

University of Washington

REDESIGNING BURKE-GILMAN TRAIL

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ABSTRACT

The Burke-Gilman Trail is a popular and heavily used pedestrian and cycling trail that runs 27 miles through the City of Seattle and suburbs to the north. As an urban trail, the Burke-Gilman has several “conflict zones” where changes in trail typology create safety problems for the trail users. This project seeks to first identify and better understand the nature of these conflict zones, and second, develop responsive design solutions that will increase the overall safety of the trail. To understand the circulation patterns and safety issues on the Burke-Gilman Trail, cameras were placed at three intersections to capture near misses, crashes, and unique uses of the trail space. The results of these observations highlight the design failures and the need for design modifications. The design solutions were developed by applying design best practices to the particular contexts of the trail. The design products from this project are intended to inspire action and build community awareness of the safety issues inherent in the current design of the Burke-Gilman trail.

INTRODUCTION

PROJECT STATEMENT

The purpose of this project is to inspire action and build community awareness of safety issues inherent in the current design of the Burke-Gilman Trail in Seattle, Washington. As a graduating Community, Environment & Planning student with a minor in Urban Design and Planning, I feel underprepared for the design aspect of the Urban Design and Planning minor. My personal goal with this project has been to develop my digital modeling and visual communication skills while also respecting limitations of a context specific piece of municipal infrastructure. I have created concept designs for two intersections of the trail. In this report I will outline why this project matters to me, how the need for redesign was determined, why specific modifications were chosen, and finally what I learned from the process.

My Story



*James Cooper dismounting a horse in Throckmorton, TX
May of 1991*

I grew up in the suburbs of Fort Worth, Texas. My father's profession listed on my birth certificate is "Mechanic". Though only half true because of multiple other family business ventures, it speaks to the type of car-centric knowledge that surrounded me as a child. In a surprising chain of events, I came into my own as an adult that advocates for municipal spending that benefits the non-motorist.

A number of factors brought me to Seattle, but among them is a slow discovery of a love for cycling. By 2009, nearly three years after finishing high school I hadn't even started on the path to developing into the person I wanted to be. I was working odd desk jobs and tending bar for a variety of seedy gay bars in the central neighborhoods of Dallas. Money was hard to come by and owning a car was almost a required prosthetic device for navigating the transportation system in Texas. In mid 2009 the vehicle I owned stopped operating and I simply didn't have funds for a substitute, so I got creative and quickly found a bicycle to get to work. I loved it, but

by 2011 I'd become aware of a developing casual cycling culture in Portland and Seattle that I wanted to be a part of.

After a lovely send off from friends and family, I moved to Seattle in 2012. I arrived to a city that felt dynamic, unique, and ready to make changes for the better. One thing I hadn't anticipated (and took me some years to learn) was how reluctant city officials are to make the changes that set Seattle apart from the rest of the country. The movement to become a bicycle friendly city was an uphill battle against centrists standing their ground for the status quo.

I came to Seattle unprepared to organize or fight the uphill battle at city hall and after a short while, I was aware of it. Coincidentally, by 2014 rents had risen quickly enough that I was forced to re-evaluate (or rather build for the first time ever) a new 5 year plan to reach financial stability. I'd already moved 2,046 miles away from everything I knew so that I could build a meaningful life for myself. Moving to a less expensive place was not an option. It was suddenly crystal clear that I could find happiness by becoming a transportation expert who studies urban planning, or something close to it. I had to go to school to be who I wanted to be.

My Commute



The image above is a topographical map with my chosen commute path to University of Washington every day. One point to notice is that the route is not the most direct, this is because the current bicycle network does not have a north-south connection along the eastern side of Lake Union.

The defining characteristic that shapes my commute is a mixture of topography combined with a separation of bicycle infrastructure from motor vehicle lanes¹. In recent years the Seattle Department of Transportation (SDOT) has installed a high quality bicycle path along Westlake Avenue. This piece of key infrastructure spans the western edge of Lake Union and connects the Burke-Gilman Trail (north of the lake) to an expanding network of protected bicycle lanes in the city center (south of the lake). Together, the Westlake bicycle path and growing downtown network create a seamless connection between neighborhoods that's low stress.

Prior to my move to Seattle, I was struck by a motor vehicle. A motorist drove over me while attempting a right turn on red without noticing my travel path straight through the perpendicular green light. I bring this into the discussion

¹ The Seattle Department of Transportation refers to these as "general purpose lanes" because all wheeled road users have a right to these lanes, in theory.

because I was (not only physically affected, but also) mentally affected by the crash. To this day, safety is a considerable barrier that limits where I will bike. As the network of bike lanes downtown grows, so do the number of destinations that I can bike to, and so does the frequency with which I bike.

According to a biannual survey of commuters who work in downtown Seattle the rate of bicycling to work has remained flat for the past 5 years, only increasing with population increase. Coincidentally though, the total number of vehicles entering the city center in cars has declined from the 2010 number while the working population has added another 60,000 workers, and the total number of people counted on bicycles has been increasing with regular expansion of the bike network. Inevitably, it means that the Burke-Gilman Trail will need to undergo future upgrades to accommodate the increasing bicycle traffic who are only very recently able to travel most of the city safely on a bike.

Anticipation for a growing number of trail users has prompted me to take a deep look at possible design modifications to help ease concerns of my own for the trail. My experience with specific sections of the trail give me a full arsenal of critiques for the trail, many of which are issues too large to address with the scope of a year long project.

My Experience With the Burke Gilman Trail

Between Stone Way and Latona Ave there are seven surface streets the trail crosses. Each of the crossings has its own set of disadvantages with relation to the use of the trail. Issues that I've experienced in my time riding the Burke-Gilman Trail include but are not limited to: hostile interactions with motorists, uneven pavement surfaces, confusing junctions (which I will cover later in the document), and a general inconsistency from block to block (which I will also expand on ahead). Additional acknowledgements related to shortcomings of the trail that do not fit the scope of this project include: poor lighting conditions, surface damage caused by tree roots, and encampments along the trail.

Inspiration

The Washington State Convention Center (WSCC) in Downtown Seattle began a process for expansion which (if constructed) will be the largest development project to take place in Seattle history. In the city of Seattle, the nine member city council understands that such large projects will have a sizable impact on the existing city and should provide a net benefit to the public. The city is able to use municipally owned land as a bargaining chip in order to receive a benefits package from developers. In this case, the WSCC was asking the city for an alley vacation² which the city has been known to deny without a robust public benefits package offered by the developer. If the WSCC was to receive the requested alley vacation, it was clear to the public that the developer would have to offer a very generous benefits package.

The location chosen for the convention center expansion is adjacent to Interstate 5 and in fact bridges a section of the freeway itself. When the freeway was planned in the 1950's, a group of concerned neighbors and people who would be displaced created a group called "stop the ditch" with intent to stop the construction of the freeway through the city. One idea the group advocated for was a tunnel under the city to prevent the inevitable displacement of thousands of residents and the division of a neighborhood. The Eisenhower administration was intent on building freeways but not at the high cost of tunneling below the city of Seattle. A compromise was reached between local, state, and federal officials to build the roadway in a trench that could later be capped with local funds. The first section of freeway to be capped came in 1988 with the development of Freeway Park that was constructed in conjunction with the first section of the WSCC.

² An alley vacation is process that allows the city to surrenders public ownership of the alleyway for acquisition by a builder in order to consolidate land on a block.



