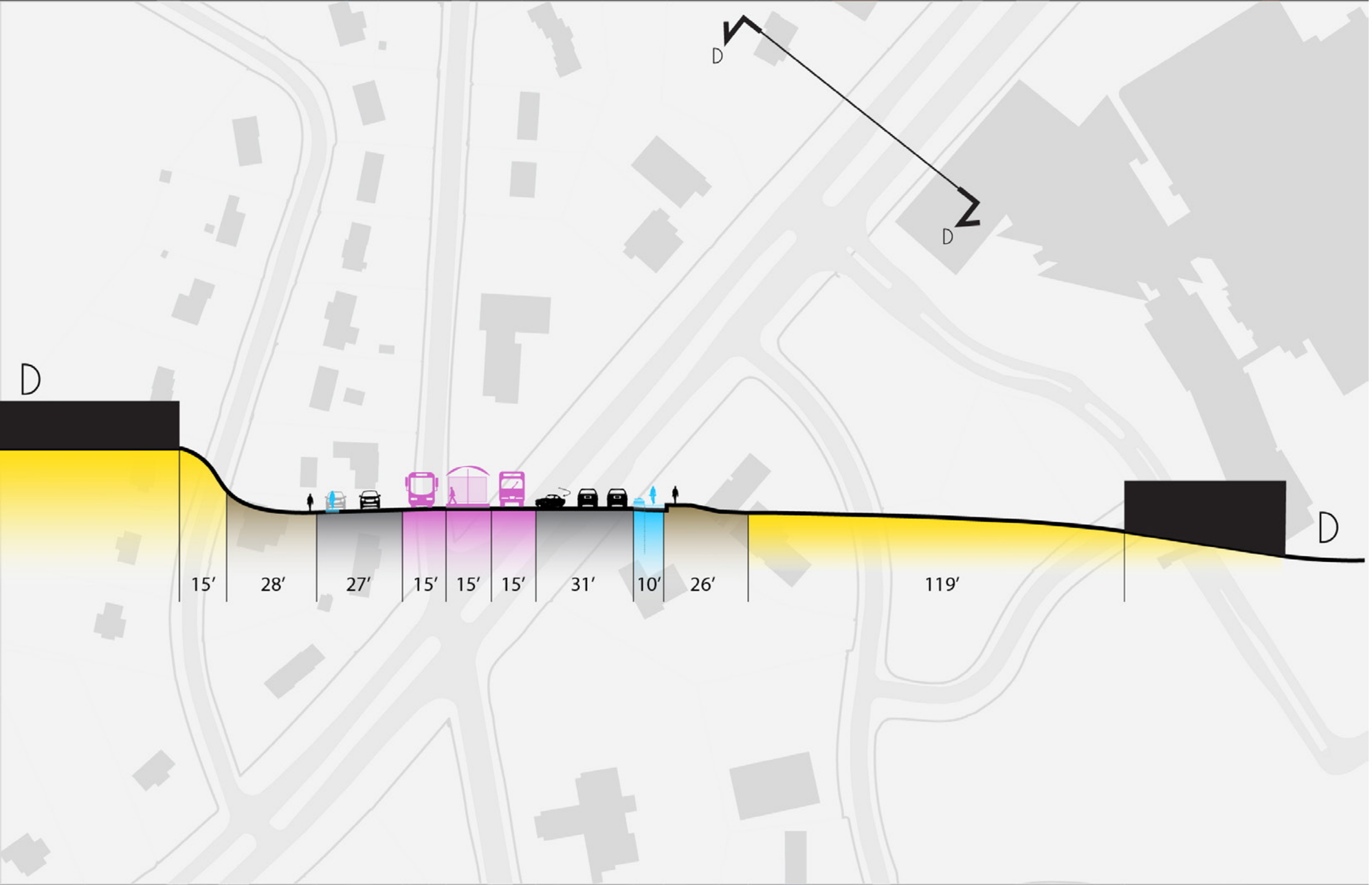

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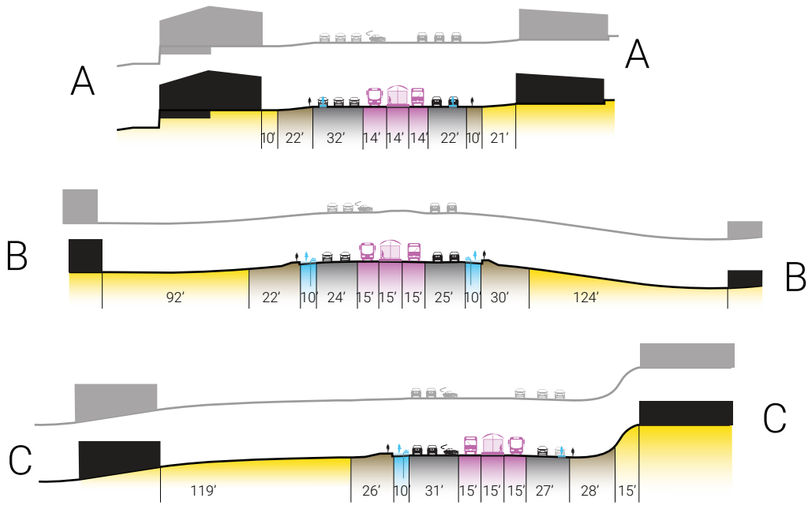

Next Steps/Engagement

The aforementioned street section proposals along New Bern represent one scenario and are intended as a conversation starter for the kinds of public engagement stipulated in the League of American Bicyclists suggestions to the city of Raleigh. This kind of public engagement could expand on the analysis of this corridor and contribute to more thoughtful infrastructural actions on the part of the City of Raleigh.

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