ACKNOWLEDGEMENTS

We would like to thank the authors from University of Washington for their contribution to this health impact assessment:

Lindsay Allen, Anna Bovbjerg, Zi Cai, Karen Chen, Shannon Conlon, Juliet D’Alessandro, Kim L. Doughty, Jerzy Eisenberg-Guyot, Tianna Fallgatter, Katherine Foy Huamani, Jordan Gemelas, Cecilia C. Goetz, Marianna Grady, Marnie Hazlehurst, Cailin R. Henley, Joshua Hoff, Saori Kitabatake, Staci Kvak, Christina Leal, Mikiko Nakamura, Danielle Olson, Patrick Pirtle, Grant Quiller, Ellie Smith, Thomas W. T. Steckel, Christina Sun, Dorothy Thomas, Jane Vaccaro, Nicole Williams, Yalun Ye, Kasemsit Yimparsit, Xin Zhang

Final Report Compilation Done By:

Anna Bovbjerg, Shannon Conlon, Tianna Fallgatter and Patrick Pirtle

Furthermore, we would like to extend our gratitude to the people and organizations, that has been a crucial part of the success of this project:

Andrew L. Dannenberg, University of Washington, Primary Course Instructor for EnvH/UrbDP 536: Health Impact Assessment
Edmund Seto, University of Washington
Chris Saleeba, Alta Planning + Design
Eric Shjarback, City of Anacortes

Suggested citation:


Photo and Map Credits:

*Unless otherwise noted, photo sources from the HIA team.
EXECUTIVE SUMMARY

A Health Impact Assessment is a tool to investigate and describe the potential health impacts of proposed projects, policies, and programs. The National Academies Committee on HIA defines them as a “systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects.” HIAs are generally conducted following six steps that together identify, explore, and promote positive and mitigate adverse health impacts:

- Screening
- Scoping
- Assessment
- Recommendations
- Reporting
- Monitoring and Evaluation

For this project, the screening was done prior to the class’ start, by Professor Andrew Dannenberg, MD, MPH. The report at hand, along with a presentation to stakeholders constitutes the primary reporting of the findings.

Introduction

This assessment was conducted by 32 students, as part of a class on Health Impact Assessment (EnvH/UrbDP 536) offered by the Department of Urban Design and Planning and the Department of Environmental and Occupational Health Sciences, at the University of Washington. It was conducted as a voluntary HIA over the course of 10 weeks, between March 28th and June 3rd 2016. The students participating in the project represent a broad variety of specialties and interests within the University of Washington: environmental and occupational health, health services, epidemiology, global health, nursing, civil engineering, urban planning, real estate, social work, and public affairs, among others. This enables the multidisciplinary teams to work with a wide perspective in order to reach the most comprehensive health impact assessment.

The goal of the project is to evaluate the 2016 South Commercial Avenue Corridor Plan, which has been designed by Alta Planning + Design. It examines how south Commercial Avenue in the City of Anacortes, Washington, can be redesigned to improve walkability, bikeability and a general quality of life, as well as attract more residents and tourists. The HIA team conducted scoping with help from Dr. Dannenberg and Dr. Edmund Seto to define the main health impacts the HIA will address and to create objectives for the assessment. The team identified important health determinants and categories and consolidated the ideas into the following areas of focus that will be further explored in their own chapters:

- Transportation
- Environmental Health
- Land Use and Public Places
- Public Safety
- Economic Health
- Community Cohesion and Social Capital

Teams were tasked with evaluating the proposed plan, visiting the south Commercial Avenue corridor, and extracting various proposed components of the plan to highlight for specific health implications. Many of the key elements proposed within the corridor plan have been positively linked with improved health outcomes. Although the South Commercial Avenue Corridor Plan provides an excellent opportunity for realizing the city of Anacortes’ Comprehensive Plan 2016 visions, certain potential negative health impacts were observed and warrant consideration as the plan moves forward through its various design phases. This Executive Summary will highlight each of the six groups’ background literature, and findings, followed by our key health impact considerations and recommended action. For expanded detail on specific topics, evidence-based research and explanations are presented within each chapter.

Methodology

This HIA was conducted utilizing a variety of sources including, but not limited to: a comprehensive review of technical and academic literature, news and popular media, public reports, previously conducted HIAs, consulting
City of Anacortes

Anacortes, WA is located within Skagit County and is known for its festivals, farmers’ markets, arts scene, outdoor recreation opportunities, and a bustling Washington State Ferries terminal. Visitors and residents alike must pass through the city’s main corridor on their way to final destinations on one of the many islands served by the ferry terminal. As it is the primary route to the islands of Lopez, Shaw, Orcas and San Juan, as well as Victoria, British Columbia and Vancouver Island, freight and tourism are important aspects of Anacortes’ history and culture. For this reason, the seasonal waves of travelers play a role in the future growth, and design visions of the city. In the early 1950’s, Anacortes saw a shift in land use from predominantly industrial and maritime to oil, retail and tourism. Population growth has remained steady since the 1970’s and today the city boasts an estimated population of 16,403 residents.

Key Recommendations

Based on the individual group findings and in discussion with the class conducting the HIA as a whole, the key recommendations are as follows:

Take action to lower the overall traffic speed through the corridor.

Action: This HIA supports the inclusion of traffic calming design features into the south Commercial Avenue redesign. The existing design elements proposed within the South Commercial Avenue Corridor Plan including: narrowed lane widths, curb bulbouts, Rectangular Rapid Flashing Beacons (RRFB), medians, and vertical vegetation, will likely have a positive impact on speed reductions and overall pedestrian/bicyclist safety.

Health Impacts: 1) Reduced rate and severity of injury and mortality from crashes and vehicle-pedestrian/cyclist collisions. 2) Improved mental and social well-being derived from a perceived sense of security along the corridor. 3) Reduced morbidity and mortality from diseases associated with insufficient physical activity, such as: diabetes, cardiovascular disease, and obesity. 4) Reduction in traffic noise along south Commercial Avenue may improve levels along the corridor, and reduce health impacts of excessive environmental noise, such as: hearing loss, sleep disturbance, cardiovascular and psychological effects. The consideration for noise reduction may be low with the current surrounding street and residential densities, however, as rezoning and infill occur, and natural population growth continues, developing noise reducing strategies early may have long lasting positive impacts.

Key Findings

In summary, throughout the HIA process, evidence repeatedly showed that improved health outcomes were both directly and indirectly associated with the use of complete street concepts on main streets and in town centers. A complete street is one that has been designed with all users in mind. More specifically, the National Complete Streets Coalition defines complete streets as: “[Streets that are] designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations”. The South Commercial Avenue Corridor Plan incorporates many of the features of complete streets. These include pedestrian friendly walkways, designated and protected bike lanes, traffic calming measures, and greenery which have been positively linked to increased physical activity, improved cardiovascular outcomes, improved mental and social well-being, and a reduction in obesity. As a whole, this HIA strongly supports the majority of the proposed design changes along south Commercial Avenue. Concerns were raised however, about the potential impacts of a street redesign on noise and air pollution, freight traffic diversion, and the potentially positive and/or negative economic and long-term health impacts on the community as a whole. Adverse health outcomes such as asthma, cancer, and cardiovascular disease are frequently associated with air pollution, and the impact of noise on mental health, hearing and community enjoyment are well documented. Supporting literature for statements made throughout the key findings and recommendations are cited throughout the individual chapters.
Ongoing evaluation of stakeholder engagement at each phase in the design process.

**Action:** 1) Identify all potentially impacted stakeholders including: local residents within a 5-mile radius of the corridor, Chamber of Commerce, businesses along the south Commercial Avenue affected by redesign, and vulnerable populations (elderly, disabled persons, and minorities). Actively seek creative ways to engage stakeholders in the adaptation and implementation of the plan. 2) Consider options for obtaining input from long and short-term visitors as well. 3) Consider culturally appropriate public art that reflects the existing culture and histories of Anacortes and the region.

**Health Impacts:** By identifying the community's health priorities and the potential barriers to health behavior, the city can work with Alta Planning + Design to ensure that future design revisions continue to incorporate concepts that will reduce barriers and encourage healthy, active lifestyles. This engagement aligns the design with community needs, encourages community buy-in and long term project sustainability.