Interstate 5 before (left) and after (right) Freeway Park opened in 1976. (University of Washington, College of Built Environments Visual Resources Collection)

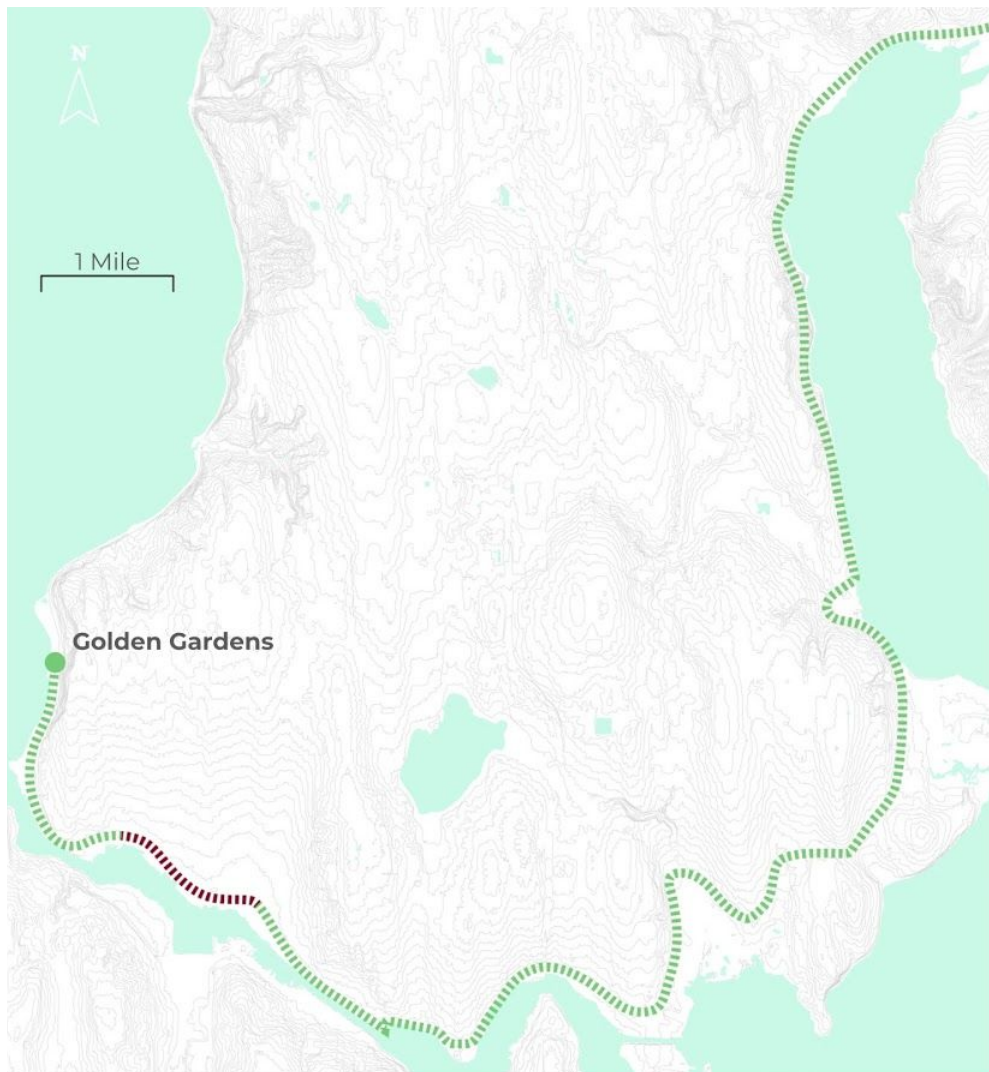
Considering that almost 50 years had past since the construction of Interstate 5, the idea of creating a lid for the freeway would have been considered a pipe dream. If the original plan for capping the freeway through Seattle were ever to come to fruition, it would take a bold vision and broad public support.

A duo of urban planners, Scott Bonjukian and John Feit knew the history of Interstate 5 and the original concept for creating caps for the freeway with local funds. In 2015 as WSCC began to publicize the intent to expand, Bonjukin and Feit took the opportunity to present a bold vision for what the public had likely forgotten. They hired architect name to develop a series of concept renderings to create a visually impactful representation for a reimagined space above the freeway. The images were released in local planning related blogs and quickly gained traction. Enough interest led to the formation of the Lid I-5 Campaign, a sizable organization that has earned the financial backing of the Seattle Parks Foundation³ and pushed the city to budget \$1.5 million for a feasibility study for a cap over the freeway.

³ Seattle Parks Foundation is a philanthropic organization who funds projects to enhance public space.

This successful form of organizing is not something I've ever seen for such an ambitious project before. The model executed by the Lid I-5 Campaign is what has inspired me to approach this project the way I have, by developing concepts for what the Burke-Gilman Trail *could* be, in an area where people aren't currently bothered by the status quo.

About the Burke-Gilman Trail



The image depicts the path of the Burke-Gilman Trail. The section indicated in red is colloquially referred to as the "Missing Link"

The Burke-Gilman Trail spans 18.8 miles between Seattle and Kenmore, Washington. The physical trail continues beyond Kenmore, but the name changes to the Sammamish River Trail between Kenmore and Woodinville (further northeast of Seattle). The majority of the trail is uncharacteristically flat for paths in Seattle because it tracks Seattle's water lines for most of its journey through the city.

Such an topographically flat path is attributed to the land the Burke-Gilman Trail is built upon. The trail is one of the very first Rails-to-Trails projects in the United States. The right of way was originally cleared and developed as part of the Seattle Lake Shore & Eastern Railway (SLS&E). In its day, the railway was the principal route for natural resources (such as logging and salmon) leaving the city through Fisherman's Terminal in Ballard. This railway was not connected to the rail network that spans the western United States, but did provide access to the bountiful natural resources deep into the Cascade mountain range as well as provide passenger travel until the 1920's.

In 1969 the SLS&E railway was acquired by Burlington Northern Railway in a company merger but was abandoned only a year later in 1970. Eight short years later the first segment of the Burke-Gilman Trail opened between Gasworks Park (in Seattle) to the city of Kenmore. Later an extension opened between Gasworks park and Fremont. The most recent extension was a 2008 addition from Golden Gardens on the far west edge of the Ballard neighborhood and the heart of Ballard.

50 years after opening the first segment, a 1.8 mile section⁴ of trail remains unfinished. Over the past 20 years the city of Seattle has spent \$20 Million on studies and legal appeals from resistant businesses who do not want the trail built. In 2017 the city issued a statement of non-significance which permits the construction of the missing segment. This decision was challenged by an organization of weary business owners adjacent to the potential route for the trail. As of January 2018 the missing link was expected to begin construction within a year.

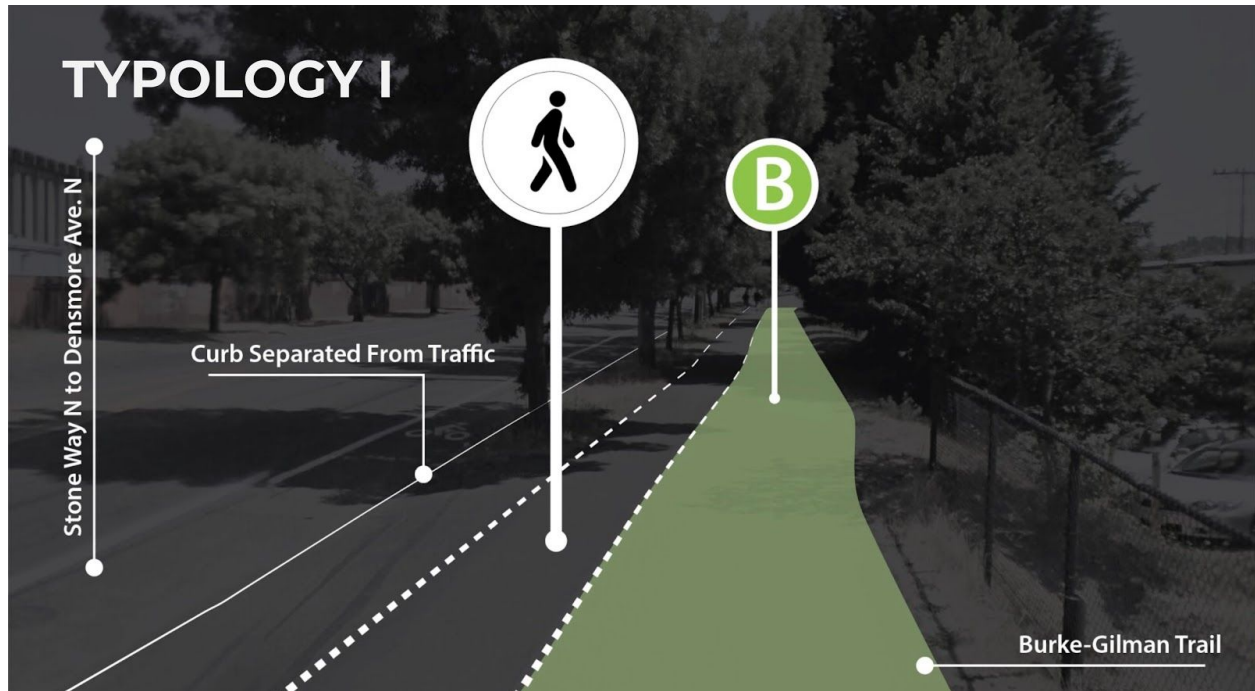
⁴ The missing section is colloquially known as "The Missing Link"

The difficulty in finishing the last section of the Burke-Gilman Trail through the city of Seattle has made for an environment that sucks a great deal of the energy out of the conversation when attempting to discuss any other aspects of the trail. The need to complete the trail is a concern to enough people that finding resources to describe the history and construction difficult to find.

HYPOTHESIS

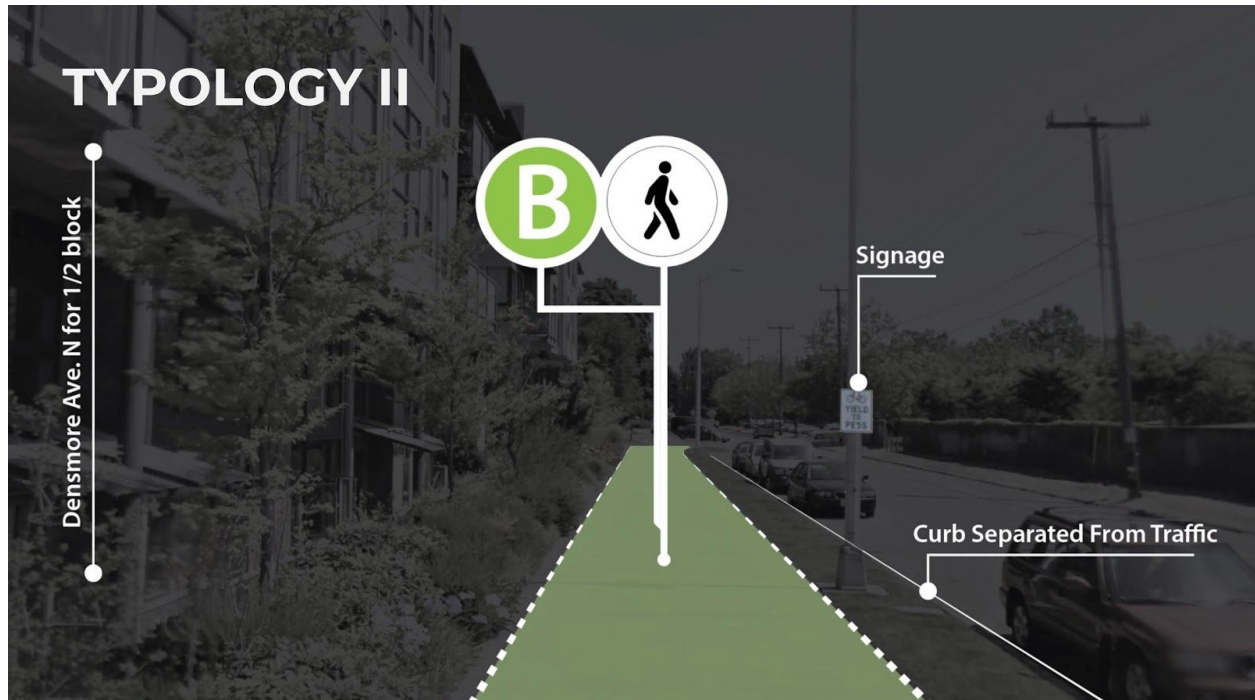
I intended to create design concepts at the outset of this project, so I wanted to focus on improvements that the public could support beyond simple aesthetic improvements. I wanted to test a hypothesis before developing a design to ensure that the outcome of the conceptual design modifications do genuinely enhance safety for trail users. The hypothesis I set out to test was that the potential for collisions on the Burke-Gilman Trail could be between bicycles and pedestrians at a select number of conflict zones. To define a conflict zone I will first have to explain the various typologies of the Burke-Gilman Trail within the scope.

TPOLOGY I



Trail Typology I is characterized by a number of components. There is a concrete curb which physically separates trail users from motor vehicle traffic. In addition there is a planting strip between the trail and the road which further enhances the separation of the trail from the street. The trail itself is spatially divided with a clear white line separating pedestrians from cyclists in addition to markings on the ground that clearly articulate the intended use of that space.