**Utilize Quick-Build Street to aid in further planning and visioning**

**Action:** Endorse recommendations for proposed Quick Build street along south Commercial Avenue. The utilization of a Quick Build street will help Anacortes align their vision with the community's needs. People for Bikes has created a nine-step toolkit for implementation of a Quick Build street. The proposed Quick Build street has four main components which include: 1) Led by a city government or other public agency. 2) Installed roughly within a year of the start of planning. 3) Planned with the expectation that it may undergo change after installation. 4) Built using materials that allow such changes. If implemented, we encourage starting from the older north end of Commercial Avenue and if possible, implementing along the entire corridor for a more complete overview of how the corridor will change. If the entire corridor is not feasible, consider encompassing both a Pedestrian Activation Zone and regular stretch of roadway to evaluate potential unintended consequences of specific design features.

**Indirect Health Impacts:** Small tactical street changes are more financially feasible, and require minimal resource investment from the city of Anacortes. A Quick Build street, see glossary, that has been “tested” by locals, tourists, freight and non-vehicle users will have stronger support within the community. The unique opportunity to ‘try it before you buy it’ provides designers, users, and the city with the ability to evaluate key design components for their effectiveness and intended functional and health outcomes. Furthermore, should any early design elements, traffic revisions, or pedestrian and bike friendly design features prove incompatible with the Anacortes culture, changes can be made with minimal loss of investment. Additionally, a pilot-proven corridor may find attracting grants and construction funding easier. By reducing the financial risks associated with an intensive main street redesign, the city preserves funding to allocate to other public goods, community services, and public health measures. This indirect health effect is far reaching.

**Support and suggest complementary elements to proposed bike infrastructure**

**Action:** Support the existing proposed bicycle infrastructure within the South Commercial Avenue Corridor Plan. Capitalize on the expanded bike friendly roadway (along the corridor) to promote a link between the Tommy Thompson Trail to the corridor via 22nd Street. Additionally, consideration of clearly identified markers between the local bike store located on south Commercial Avenue and the trail via the nearest cross street would aid cyclists in wayfinding and improve connections between the Tommy Thompson Trail and south Commercial Avenue. 2) Consider a modular design allowing for the future installation of an intermittent protective barrier between bike lanes and pedestrian sidewalks, such as flexi-posts or Riley curbs. Barriers may not be necessary at current usage levels but may become necessary as usage increases in the future. See Image ES.1 for an example of these specific design elements.

**Health Impacts:** 1) Reduction in the rate and severity of vehicle-bicycle collisions and fatalities, by way of protected bike lanes, well designed mixing zones, and appropriate cues for motorists, pedestrians, and bicyclists. 2) Reduction in the rate and severity of injury from bike-pedestrian collision by way of clearly demarcated lanes for pedestrian and bicycle pathways. 3) Installation of flexi-posts between pedestrians and bicyclists could reduce the risk of bike-
pedestrian collision, and improve pedestrian perceived sense of physical safety. This can prevent injuries and lead to a lower stress environment, increased utilization of the corridor for physical activity, and a reduction in diseases associated with poor exercise including diabetes, cardiovascular disease, and obesity. 4) A reduction in cyclist exposure to roadway and air pollutants via a designated bike lane with protected buffers may reduce morbidity and mortality associated with excessive air pollution such as: asthma, cardiovascular disease, chronic obstructive pulmonary disease, breast cancer, stroke, and lung cancer.

Image ES.1 Example of Flexi-posts and Riley curbs

Source: http://cyclingchristchurch.co.nz/2014/01/26/where-would-you-like-some-separator-posts/

**Develop effective destination wayfinding**

**Action:** The use of signage for both pedestrians and motorist will help improve wayfinding and promote specific cultural, recreational, and retail destinations. Additionally, appropriately located wayfinding signage within the proposed hospital overlay may reduce traffic confusion associated with the hospital and unnecessary traffic volumes along south Commercial Avenue, by directing hospital users to the appropriate entrances off of 24th and 26th Streets. Wayfinding, when designed correctly, has the potential to improve traffic flow, thereby reducing excessive vehicle emissions, confusion from tourists, and congestion during heavy seasonal traffic.

**Health Impacts:** 1) This traffic reduction, which is associated with improved air quality, could reduce morbidity and mortality associated with air pollution including asthma and chronic obstructive pulmonary disease. 2) Increased ease of destination finding provides for greater chance of tourist and local spending to remain within the community. Improved utilization of local tourist attractions, retailers, and accommodations provides revenue for the city and its business owners. Increased revenue is indirectly related to equitable access to health and public services for Anacortes residents most in need. Sustainability through secure revenue streams provides equitable access to services for the most vulnerable residents. This improves health outcomes including mental, cognitive, and physical well-being. 4) Individual income is positively associated with reductions in personal stress, mental health, cardiovascular health, diabetes, and access to healthcare resources; wayfinding to local establishments provides local business owners greater income earning potential.

**Proposed land use planning and corridor connectivity**

**Action:** Support the south Commercial Avenue Corridor Plan for its design elements that reinforce the city’s vision of connectivity, accessibility, all-users roadways, and mixed use (outlined in the Anacortes 2016 Comprehensive Plan). Highlight the importance of greenspace to overall community connectivity, by way of parklets. Consider the creation of a mobile parklet as a key greenspace feature of the plan. In addition to providing various businesses along the corridor access to the benefits of a green space, a mobile parklet could aid the city in envisioning what a corridor connected by parklets, and other green spaces would look like. Recommend a minimum setback of no more than 5 feet with restrictions on approved business frontage use.

**Health Impacts:** Access to green spaces are associated with reductions in depression, increased walking and physical activity, and provides a community gathering space; which can improve social cohesion, and reduce morbidity and mortality from diseases associated with poor exercise and social isolation.

**Proposed hospital overlay district and corridor interactions**

**Action:** Support the plan’s consideration of emergency response vehicles (ERVs) in roadway design. Evaluate how medians when combined with a lack of on-street parking in the Pedestrian Activation Zones may impact the ability of non-emergency road users to yield. Two of the three
proposed Pedestrian Activation Zones incorporate green medians; recommend against medians within the section of south Commercial Avenue that interacts with the proposed hospital overlay. Recommend further design phases evaluate light source intensity, and lamp post frequency along the section of the corridor associated with the overlay. For example, hospitals produce around the clock pedestrian and vehicle travel, which may have lighting needs that differ elsewhere along the corridor. Consider the impact of the Pedestrian Activation Zones on off-street parking utilization; recommendation for further traffic studies on driving behaviors of the region. Consider the addition of a HAWK beacon running perpendicular at the intersection of 25th Street and south Commercial Avenue, to discourage unsafe pedestrian crossings at a ‘convenience point’ in the overlay. Consider incorporation of a public transit stop on both sides of south Commercial Avenue at 25th Street, to reduce the impacts.

**Health Impacts:**

1) The ability of non-emergency vehicles to yield is associated with reduced ERV-vehicle collisions, and is also associated with improved emergency response timing and delivery of critical patients. 2) Improved visibility of the roadway and pedestrian-bike infrastructure will benefit all (e.g. elderly, disabled, injured or sick hospital visitors, emergency response vehicles, employees) roadway users within the proposed overlay. Age related vision changes, hearing changes, as well as pain and other illness-induced symptoms have been associated with collisions and dramatic increases in the severity and fatality of pedestrian-vehicle incidents. Seniors and children are at greatest risk for severe injury and death caused by a collision. 3) HAWK beacons are associated with reductions in mid-block fatalities and provide safer crossings on super blocks in heavy pedestrian areas such as a hospital zone.

Consider the implications of freight on the community

**Action:** Recommend further investigation of the major thoroughfare and alternate freight routes. In this investigation, clearly define the corridors where freight is moving and evaluate the impact a complete street design may have on this main truck route. Consider the potential long term consequences to future land use and urban growth along Q and R Avenue, and whether there are economic and health implications associated with freight diversion for residents and businesses located along the proposed alternative routes.

**Health Impacts:** Largely unknown, but could include loss of revenue to businesses along south Commercial Avenue (either via reduced traffic or via increases in delivery costs/times). Increase in morbidity and mortality for diseases such as cancer, asthma, cardiovascular disease, low-birth weight and lead poisoning for residents along the proposed alternative routes. Impacts to local flora, fauna, marine and wildlife are also largely unknown, but without proper drainage and environmental protection features, it could be significant.

**Public Transit, Buses, and Shuttles**

**Action:** Recommend further evaluation of public transit conditions and availability along south Commercial Avenue, especially Skagit Transit bus routes 409 and 410. As the South Commercial Avenue Corridor Plan progresses, consider explicitly stating locations and identifying structural design elements like bus stops and signage that will be incorporated into the street infrastructure. Consider the need for transit scale-up in the future as corridor density and overall city population increases. Explore options for collaboration between the city of Anacortes and the Washington State Department of Transportation to evaluate shuttle usage and unnecessary long-term parking on south Commercial Avenue from ferry users.

**Health Impacts:**

1) Early planning and adoption of transit-ready street design has the potential to improve long-term roadway efficiency and improve access to services and retail outlets along south Commercial Avenue. 2) Over time, as the city population continues to grow, strengthening local public transit may stabilize the growth rates of single-occupancy vehicles traveling through the main corridor. A reduction in single-occupancy vehicles is associated with reductions in air pollution from vehicle emissions and overall reductions in morbidity and mortality associated with environmental (air, noise, water) pollutants. 3) When considering bus stop locations along south Commercial Avenue, having an understanding of the unique needs of individuals of all ages and abilities is important. For example, inappropriately spaced bus stops could potentially deter seniors from utilizing the
bus for transportation thereby reducing the effectiveness of the intended design, and its positive impact on health outcomes.

**American Disabilities Act Compliance**

**Action:** The South Commercial Avenue Corridor Plan includes design elements that accommodate accessibility for all users, such as widened sidewalks, reduced driveway angles, and pedestrian curb cuts installed into sidewalks using 90 degree angles. Recommend future design phases consider wheelchair accessibility that extends beyond widened sidewalks, and includes charging stations along the corridor for individuals confined to custom, electric wheelchairs. Similar to Anacortes in size and resident ages, Pendleton, Oregon (population size 16,612 roughly, 40% > age 45), has begun installing electric wheelchair charging stations in some of the city's greenspaces (Sierra, 2016). This can be done as a free standing station as shown in the Image ES.2 and Image ES.3, or could potentially be incorporated into electric vehicle charging stations. Recommend shifting the vehicle stop-line farther away from designated crosswalks and providing pedestrians a head start by using smart crosswalk signaling. Consider sidewalk widths that accommodate passing wheelchairs and/or electric wheelchairs. Incorporate access to drinking fountains along south Commercial Avenue, to complement active transportation, and all-age friendliness of the corridor.

**Health Impact:** Federal law requires that all persons, regardless of abilities, be provided equitable access to public spaces. Evaluating the current ADA standards and incorporating them into existing and future design phases will allow the city of Anacortes an opportunity to improve ADA compliance along the corridor. This provides safer and greater access to all street users including those with disabilities. This access may lead to more usage by individuals with impaired mobility or vision, which may improve an individual sense of connection, improved mental and psychological well-being, and modified forms of physical activity.

**Other recommendations, outside of the plan’s scope**

In addition to the key recommendations outlined above, several external factors were identified that will influence the degree to which the plan will improve health outcomes. Specific proposed changes to land use, zoning, storm water management, and long-term visions outlined in the Anacortes 2016 Comprehensive Plan may prove to have a positive or negative synergism when combined with various design elements proposed by Alta Planning + Design. Some of the key external considerations for the City of Anacortes, Island Hospital, and the Washington State Department of Transportation include recommendations for:

1. A required setback of no more than 5-feet with a pedestrian-oriented frontage zone along south Commercial Avenue. If the city chooses to allow for larger setbacks, consider creating governing ordinances that prohibit the use of setback areas for parking or other non-pedestrian friendly activities.

2. In general, growth, infill, and densification of a town center is associated with positive economic and community health outcomes. This is especially true for the individuals who move into newly urbanized areas. This progress however, is often associated with gentrification of entire neighborhoods and communities. As the city of Anacortes expands, consideration for the impacts that mixed-use, new development, and overall neighborhood desirability may have on vulnerable populations (e.g. minorities, seniors, persons living below the Federal Poverty Line) is warranted. If the risk of gentrification is high, consider establishing governance policies that encourage mixed-use developers to offer on-site
affordable housing with each new development. This will maintain community diversity and limit the negative health impacts of displacement and financial stress.

3. Long-term sustainability and buy-in will be required for the South Commercial Avenue Corridor Plan to reach fruition. Stakeholder buy-in not only throughout the design phases, but also once the corridor has been completed is essential to the successes and potential for positive health outcomes. A great road does not make the town, it is instead a key feature inviting locals and visitors to stop and stay awhile. To extract the greatest value from the completed corridor, the city should develop a communications and marketing campaign to attract tourism and corridor users. If this is already a strategy incorporated by the City, the recommendation is to evaluate the process and strategy to ensure that it aligns well with the visions for the corridor.

4. Consider working with local vacant land owners, excessive surface parking lots, and the hospital to coordinate potential privately owned spaces that could be further activated and vegetated to provide green space, connectivity and positive health benefits. For example, consider adding a greenway connecting the hospital to the main corridor, by way of 25th Street. Reductions in unnecessary parking or temporary conversions of unused land into semi-permanent green spaces can provide the city with additional destinations along the corridor that provide opportunities for physical activity and social mixing.

5. Consider adding public restroom facilities along south Commercial Avenue.

6. Consider the long-term impacts of allowing the hospital overlay to expand to the street frontage on south Commercial Avenue. If local businesses are impacted by hospital expansion the city may want to consider negotiating for an alternate overlay, and establishing developer agreements or incentives such as upzoning that make special exceptions and considerations for existing businesses in the proposed overlay. Sharing resources about the health benefits of connectivity, accessibility, and green spaces on patient outcomes may strengthen the hospital’s support of the corridor design plan.

7. Ensure the city of Anacortes’ emergency evacuation plan is updated to reflect any changes to the south Commercial Avenue corridor.
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>3</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>5</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>13</td>
</tr>
<tr>
<td>List of Images, Tables, Maps, &amp; Figures</td>
<td>14</td>
</tr>
<tr>
<td>Acronyms</td>
<td>15</td>
</tr>
<tr>
<td>Glossary of Terms</td>
<td>16</td>
</tr>
<tr>
<td>Introduction</td>
<td>19</td>
</tr>
<tr>
<td>**Chapter 1</td>
<td>Transportation**</td>
</tr>
<tr>
<td>Motor Vehicle Traffic</td>
<td>28</td>
</tr>
<tr>
<td>Freight &amp; Commercial Traffic</td>
<td>31</td>
</tr>
<tr>
<td>Accessibility &amp; Mobility</td>
<td>35</td>
</tr>
<tr>
<td>Public Transit</td>
<td>38</td>
</tr>
<tr>
<td>Pedestrian &amp; Bike Infrastructure</td>
<td>40</td>
</tr>
<tr>
<td>Recommendations</td>
<td>42</td>
</tr>
<tr>
<td>**Chapter 2</td>
<td>Environmental Health**</td>
</tr>
<tr>
<td>Environmental Noise</td>
<td>44</td>
</tr>
<tr>
<td>Air Quality</td>
<td>46</td>
</tr>
<tr>
<td>Water Quality</td>
<td>48</td>
</tr>
<tr>
<td>Green Space</td>
<td>50</td>
</tr>
<tr>
<td>Recommendations</td>
<td>52</td>
</tr>
<tr>
<td>**Chapter 3</td>
<td>Land Use &amp; Public Spaces**</td>
</tr>
<tr>
<td>Corridor Streetscape</td>
<td>56</td>
</tr>
<tr>
<td>Hospital Overlay</td>
<td>59</td>
</tr>
<tr>
<td>Land Use</td>
<td>64</td>
</tr>
<tr>
<td>Recommendations</td>
<td>69</td>
</tr>
<tr>
<td>**Chapter 4</td>
<td>Public Safety**</td>
</tr>
<tr>
<td>Disaster Risk Reduction</td>
<td>75</td>
</tr>
<tr>
<td>Pedestrian &amp; Bike Safety</td>
<td>77</td>
</tr>
<tr>
<td>Traffic Speed</td>
<td>79</td>
</tr>
<tr>
<td>Crime &amp; Violence</td>
<td>80</td>
</tr>
<tr>
<td>Recommendations</td>
<td>81</td>
</tr>
<tr>
<td>**Chapter 5</td>
<td>Economic Health**</td>
</tr>
<tr>
<td>Retail Sales &amp; Jobs</td>
<td>84</td>
</tr>
<tr>
<td>Workplaces Health &amp; Economic Gain</td>
<td>85</td>
</tr>
<tr>
<td>Resident Savings</td>
<td>87</td>
</tr>
<tr>
<td>Parking</td>
<td>88</td>
</tr>
<tr>
<td>Property Value</td>
<td>89</td>
</tr>
<tr>
<td>Recommendations</td>
<td>91</td>
</tr>
<tr>
<td>**Chapter 6</td>
<td>Community Cohesion &amp; Social Capital**</td>
</tr>
<tr>
<td>Preserve Native Culture</td>
<td>94</td>
</tr>
<tr>
<td>Pedestrian Mental Health</td>
<td>95</td>
</tr>
<tr>
<td>Universal Access</td>
<td>97</td>
</tr>
<tr>
<td>Affordable Housing</td>
<td>99</td>
</tr>
<tr>
<td>Recommendations</td>
<td>100</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td>102</td>
</tr>
<tr>
<td>Key Recommendations</td>
<td>104</td>
</tr>
<tr>
<td>Reporting, Monitoring, &amp; Evaluation</td>
<td>110</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>112</td>
</tr>
</tbody>
</table>
LIST OF IMAGES, TABLES, MAPS AND FIGURES