TPOLOGY II

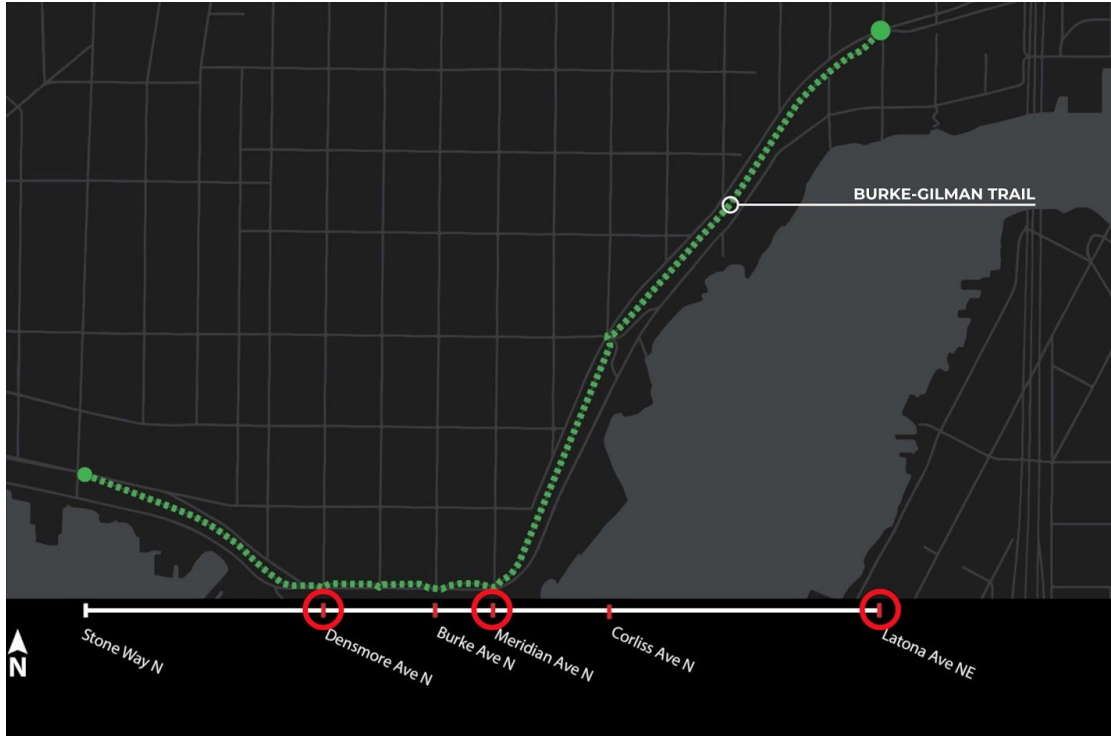


Typology II is also characterized by physical separation from the street but differs on the trail itself. There is no dividing line between pedestrians and cyclists, but signage is present to instruct cyclists to yield to pedestrians. This typology is the most prevalent of the two types for the length of the Burke-Gilman Trail and (from my experience) aren't problematic when people are consistently expected to share the trail between cyclists and pedestrians.

CONFLICT ZONES



The conflict zones I've identified occur where trail Typology I changes to Typology II without advance warning to trail users. A deeper aspect of my hypothesis was that conflict zones are a product of poor transitions between trail typologies, and in these areas pedestrians have a high risk of collision with cyclists.



Of the five conflict zones identified within the project scope, a number of the conditions were repeated at other intersections. For the sake of simplicity, the concept redesigns only attempted to address the trail crossings at Densmore Avenue North, Meridian Avenue North and Latona Avenue Northeast. Later the trail crossing at Densmore Avenue North was removed from the list of modified intersections.

METHODS

The scope of this project was confined to the 1.6 mile section of Burke-Gilman Trail that lies within the confines of the Wallingford neighborhood of Seattle. The purpose of focusing attention to the segment of trail located within one neighborhood served multiple purposes. Prior to conducting a literature review I anticipated trouble with collecting information about property owners, stakeholders and neighborhood ambition for the trail. Another purpose was to work with a section of trail that was easy to access on my commute to and from the University of Washington.

Once the scope was determined there were two basic methods used to execute this project. The first was to test the hypothesis, and the second was to design solutions in response to the evidence collected while testing occurred.

To test the hypothesis, I placed cameras at three trail intersections with city streets. During a warm spell in late April 2018, cameras were placed at: Latona Avenue Northeast at Northeast Pacific Street, Meridian Avenue North at North Northlake Way, and Densmore Avenue at North Northlake Way. Cameras were set up simultaneously and left recording for three hours while capturing rush hour on April 26th. Following filming, the footage was reviewed for collisions, near misses⁵ or unique uses⁶ of the trail.

The purpose of using cameras to document my observations was to automate the process and expand the number of places I could observe in one timeframe. This method is derived from the work of William White's work with using film to record and observe park users in New York City. His work was revolutionary for the time because it allowed for multiple reviews of the information being tracked. Today, it's used by a number of urban design consulting firms, one of which is a Danish design firm called Copenhagenize, who uses cameras to track people's desire lines to understand how to build infrastructure that fits people's behavior.

The second part of the methods for this project involved learning how to operate digital modeling technology. The design responses were created using Sketchup software in combination with Adobe Illustrator to annotate specific changes to the trail.

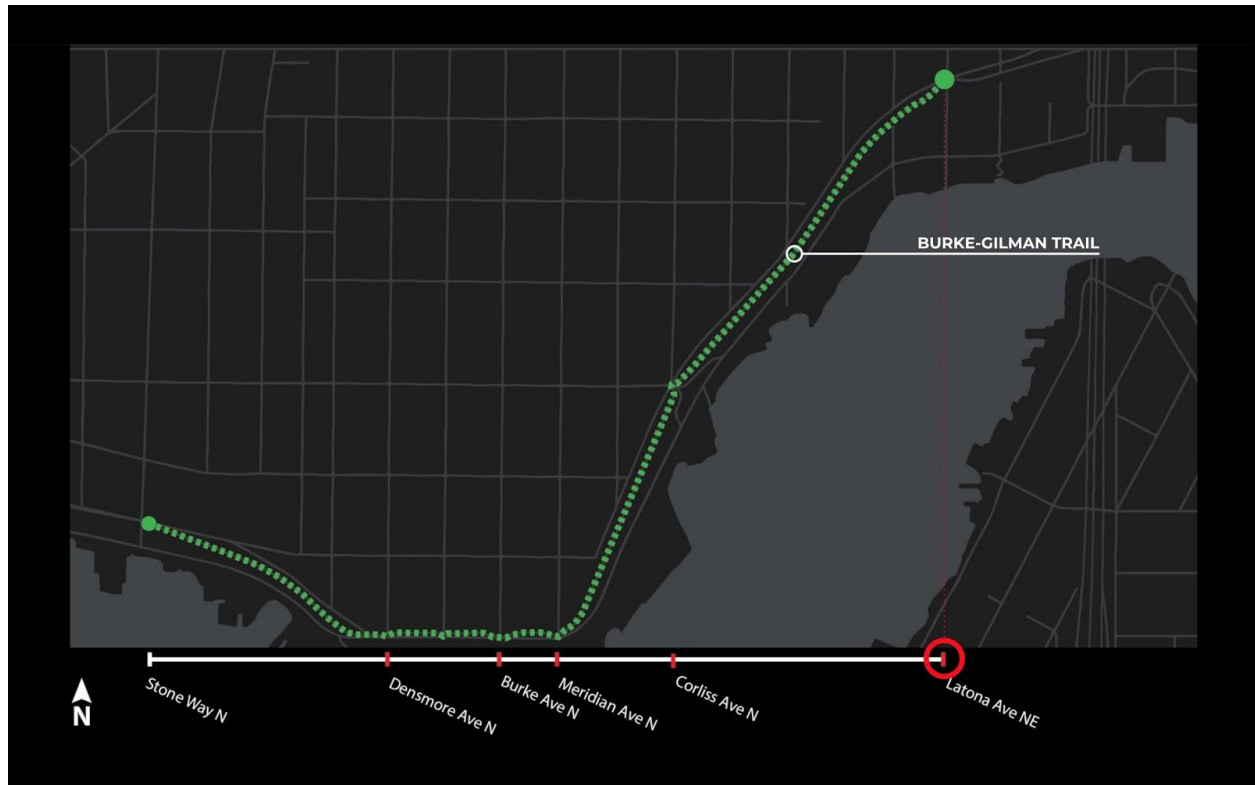
⁵ I defined near misses as interactions of any trail user with a bicycle or motor vehicle that occurred with an apparent passing distance of less than one foot.