Image ES.1 Example of Flexi-posts and Riley curbs 8
Image ES.2 East Oregon Electric Charging Station for Wheelchair users 10
Image I.3 Anacortes Welcome Sign 23
Image T.4 Complete Street 35
Image T.5 Bus stop along bus route 409 39
Image T.6 Existing Condition 40
Image T.7 Alta Corridor Plan Proposal Rendering 41
Image EV.8 Example of a Bio-Retention Facility 49
Image PS.9 Rectangular Rapid Flashing Beacons 78
Image PS.10 Magnitude of Injuries if related to speed 79
Image PS.11 Pedestrian lighting can improve public safety 80
Image EC.12 Some retailers are designed for drive-thru and do not have seats to accommodate consumers. 90
Image EC.13 There are a few bike racks along the corridor 90
Image EC.14 Increased traffic lights and signage could improve pedestrian safety 90
Image CC.15 Swinomish and Samish Tribal Logo 94
Image CC.16 Existing architectural interest and playful wayfinding 96
Image CC.17 Light Pole Obstructing Sidewalk for Wheelchair-Bound Community Members 97
Image CC.18 South Commercial Avenue Street Corner without Curb Cut for Disabled Community Members 98
Image CC.19 Driveway that is not ADA Compliant and Dangerous to Wheelchair-Bound Community Members 98
Image C.20 Example of Flexi-posts and Riley curbs 105
Image C.21 Free standing electric wheelchair charging station in the metro station, Istanbul, Turkey. 108

Table I.1 Basic demographics of Anacortes, WA compared to the State 20
Table I.2 Mortality, Skagit County 21
Table I.3 Morbidity, Skagit County 22
Table I.4 2011 Physical Activity Levels 23
Table T.5 Speeds, Distance, Injury Severity 30
Table T.6 Freight Classifications 31
Table T.7: US EPA Truck Emission for Selected Pollutants 32
Table EV.8 Air Quality Index in Anacortes, WA 46
Table L.9 Commercial Zoning (C) Description 64
Table L.10 2016 Anacortes Comprehensive Plan Land Use Goals and Policies That Are Addressed through Proposed Plan for South Commercial Avenue 66

Map T.1 Traffic speeds on selected roads in Anacortes 28
Map T.2 Anacortes Freight Routes 31
Map T.3 # of Curb Cuts Along Commercial Ave. 33
Map T.4 Public Retail Property Proposal Map: This was produced as an exercise during a planning meeting in Anacortes. It shows were attendees would like to see new retail 34
Map T.5 Schools within 1/4 mile of Commercial Ave 36
Map T.6 One Day Pedestrian and Bike Count 2014 & 2015 Map 37
Map T.6 Bus Routes 410 and 409 38
ACRONYMS

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADA</td>
<td>Americans with Disabilities Act</td>
</tr>
<tr>
<td>CDC</td>
<td>Center for Disease Control and Prevention</td>
</tr>
<tr>
<td>CPTED</td>
<td>Crime Prevention through Environmental Design</td>
</tr>
<tr>
<td>CSO</td>
<td>Combined Sewer Overflows</td>
</tr>
<tr>
<td>ERV</td>
<td>Emergency Response Vehicles</td>
</tr>
<tr>
<td>HAWK</td>
<td>High-Intensity Activated Crosswalk beacon</td>
</tr>
<tr>
<td>HIA</td>
<td>Health Impact Assessment</td>
</tr>
<tr>
<td>LOS</td>
<td>Level-Of-Service</td>
</tr>
<tr>
<td>NHTSA</td>
<td>National Highway Traffic Safety Administration</td>
</tr>
<tr>
<td>PM</td>
<td>Particulate Matter</td>
</tr>
<tr>
<td>RRFB</td>
<td>Rectangular Rapid Flashing Beacons</td>
</tr>
<tr>
<td>TDM</td>
<td>Transportation Demand Management</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WSDOT</td>
<td>Washington State Department of Transportation</td>
</tr>
<tr>
<td>VMT</td>
<td>Vehicle-Miles-Traveled</td>
</tr>
</tbody>
</table>
Glossary of Terms

**Active Transportation**
A term used for recreational or commuter transportation that involves physical activity. Most common types are biking and walking, but can also be rollerblading, skateboarding, running, among others. There is solid research supporting the health benefits of active transportation.

**Absorption Rates**
This is the rate at which “available homes are sold in a specific real estate market given a time period. It is calculated by dividing the total number of available homes by the average number of sales per month.”

**Complete Street**
An urban design approach to street design that accommodates all users—pedestrians, transit riders, bicyclists, and motorists—within a single street, with no preferential treatment given to any particular mode of travel.

**Curb Cut**
A smooth ramp which connects street to private or public property, which are typically at different grades in those areas that use curbs. Also denoted as driveways in this report.

**Dilemma Zone Behavior (Type I)**
The area in which it may be difficult for a driver to decide whether to stop or proceed through the intersection at the onset of the yellow signal indication. It is also referred to as the “option zone” or the “zone of indecision.” Institute of Transportation Engineers provide an equation for how to time intersections correctly, so that type I dilemma zones are minimized. Read more: http://www.ite.org/.

**Freight Economic Corridors**
Defined by WSDOT, the Freight Economic Corridors are waterways, truckways and railways that are critical to the economic health of Washington State. They are defined by the volume of goods they carry, with a T1 carrying the most and a T3 carrying the least amount of freight.

**Green Space**
A more or less define space in the public environment of grass, trees or other vegetation, that is meant for recreational, health or aesthetic purposes in an otherwise urban environment. Includes for example, parks, parklets, community gardens, schoolyards, and vacant lots.

**HAWK Beacon**
A high-intensity activated crosswalk beacon; commonly used as a traffic control device to stop vehicular traffic with a pedestrian activated, signalized light to allow for the safe passage of pedestrians and cyclists. These are also known as Pedestrian Hybrid Beacons and are frequently installed in long blocks.

**In-Recovery**
Describes persons who are convalescing in hospitals, mental rehabilitation facilities, physical rehabilitation facilities, and long and short-term care facilities with a condition, illness, or injury that requires time for healing (long or semi-short in duration).

**Parklets**
A parklet is form of sidewalk extension that provides space and amenities for people staying in the street and for recreational purposes. The name stems from a combination of it being a recreational area, like a park, that is parking space sized. Most often seen in densely populated areas and in relation to cafes and restaurants. Read More: http://nacto.org/publication/urban-street-design-guide/interim-design-strategies/parklets/.

**Pedestrian Activation Zone**
According to the South Commercial Avenue Corridor Plan, “these zones include elements that further increase the pedestrian comfort level. Controlled crossings, raised crosswalks, street furniture, and other amenities make the area more conducive to pedestrian activity and prioritize this mode of travel.”
Placemaking
The process of designing and managing public spaces in a way that leverages local community identity and assets, resulting in places that promote health, well-being, and sense of community. Read More: http://www.pps.org/reference/what_is_placemaking/.

Quick Build Street
Quick Build streets have no one specific set of components and vary widely based on the community needs. However, all quick-build streets have four main components which include: 1) Led by a city government or other public agency. 2) Installed roughly within a year of the start of planning. 3) Planned with the expectation that it may undergo change after installation. 4) Built using materials that allow such changes (People for Bikes, 2016). Often created to give a demonstration or to evaluate the impacts of proposed street redesign prior to significant investment of resources.

Smart Crosswalk Signaling
A traffic system designed for pedestrian crossings that includes the use of In-Roadway Warning Lights (IRWL). These lighting systems are commonly seen in hospital and school zones.

Street and Sidewalk Activation
The process of bringing more attractions and activities to under-utilized areas to increase pedestrian presence.

Walk Score/Transit Score/Bike Score
Walk Score measures the routes to different amenities for a given address, and scores this address on a scale from 0-100 based on approximation and quantity. Transit Score assigns a “usefulness” value to transit routes near an address, based on the type of route, frequency and areas served. Bike Score measures bike infrastructure, hills, road connectivity and number of users. Read more: https://www.walkscore.com/methodology.shtml.

Walkability/Bikeability
A qualitative measure of how pleasant and safe a road is to traverse walking or biking, and includes crosswalks, driver behavior, litter and the quality of the pavement. A walkability and bikeability assessment can easily be conducted by interested citizens or by a city, using publicly available checklists: http://www.pedbikeinfo.org/cms/downloads/walkability_checklist.pdf

Wayfinding
Systems of signage or other demarcations that assist pedestrians, bicyclists, and motorists to find their destination.

10% Plan
A plan that outlines the framework for a project, which is not fully detailed and containing all specifications, but allows for further decisions to be made within the plan’s overall frame.

*Note
South Commercial Avenue is used interchangeably with south Commercial Avenue. This is because the proposed plan is named the South Commercial Avenue Corridor Plan.
Anacortes is a city in Skagit County in Washington State located approximately halfway between Seattle, WA and Vancouver, BC. The city is known for its festivals, farmers’ market, arts scene, and outdoor recreation opportunities, and as the home port for the Washington State Ferries serving the San Juan Islands, Victoria, British Columbia, and Vancouver Island. Major employers in Anacortes include the oil refining, healthcare, and tourism industries. The ferries carried almost 2 million passengers in 2015, most of them during peak periods of summer and around holidays. In addition to the nearby islands, tourists are drawn to the city parks, campgrounds, and cycling and hiking trails. The city experienced a decrease in population during the 1970s, but population has increased consistently since then.

In 2015, the Washington State Department of Transportation (WSDOT) issued a grant to the City to develop a plan for south Commercial Avenue between 11th and 34th Streets that improves roadway facilities for non-motorized uses along the Avenue. With this grant the City commissioned a multimodal plan from Alta Planning + Design to make south Commercial Avenue for pedestrians and cyclists and to support economic development in Anacortes. Alta Planning + Design held public open houses to solicit community input on the design and reviewed city planning documents including the 2012 Comprehensive Plan to assess the needs of future Anacortes residents. They developed three options for the Corridor and presented them to the City Council for review. The City Council then selected the Parkway Alternative as their preferred option, and Alta Planning + Design developed a ten percent plan based on this alternative.

Research shows that focusing on health when designing built environments can reduce the rates of chronic disease, injuries, death and disability in a community and this plan addresses health in Anacortes in numerous explicit and implicit ways. This plan has the potential to reduce morbidity and mortality by increasing physical activity, to improve community cohesion and mental health, and to reduce the rate and severity of traffic injuries. However, some aspects of the plan have the potential for negative health impacts as a result of increased vehicle noise, displacement of freight traffic to residential streets, and increased vehicle emissions due to reduced speeds. This Health Impact Assessment (HIA) closely examines the plan’s potential effects on the health of Anacortes residents and provides recommendations to support the positive and mitigate the negative health impacts of the plan.
Anacortes is a city in Skagit County in Washington State. They are known for their Washington State Ferries dock, that serves the islands of Lopez, Shaw, Orcas and San Juan, as well as Victoria, British Columbia and Vancouver Island. For this reason, Anacortes has a large influx of tourists traveling to and from the ferry, especially during peak periods of summer and around holidays. After experiencing a decrease in population during the 1970s, Anacortes has had a steady increase ever since.

Demographics

The total population estimate of Anacortes city as of July 1st 2015, is 16,403 people. The Table I.1 reflects data from the most recent census, the 2010 Demographic Profile Data. For reference, data for the entire Washington State is shown in table I.1.

Anacortes is generally similar to Washington State, but it differs in some important aspects. Median household income is slightly higher than the statewide median, and Anacortes has a significantly higher percentage of citizens identifying as white. The Anacortes population is also older than the statewide population. The city has almost double the percentage of residents over 65 years of age, and significantly lower percentages of 25 to 44 year olds. The higher proportion of senior citizens is an important consideration in designing streets, as accessibility is important for this group's well-being.

<table>
<thead>
<tr>
<th>Age</th>
<th>#</th>
<th>%</th>
<th>% of Washington</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>2,548</td>
<td>16.2</td>
<td>19.4</td>
</tr>
<tr>
<td>15-24</td>
<td>1,529</td>
<td>9.7</td>
<td>13.8</td>
</tr>
<tr>
<td>25-44</td>
<td>3,378</td>
<td>21.4</td>
<td>27.3</td>
</tr>
<tr>
<td>45-64</td>
<td>4,715</td>
<td>29.9</td>
<td>27.1</td>
</tr>
<tr>
<td>65+</td>
<td>3,608</td>
<td>22.9</td>
<td>12.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race &amp; Ethnicity</th>
<th>#</th>
<th>%</th>
<th>% of Washington</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>14,433</td>
<td>91.5</td>
<td>77.3</td>
</tr>
<tr>
<td>Black or African American</td>
<td>104</td>
<td>0.7</td>
<td>3.6</td>
</tr>
<tr>
<td>American Indian and Alaska Native</td>
<td>154</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Asian</td>
<td>305</td>
<td>1.9</td>
<td>7.2</td>
</tr>
<tr>
<td>Native Hawaiian and Other Pacific Islander</td>
<td>17</td>
<td>0.1</td>
<td>0.6</td>
</tr>
<tr>
<td>*Hispanic or Latino</td>
<td>794</td>
<td>5.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Other</td>
<td>251</td>
<td>1.6</td>
<td>5.2</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>514</td>
<td>3.3</td>
<td>4.7</td>
</tr>
</tbody>
</table>

*Hispanics may be of any race, so are also included in applicable race categories.
Major Health Issues

Health data specific to Anacortes were not available at the time of the assessment, so health issues in the city were assessed by examining health data for Skagit County. As shown in table I.2 below, compared to the overall Washington State population residents of Skagit County have lower rates of mortality from coronary heart disease, cancer, stroke, chronic lower respiratory disease, unintentional injury, diabetes, and Alzheimer’s Disease.

Table I.2 Mortality, Skagit County

<table>
<thead>
<tr>
<th>Health Measure</th>
<th>Skagit County</th>
<th>Compared to Peer Counties</th>
<th>Compared to Washington State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall health status (adults reporting fair or poor health)</td>
<td>15.4%</td>
<td>Moderate</td>
<td>16%</td>
</tr>
<tr>
<td>Coronary Heart Disease Deaths</td>
<td>93.2 per 100,000</td>
<td>Better</td>
<td>100.0 per 100,000</td>
</tr>
<tr>
<td>Chronic Kidney Disease Deaths</td>
<td>6.2 per 100,000</td>
<td>Better</td>
<td>Missing data</td>
</tr>
<tr>
<td>Cancer Deaths</td>
<td>185.1 per 100,000</td>
<td>Moderate</td>
<td>259.0 per 100,000</td>
</tr>
<tr>
<td>Stroke</td>
<td>41.6 per 100,000</td>
<td>Moderate</td>
<td>56.0 per 100,000</td>
</tr>
<tr>
<td>Chronic Lower Respiratory Disease Deaths</td>
<td>41.0 per 100,000</td>
<td>Moderate</td>
<td>65.0 per 100,000</td>
</tr>
<tr>
<td>Unintentional injury</td>
<td>49.9 per 100,00</td>
<td>Moderate</td>
<td>57.0 per 100,000</td>
</tr>
<tr>
<td>Diabetes Deaths</td>
<td>25.8 per 100,000</td>
<td>Worse</td>
<td>34.0 per 100,000</td>
</tr>
<tr>
<td>Alzheimer’s Disease Deaths</td>
<td>53.3 per 100,000</td>
<td>Worse</td>
<td>67.0 per 100,000</td>
</tr>
</tbody>
</table>

*Peer Counties are US counties of comparable population size, density, age distribution, household income, and unemployment, among other factors. The CDC creates 89 Peer County groupings using a k-means cluster analysis of 19 county-level variables for all 3,143 U.S. Counties.
### Table I.3 Morbidity, Skagit County

<table>
<thead>
<tr>
<th>Health Measure</th>
<th>Skagit County</th>
<th>Compared to Peer Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall health status (adults reporting fair or poor health)</td>
<td>15.4%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Older Adult Asthma</td>
<td>2.9%</td>
<td>Better</td>
</tr>
<tr>
<td>Older Adult Depression</td>
<td>12.5%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6.6%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Alzheimer’s Disease and Dementia</td>
<td>8.6%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Cancer</td>
<td>508.7 per 100,000</td>
<td>Worse</td>
</tr>
<tr>
<td>Obesity</td>
<td>29.8%</td>
<td>Worse</td>
</tr>
</tbody>
</table>

*Peer Counties are US counties of comparable population size, density, age distribution, household income, and unemployment, among other factors. The CDC creates 89 Peer County groupings using a k-means cluster analysis of 19 county-level variables for all 3,143 U.S. Counties.