⁶ I defined unique uses as a use other than the intended use of the space.

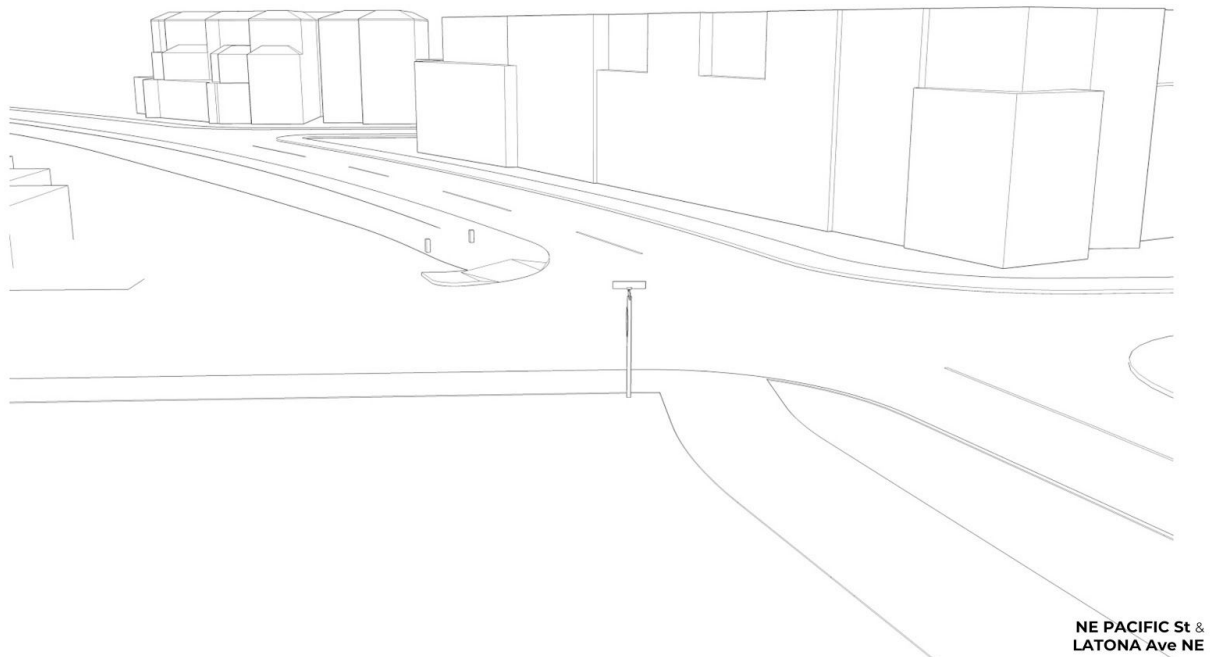
RESULTS

Unfortunately, I was unable to prove the hypothesis with the limited time allocated to observations. There were no conflicts between pedestrians and bicycles at any of the three intersections as a result of changes in trail typology. However, there were multiple instances of compromising situations introduced with the presence of automobiles at the intersections nearest Latona Avenue Northeast at Northeast Pacific Street and Meridian Avenue North at North Northlake Way. For the lack of conflict at the intersection of Densmore Avenue at North Northlake Way, I chose to refrain from providing a design response and spent time redesigning Latona Avenue Northeast at Northeast Pacific Street and Meridian Avenue North at North Northlake Way.