### Table I.4 2011 Physical Activity Levels

| Indicator                                                        | Skagit County | Washington State | United States |
|                                                               | Female | Male  | Female | Male  | Female | Male  |
| No Physical Activity                                            | 18%    | 17.8% | 19.0%  | 18.0% | 25.9%  | 22.4% |
| Less than the recommended amount of physical activity           | 37.9%  | 40.0% | 40.0%  | 38.8% | 47.4%  | 43.7% |
However, when compared to similar US counties, Skagit County’s mortality rates were lower than those of Peer Counties for only two causes of death: heart disease and kidney disease. Skagit County’s mortality rates were similar to or higher than Peer Counties for all other causes of death. Similar rankings are seen for morbidity, as shown in table I.3 below. These injuries and diseases represent a significant health burden in Skagit County, and the South Commercial Avenue Corridor Plan provides an opportunity to reduce that burden.

As shown in table I.4 while Skagit County has more physical activity than Washington State and the country as a whole on physical activity indicators, almost one in five residents engage in no physical activity, and more than one in three engage in less than the recommended amount of physical activity. There is an upward trend in physical activity among women, but levels of physical activity among men decreased steadily between 2001 and 2011. Insufficient physical activity is a risk factor for many of the diseases affecting Anacortes residents, so increasing active transportation and recreational physical activity along south Commercial Avenue can be expected to have a positive impact on residents’ health.
HIA Process

A Health Impact Assessment is a tool to investigate and describe the potential impact of a project or program on public health. The National Academies Committee on HIA defines an HIA as “a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects” 17.

This assessment was conducted by 32 students as part of a graduate-level class on Health Impact Assessment (EnvH/UrbDP 536) at the Department of Urban Design and Planning and Department of Environmental and Occupational Health Sciences at the University of Washington. It was conducted as a voluntary HIA over the course of 10 weeks, between March 28th and June 3rd 2016. The students participating in the project represent a broad variety of specialties and interests within the University of Washington: environmental and occupational health, health services, epidemiology, global health, nursing, civil engineering, urban planning, real estate, social work, and public affairs, among others. This enables the multidisciplinary teams to work with a wide perspective in order to reach the optimal outcome.

HIAs are generally conducted following six steps, which together identify, explore and suggest mitigation for health impacts and their consequences.

Screening

Screening is conducted to identify a project where an HIA is feasible and has the potential to influence the final outcome and where the project being assessed is likely to have identifiable positive and negative health impacts 17. A candidate for an HIA must be far enough along in the planning process that there is something substantial to assess, but not too far along that it is too late to make changes as a result of the HIA. For this project, screening was conducted prior to the start of the class by Dr. Dannenberg in collaboration with Chris Saleeba from Alta Planning + Design. The South Commercial Avenue Corridor Plan is sufficiently detailed to allow for a thorough analysis of potential health impacts, and there will be opportunities to make health-related adjustments to the plan before it is finalized. This makes it an ideal candidate for a Health Impact Assessment.

Scoping

Scoping is done to define the main health impacts the HIA will address and creates objectives for the assessments 17. The HIA team conducted scoping with help from Dr. Dannenberg and Dr. Edmund Seto. The team identified important health determinants and categories and consolidated the ideas into the following areas of focus that will be further explored in their own chapters:

- Transportation
- Environmental Health
- Land Use and Public Places
- Public Safety
- Economic Health
- Community Cohesion and Social Capital

Assessment

The assessment is the most intensive step in the HIA. The assessment describes the existing health conditions in a community, and predicts how those health conditions would change under the proposed project 17. To accommodate the ten-week timeframe and the resources available for this HIA, only readily available existing data were used.

While it was not possible to conduct primary data collection or solicit significant community input into the HIA, the team did conduct a field visit to Anacortes to observe the existing conditions along south Commercial Avenue. The team also discussed the Plan and the HIA with Chris Saleeba from Alta Planning + Design and Eric
Shjarback, City Engineer for the City of Anacortes, on multiple occasions and incorporated their feedback into the final assessment.

**Recommendations**

Following the analysis and assessment, a series of recommendations are developed to support positive health impacts and mitigate negative ones. For this HIA, recommendations were identified for each focus area and prioritized based on the anticipated health impact. All recommendations can be found in the focus area chapters, and the top recommendations can be found in the executive summary and conclusion.

**Reporting**

The analysis and results are communicated to decision makers and the community through reporting. This HIA has been distributed electronically, and key findings were presented to Chris Saleeba from Alta Planning + Design and Eric Shjarback, the City Engineer for the City of Anacortes on June 2, 2016.

**Monitoring & Evaluation**

Monitoring and evaluation are often included for documentation and transparency reasons, and to provide insight in the practice of conducting HIAs in the future. Evaluation also allows the community and decision makers to assess the actual health impacts of a project following its completion. Due to the nature of the university course, the HIA team will not be able to conduct monitoring and evaluation. However, a monitoring and evaluation plan is proposed in the conclusion of this report.
Figure T.2 Transit Health Logic Model
Source: EnvH/UrbDP 536 Transportation Group

- HELPS REDUCE HEALTH IMPACTS
  - Stress
  - Hearing Loss
  - Cardiovascular disease
  - Sleep Disturbances
  - Asthma
  - Reduced Lung Growth
  - Heart Disease
  - Type II Diabetes
  - Breast Cancer
  - Lung Cancer
  - Physical Injury
  - Death

- Helps reduce health impacts
  - Promotes Physical Activity
  - Promotes Pedestrian Safety

- Noise
- Air Pollution
- Collisions
- Diesel
- Speed
- Gasoline
- Widen Sidewalks
- Dedicated Bike Lanes
- Vegetative Buffer
- Reduce Traffic Lane Widths

- Truck
- Commuter
- Freight
- Public Transit
- Bicycle
- Walking
- Motor Vehicles
- Pedestrians
The following section addresses how the South Commercial Avenue Corridor Plan may impact health outcomes related to transportation. The section focuses on five areas: motor vehicle traffic; freight and commercial traffic; pedestrian and bicycle infrastructure; public transit, and; accessibility and mobility. The section utilizes data from several sources, including the City of Anacortes, the State of Washington, and academic literature. It has been thoroughly documented in research and practice that a public space must induce a sense of security and safety for people to use it and enjoy it; thus, pedestrians and drivers must be provided with well-designed roads that consider and accommodate all modes safely and efficiently.

Freight is an important part of the economy and culture in Anacortes, and is something that must be considered when redesigning Commercial Avenue. Anacortes plays an important role in Washington State’s fuel supply chain, as it’s home to one of the refineries that provide a total of 20% of the West Coast District’s fuel capacity. The Port of Anacortes is also important for the Washington economy in terms of maritime freight, with goods movement valued at $3.2 billion. The State Route-20 (SR-20) is categorized as a T3 Truck Freight Economic Corridor and is therefore part of critical infrastructure for Washington State. For these reasons, it is crucial to accommodate the freight movement in the area while providing safe roads for other users.