Latona Avenue Northeast at Northeast Pacific Street

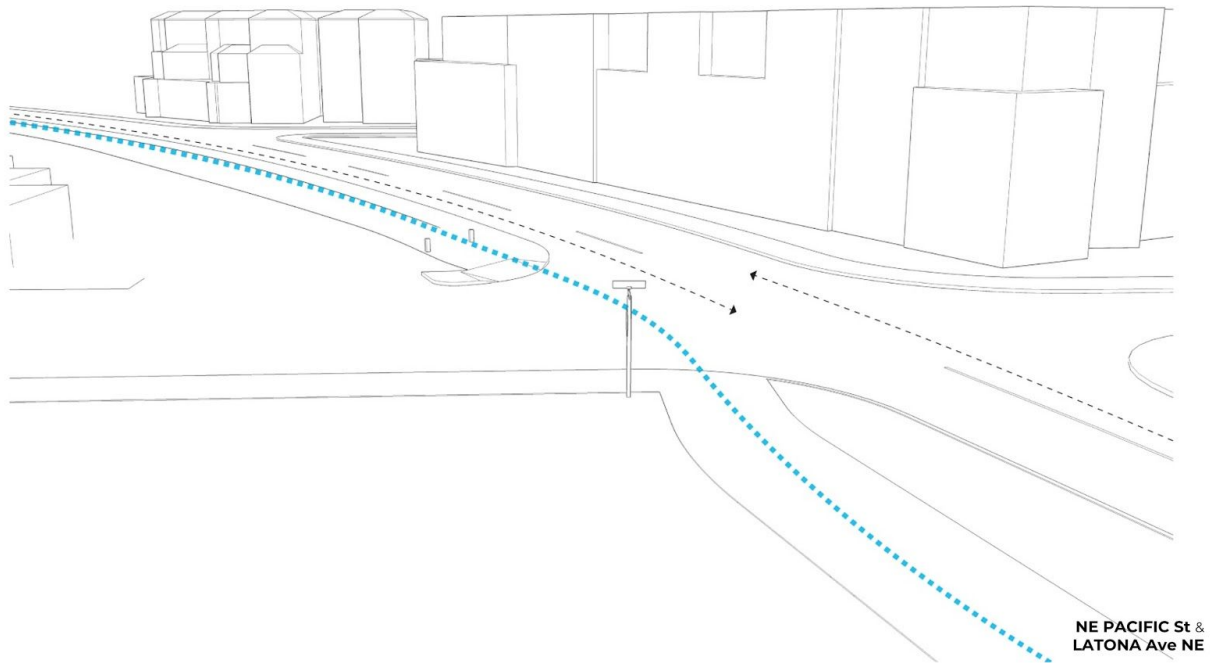


Location Context of Latona Ave NE & NE Pacific St



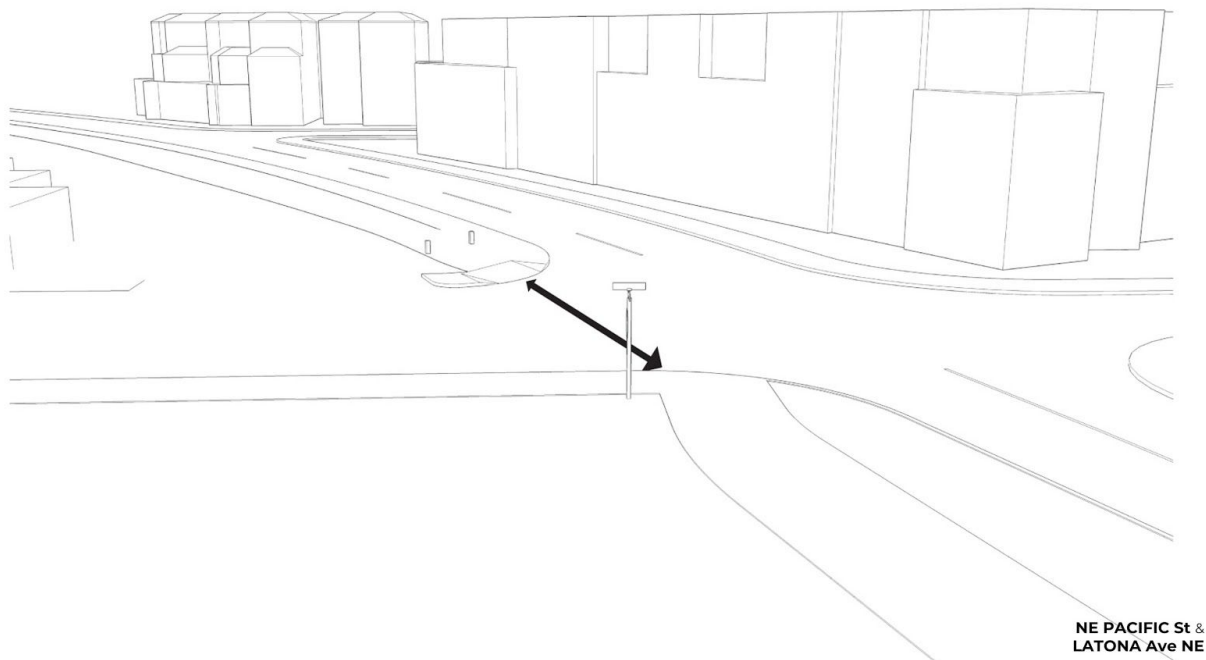
Current Design

The current intersection design today looks like the image above where NE Pacific St is parallel to the Burke-Gilman Trail. The design of the trail creates a situation where motorists may confuse the trail for a standard sidewalk near light industrial area.



Current Travel Patterns

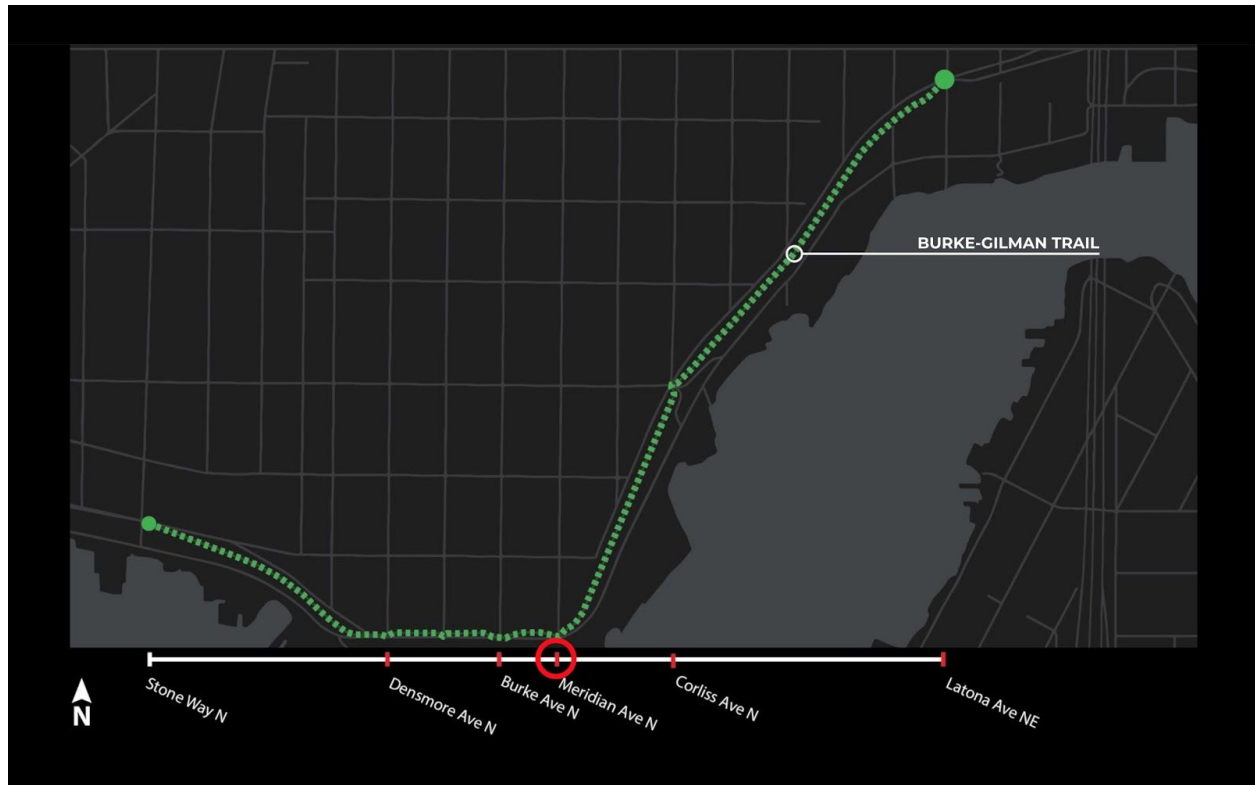
The current travel patterns are depicted above. The blue dashed line represents the path of trail users, and the black lines represent the path of motor vehicles. A notable feature of the current travel patterns is that the path of trail users moves closer to auto traffic as they approach the junction. I find this aspect of the design particularly troublesome because of the lack of protection from motor traffic here.



Current crossing distance: 55 ft.

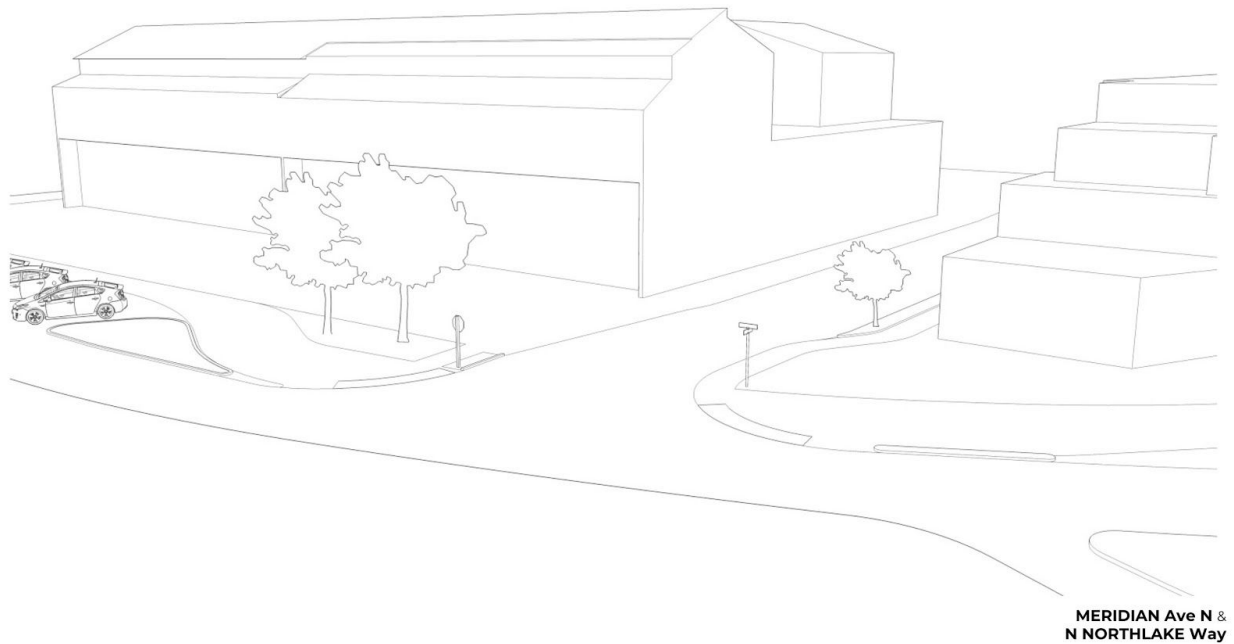
The current intersection has a crossing distance of 55 ft. This can be particularly troublesome for elderly or young trail users who expect to move about in a car free environment. Another issue with the extremely wide crossing is that motorists have a tendency to move through areas like this at speeds faster than necessary, increasing the likelihood of serious or fatal injury for trail users.