The transition from manual labor to less physically demanding work and increases in automobile transportation, elevator use, and television watching time all contribute to the more sedentary lifestyle we live today. Increases in sedentary time are associated with a number of negative consequences, including a lower quality of life, higher morbidity, and a shorter expected lifespan. Thus, one goal within transportation planning should be to provide inclusive built environments that promote active transportation and recreational use to mitigate the impacts of a sedentary lifestyle.
Existing Conditions

From a transportation perspective, one of the challenges to redesigning the corridor is the many different functions that south Commercial Avenue serves in Anacortes. Commercial Avenue is a State Highway (SR-20) and is crucial to Washington State because of its connection to the Ferry Terminal and its function as a principal arterial in the city. Reconciling the avenue's functional value for motor vehicle traffic with the need to make it safer and more enjoyable for alternative modes of transportation is a key issue in this project. Research demonstrates that heavier vehicles and higher vehicle speeds are more dangerous for pedestrians, cyclists, and other drivers. For example, the risk of severe injury for a pedestrian struck by a motor vehicle reaches 50% at a speed of 31 mph. Speeding vehicles are also one of the most prevalent factors contributing to crashes. Current speeds and traffic volumes on Commercial Avenue are not high for a principal arterial. Nonetheless, all else equal, decreasing vehicle speed and the size of vehicles along the corridor may improve safety by reducing the number and severity of crashes. Higher traffic volumes are also associated with increased morbidity and mortality from air pollution, which further supports consideration for traffic reducing measures along the south Commercial Avenue corridor.

The speeds of Commercial Avenue are on the lower end of what is usually seen on principal arterials; the road itself is limited to 35 mph, while side roads are set at 25 mph, as shown in the map below. Regardless of the relatively low speeds of this main street highway, its current design emphasizes vehicle travel, with minimal features for pedestrians and bicyclists. There are few traffic calming features along the section of the road that is the focus of the redesign proposal; the avenue is wide, with few crosswalks or traffic lights.

The traffic volume on SR-20 averages approximately 15,000 trips per day. Ferry riders represent a significant portion of the motor vehicle traffic along the corridor. In 2012, 16% of traffic along the corridor was destined for the San Juan ferry terminal. There were 909,195 vehicle trips on the Anacortes-San Juan ferries in 2015, and 188,852 vehicle trips on the Anacortes-Guemes ferries in 2009. In 2015 the consulting firm Transportation Solutions conducted a Level of Service (LOS) analysis of all the intersections on south Commercial Avenue, and found that all, except for one, adhered to LOS standards for the city. However, the analysis did note that these LOS-estimates did not include capacity impacts of non-motorized vehicles. Thus the LOS may be lower than originally estimated. The City of Anacortes is forecasting housing and employment growth in the coming years, which may result in increased traffic along south Commercial Avenue, as well as induce traffic displacement to Marine Drive, which is unwanted by the City. In 2007, four intersections along south Commercial Avenue were in the top ten locations for motor vehicle crashes in the city.
Proposed Changes

The South Commercial Avenue Corridor Plan proposes a number of improvements on the corridor that seek to augment public health. In relation to motor vehicle transportation, these suggestions are focused around traffic calming and a decrease in traffic speeds. First of all, the corridor plan suggests decreasing speeds on south Commercial Avenue from 35 mph to 25 mph. However, the current speed limit is often disregarded. When the speed limit is lowered to 25 mph, vehicles will continue to speed if the policy change is not accompanied by further intervention. For this reason, a series of calming improvements are suggested to accompany the recommended speed policy. The largest intervention is the narrowing of the road lane from 20ft to 11ft, according to the renderings in the Corridor Plan. It is documented through literature and practice that a narrower lane width is directly correlated with lower vehicle speeds. Narrowing the lane width will also create more space for other users, which should incentivize other users to increase utilization of the corridor. A higher presence of pedestrians and bikes in the driver’s field of vision will further increase driver awareness and caution. The Corridor Plan also suggests installing rectangular rapid flash beacons (RRFB) at all crossings on south Commercial Avenue. These are intended to increase driver awareness of pedestrians and to reduce vehicle speeds. It is noted in the Corridor Plan that the suggestions will slightly increase average vehicle delay, by an unquantified amount, but that all intersections will remain in compliance with city and state LOS requirements. The South Commercial Avenue Corridor Plan also proposes installing raised crosswalks at 32 selected side street intersections. The goal of doing so is again to decrease vehicle speeds and induce a sense of safety in the pedestrians and bicycles using the corridor.

Health Impacts

There are both negative and positive health impacts of the proposed South Commercial Avenue Corridor Plan. Reducing speeds in the corridor may lead to fewer multimodal incidents along with fewer motor vehicle incidents. It is also probable that the incidents that do occur will have a lower severity and result in fewer fatalities. However, there are several potential negative impacts of the proposal. The four signalized intersections, at 12th Street, 17th Street, 22nd Street and 32nd Street may have two negative impacts. Firstly, as noted in the Corridor Plan, these intersections will slightly increase the average control delay, which leads to increased pollution in the local area. This issue is discussed further in the Environmental Health chapter. Secondly, intersections, especially badly timed intersections, increase the prevalence of dilemma-zone behavior; when the light changes from green to yellow, and the driver is within the dilemma zone, he or she will either have to brake unsafely or speed up in order to make the light before it changes. In addition to the potential negative safety implications of this behavior, excessive braking leads to increased noise levels, while unbalanced acceleration is both noise and pollution inducing.

The use of raised crosswalks should be further investigated before making a final decision. Though they are only placed on side streets, they may not provide the health benefit that is sought from them, compared to the negative impact they may have. Generally, raised crosswalks have not been found to have a significant effect on the lowering of speeds, and as the side streets where they are proposed are already full stop, it may not provide a benefit. In the cases where the side street does not have a full stop, the vehicle speeds are too high, at 25 mph to safely use raised crosswalks. Higher speeds compound the negative impacts of raised crosswalks, which include vehicle damage, especially for longer buses and recreational vehicles. Because Anacortes has many tourists visiting in RVs and campers, along with regular bus and truck traffic, raised crosswalks may lead to significant damage to vehicles and goods traversing them. Second, raised crosswalks lead to excess noise due to the acceleration and deceleration they induce.
crosswalks have previously been found to be dangerous to 2-wheeled vehicles, such as motorcycles, as they have a tendency to make them tip over, depending on the type of pavement chosen and the external conditions. Fourth, studies demonstrate significant negative health impacts of raised crosswalks on commercial drivers such as truckers, buses, and workmen in heavier vehicles, who have an increased prevalence of spinal cord injury from poorly designed tables and bumps, even at very low speeds. One thing, that could be a big challenge to Anacortes, is that it is complicated to construct these crosswalk interventions accurately enough that they have the desired effects. For example, a previous study found that the recommended ramp height for raised crosswalks should be 10%; at both 11% and 12% the effect it had on reducing vehicle speeds was significantly lower. Another study found that 75% of the bumps, humps, and tables surveyed were not constructed according to standard or design. When they are not correctly done, they'll often need to be resurfaced or rebuilt within a short period of time, leading to increased expenses on maintenance. This report also questions the cost estimate provided in the Corridor Plan, as the cost of one raised crosswalk is usually set at $1,290 to $30,880, averaging at $8,200 per unit. Stretches of road equipped with raised crosswalks are harder to maintain during the winter season after snowfall or other difficult conditions, which can be an economic burden to the city. Furthermore, roads that are not properly maintained can be detrimental to the health of vulnerable populations like senior citizens, who are unable to walk freely and are at high risk from danger due to bad road conditions. As Anacortes has a high number of seniors in the community, this is an important consideration in regards to their health. Finally, raised crosswalks are problematic for emergency response vehicles. It is generally recommended not to install them on roads that are used by emergency response teams, as they pose a danger to both the team and the patient being carried. Though raised crosswalks have been documented to lower vehicle speeds slightly, the potential negative health impacts of them are high, which is why it is recommended that alternatives are considered or a study conducted to evaluate their potential negative and positive health impacts.

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>STOPPING DISTANCE (FT)</th>
<th>CRASH RISK (%)</th>
<th>FATALITY RISK (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–15</td>
<td>25</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>20–25</td>
<td>40</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>30–35</td>
<td>75</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>40+</td>
<td>118</td>
<td>90</td>
<td>85</td>
</tr>
</tbody>
</table>

* Stopping Distance includes perception, reaction, and braking times.

Freight & Commercial Traffic

Existing Conditions

Freight is defined as all forms of transportation used to transport bulk goods: trucks, trains, ships, or aircraft. Anacortes has an airport, seaport, two ferry terminals, and a railroad that all provide the city with jobs and are a reflection of the local history and culture of the community. Each of these different transportation modes vary in scale in terms of their goods volume. State Route 20 sees 3.1 million tons of freight per year with R Avenue experiencing 1.7 million tons of freight each year. These roads are comparable to many stretches along the SR-99 corridor. These routes are important to the local and regional economy with the ferry being a primary means for getting goods to British Columbia. The historic railroad line into Anacortes from the existing refinery railroad has been converted into a pedestrian and bicycle pathway. This trail, named the Tommy Thompson Trail, provides residents and tourists with new recreation experiences and opportunities for physical activity.