Meridian Avenue North at North Northlake Way



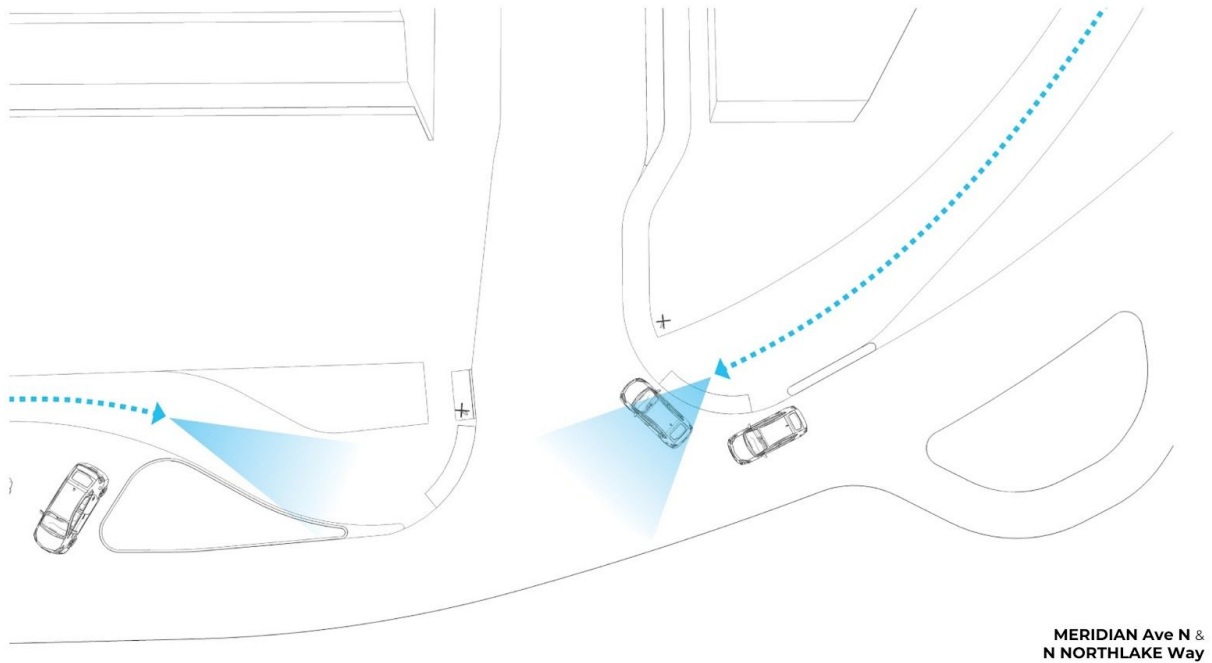
Location Context of Meridian Ave N & N Northlake Way

The location of the Meridian Avenue North at North Northlake Way crossing may be familiar to people who live in Seattle. It is the intersection nearest Gasworks and is notable as the western terminus of the initial trail segment from Seattle to Kenmore.



Current Design

The image above depicts the current design of the Burke-Gilman Trail at Meridian Avenue North and North Northlake Way. The building depicted in the background to the left belongs to Marine Supply and Sanitation and a company named Urban Surf occupies the lower floor of the building depicted on the right.

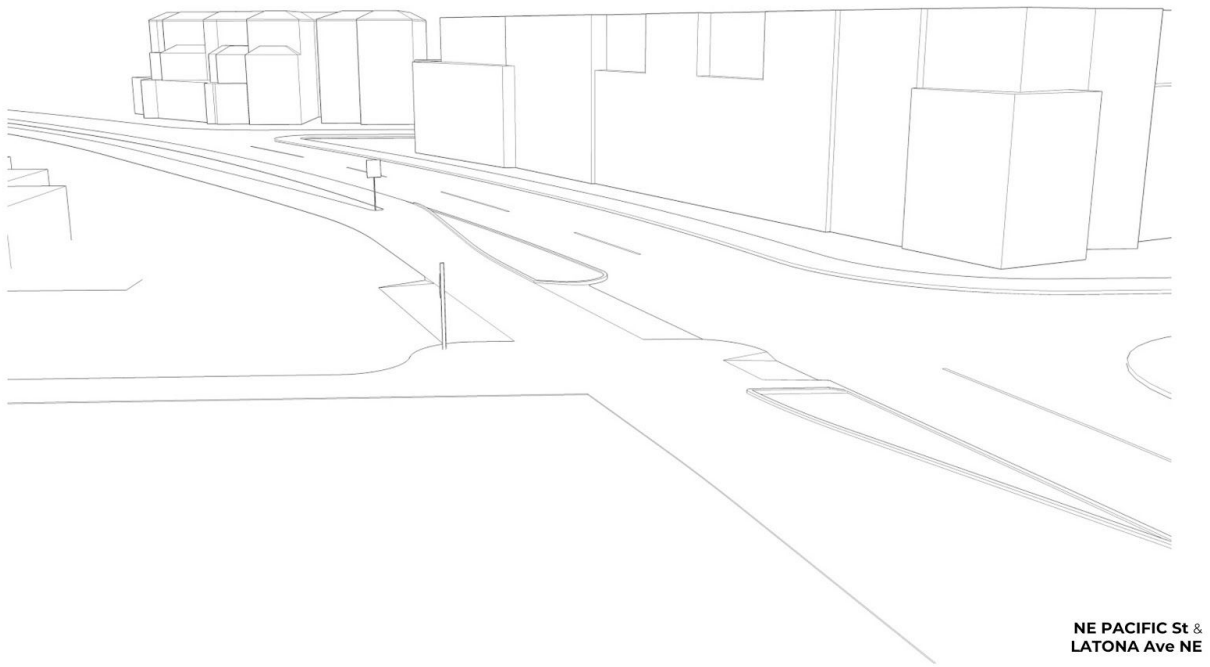


Aerial perspective of Meridian Ave N & N Northlake Way

Observations at this intersection revealed that the trouble here is partially attributed to a path which nears the parallel street (as is the trail crossing at Latona Avenue Northeast), but a larger factor at play is the generous turning radii which allows motor vehicle traffic to accelerate through the intersection. The observations revealed a tendency for trail users to keep their eyes focused toward the intersection instead of looking ahead to one another.

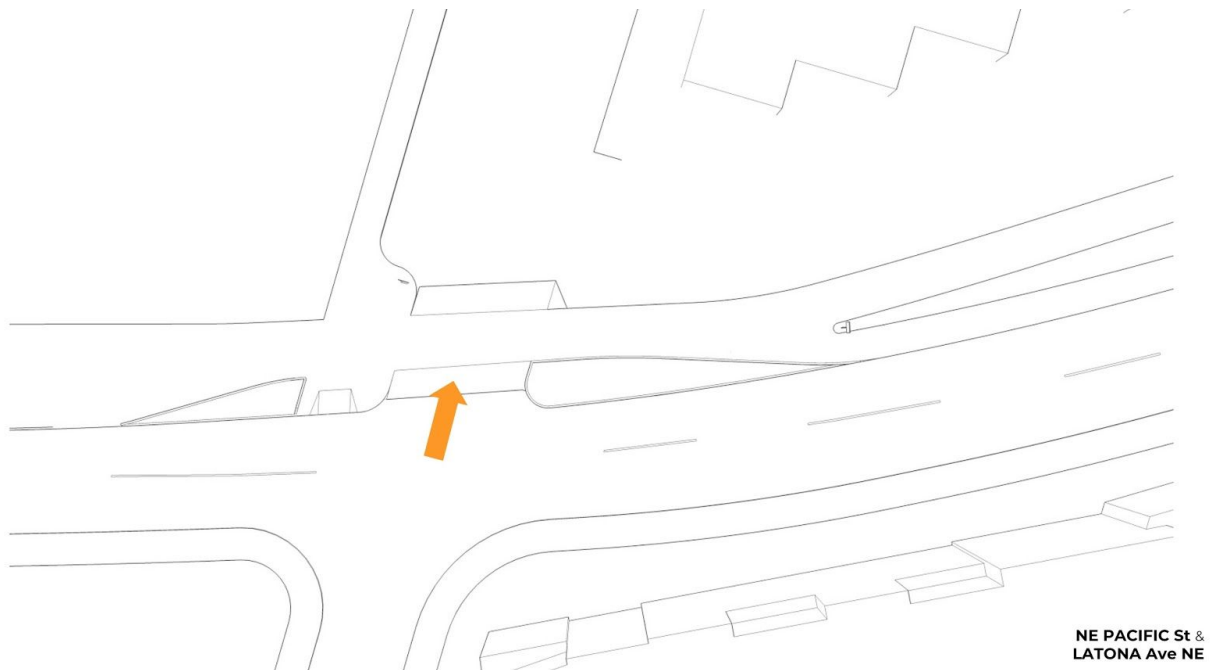
PRODUCT

Latona Avenue Northeast at Northeast Pacific Street



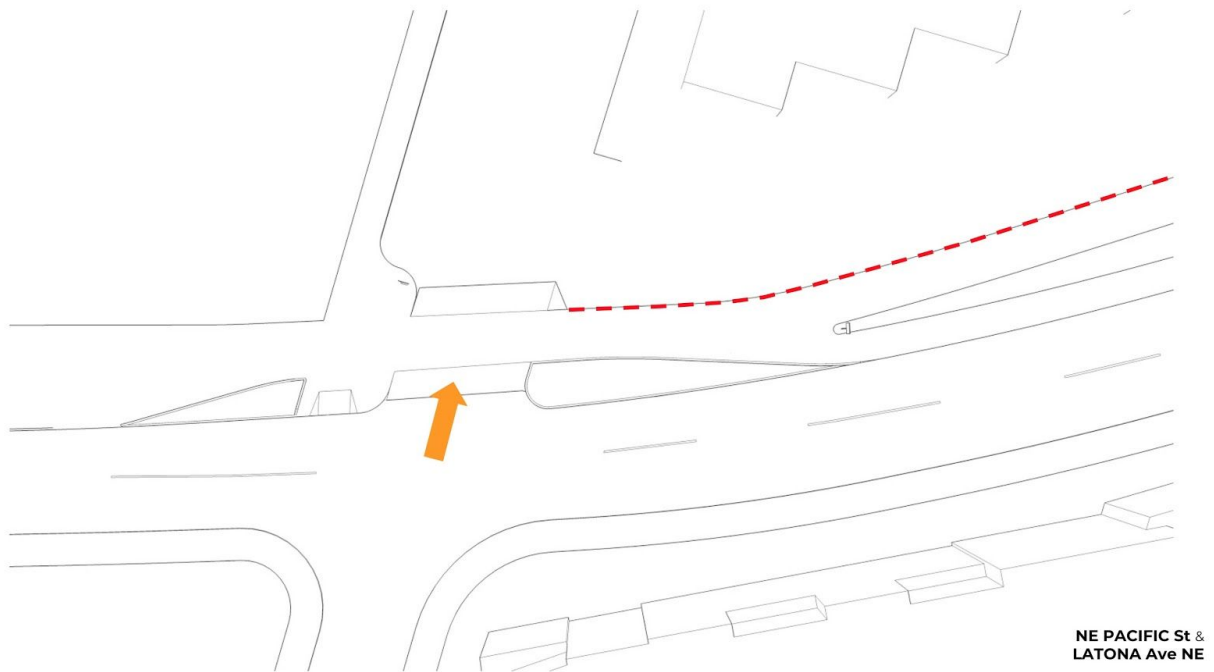
Concept design

The concept design for Northeast Pacific Street at Latona Avenue Northeast is depicted above. A number of things changed to address the issues that were identified prior in the report.



Adjusted travel path for trail users

Perhaps the most impactful design modification in this concept is the re-alignment of the travel path for trail users away from the street. This is a standard best practice found on Dutch bicycle infrastructure. The purpose of moving the travel path away from the street is to provide more space between trail users and motorists. In the event of a motorist error, more space allows for correction.



Design constraints

The concept design attempts to move the trail as far away from the street as possible, however the right of way is constrained by the adjacent property line preventing a fully effective shift away from the street.

NEXT STEPS

Similar to the route that was taken by Lid I-5 Campaign, I've been discussing this project with a writer who works for the Urbanist named Ryan Packard. Once the finishing touches are put in place for the write up, I will be working with Packard to present the design concepts in an editorial format. Over the next few days I will be working to revise for consistency and lay out the write up in a more visually stimulating manner.

REFLECTION

I started this project before I knew I had. I've been thinking about ways to redesign sections of the trail since the University of Washington rebuilt the segment that runs through campus. Thinking back, most of the difficulty I had with this project was due to a lack of time that comes from being a student who also works. I've greatly enjoyed bringing an idea to life. In a way, it doesn't feel like this is my project, so much as it seems like a series of circumstances that have alternatives that I have taken on the job of sharing that with other people.

Learning Experience

The biggest learning hurdle to overcome with this project was learning how to creatively work with a faulty hypothesis. When the film review was complete I felt absolutely defeated and was and frustrated with the amount of time it had taken to develop. Following the initial review of the film I did not work with the project for a number of weeks. It wasn't until I began making digital models for fun (out of spite) that I realized I can develop whatever I want. I was forced to review the film again in search of something else that could be accounted for with a redesign. That's when I realized that the academic model doesn't work well for technical projects like mine. The hypothesis was wrong, but that didn't mean I couldn't answer other issues that became apparent in the process.

With regard to redesigning an existing piece of public infrastructure, a multitude of factors make a one person project a massive feat. I now know that a single person cannot single handedly design anything well on a short timeline. The number of issues that a designer wants to address are quickly pitted against design constraints and requirements of the fire department.