2015 FGTS City Street T1-T5 Classifications
(Courtesy of Freight Systems Division)

<table>
<thead>
<tr>
<th>Route Name</th>
<th>Start</th>
<th>End</th>
<th>FGTS Class</th>
<th>Average Daily Truck Volumes</th>
<th>2015 Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td>32nd St</td>
<td>D Ave</td>
<td>R Ave</td>
<td>T-3</td>
<td>395</td>
<td>875,363</td>
</tr>
<tr>
<td>Q Ave</td>
<td>22nd St</td>
<td>4th St</td>
<td>T-3</td>
<td>641</td>
<td>1,534,035</td>
</tr>
<tr>
<td>R Ave</td>
<td>SR 20</td>
<td>22nd St</td>
<td>T-3</td>
<td>604</td>
<td>1,658,423</td>
</tr>
<tr>
<td>D Ave</td>
<td>37th St</td>
<td>SR 20</td>
<td>T-3</td>
<td>465</td>
<td>947,438</td>
</tr>
</tbody>
</table>

2015 FGTS State Route T1-T5 Classifications
(Courtesy of Freight Systems Division)

<table>
<thead>
<tr>
<th>Route Description</th>
<th>FGTS Class</th>
<th>2015 Tonnage</th>
<th>Truck %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 20 SR 20 to Commercial Ave</td>
<td>T-3</td>
<td>3,150,500</td>
<td>4.5%</td>
</tr>
<tr>
<td>SR 20 Commercial Ave to Ferry Terminal</td>
<td>T-3</td>
<td>1,326,000</td>
<td>4.0%</td>
</tr>
<tr>
<td>SR 99 Elliot Ave to N 105th St</td>
<td>T-2</td>
<td>3,160,000</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

Map T.2 Anacortes Freight Routes
Source: Patrick Pirtle

- Study Area
- T3 Freight Route
- Other Routes
- Proposed Routes
- Rails to Trails
- Railroad
Proposed Changes

All of the road design alternatives proposed by Alta Planning + Design would require freight trucks to slow down, potentially resulting in the displacement of freight to alternative routes. Narrower lanes, more pedestrians, traffic calming, and increased complexity has the potential to discourage freight to use south Commercial Avenue due to increased time and risk. Given that all of the adjacent roads in the network have the same right-of-way-width as south Commercial Avenue with less infrastructure, freight may naturally shift to less restrictive pathways. Because of the above mentioned design features, freight would have to go slower in speed than currently which may result in, more pollution. The addition of a vegetative buffer and setbacks from the curb edge could help mitigate the impacts of the resulting pollution 47.

The complete implementation of this project is being proposed in pieces allowing for design strategies to be tested at a small scale. As early buildout occurs, small interventions have the potential to impact freight on the corridor. The phased development strategy of the road can benefit the city by taking advantage of testing road schemes using paint and planters. Using this strategy, there could be a focus on freight traffic, to see if it shifts to other roads due to different interventions and what the potential long-term impacts of a shift might be.

Any shifts in freight truck route volumes could potentially push the negative impacts to other areas of the city. Ideally, freight will be encouraged in areas that have and are expected to have low levels of residential housing and pedestrians, resulting in better air quality, noise reduction, and an overall improved urban environment for pedestrians and bikes, among others 27. The Public Retail Property Proposal Map T.4, conducted by Anacortes shows the public’s interest in having new retail and pedestrian destinations clustered along Q Avenue, R Avenue, within the Commercial Business District, and along the waterfront. With the ongoing need for freight, freight routes will need to be planned along-side the city’s long-term land use and economic strategies to minimize its impacts on public health and the economic vitality of Anacortes.

The South Commercial Avenue Corridor Plan prioritizes bikes and pedestrians with wide sidewalks, vegetative buffers, and protected bike lanes resulting in a potentially safer environment for bikers and pedestrians. Safety is lowest where there are driveways into parking lots. Based on a survey of curb cuts using Google maps street view, 80% of the blocks have one or more driveways onto Commercial Avenue. In the South Commercial Avenue Corridor Plan, vehicles, including freight will have to cross 23 feet of pedestrian infrastructure in the pedestrian activation zones when entering and exiting business parking lots. This is cause for concern because it was found that the greatest contributor for truck incidents is conflicts with pedestrians 47.

If the manufacturing and freight industry is projected to dwindle over time, then the potential long-term impacts of the design on freight can be disregarded. This is a potential because implementation of the south Commercial Avenue redesign will be a catalyst for future development, potentially resulting in less intensive land-uses being changed to support high-density, multi-use buildings with high rents. This would reduce freight needs derived from Anacortes due to a loss of manufacturing land use, although freight to and from British Columbia and the port will continue to be an impact to Anacortes. Thus, careful consideration should be made to the design’s impact on the movement of goods. The balancing of freight with pedestrian and bike infrastructure should be analyzed further before moving ahead with a permanent intervention. Implementing the suggested Quick Build Street would allow the city to collect traffic data from testing.
different street design strategies, hopefully resulting in a final design that is an ideal condition for all stakeholders.

Health Impacts

Freight plays a pivotal role in the existing economy of Anacortes with manufacturing being the top core industry at 28% of the overall total. In the July 2015 Port of Anacortes newsletter it was reported that Port Executive Dan Worra presented a 60% revenue increase for the Port over the last seven years. While this is economically beneficial to Anacortes and the region, the diesel and gasoline freight trucks that support this part of the economy exhaust 40 toxic chemicals into the environment that each have various impacts to human health. Particulate Matter (PM) is one of the primary chemicals in the exhaust which is also one of the more harmful chemicals to public health. Diesel engines are more harmful to humans and the environment than gasoline powered engines. In the San Francisco Bay Area, 81% of all cancer risks are associated with air pollution derived from diesel particulate matter. The volume of contaminants released is correlated to the speed of the vehicle. In a recent Bay Area California study, the highest risk cancer areas where the ones closest to freeways, seaports, and airports. Anacortes has all these conditions present, with one being the study site and others being in close proximity.

In addition to the physical impacts caused through inhalation of air pollution, the noise produced by freight can impact a person’s hearing, mental health, and overall quality of life. It can cause stress, sleep disturbances, hearing loss, and cardiovascular diseases. Noise produced from a truck can vary; the heavier the truck the greater the noise. As speeds increase and when

Figure T.3 Potential Conflict Diagrams | Pedestrian Activation Zone (top) Other Areas (bottom)
Source: Alta Planning & Design

Map T.3 # of Curb Cuts Along Commercial Ave.
(Data derived from Google Maps)
traffic speeds constantly vary due to design elements like speeds humps and stop signs, the noise produced by vehicles increases. Roadway texture can also impact noise. Materials like brick and paving stones “can increase noise from vehicles ... caused by their bodywork to vibrate.” Materials that can shift over time may also require additional maintenance due to the physical impacts of freight vehicles.

As the previously provided evidence suggests, the magnitude of impacts caused by truck freight is primarily dictated by proximity and the frequency of exposure to toxins and the noise. This is also true for collisions; as the volume of interaction increases it is expected that collisions will also increase. Overall, as interaction between people and freight increases, so do the negative health impacts. So, it is recommended that the long-term city goal incorporates ways to limit the interaction between pedestrians and freight trucks.

Health impacts of traffic pollution near highways
(Courtesy of The Impact Project)

Children:
- Higher risk of asthma for children living within 1/4 mile of a highway.
- Asthma gets worse, such as wheezing and use of more asthma medication, among children living closer to highways.
- Higher risk of asthma when exposed to traffic pollution at school.
- Reduced lung growth in children living within 1,640 feet of a highway.
- Premature births and smaller weight babies for pregnant women living near highways.

Adults:
- Higher long-term exposure to traffic is associated with new cases of heart disease in middle aged persons.
- Both short-term and long-term exposure to traffic-related air pollution is related to cardiovascular deaths and illness.
- Traffic pollution is linked to increased new cases of lung cancer in people who never smoked.
- Long-term exposure to traffic-related air pollution in middle-aged women is linked with a risk of developing type II diabetes as the women age.
- Breast cancer in post-menopausal women is linked to traffic-related pollution.
Commercial Avenue is a small-town Main Street. People use it for more than passing through town. People choose to walk a Main Street because it is a destination: a place to buy things, dine out, drink coffee and meet with friends. These are all pedestrian level activities. South Commercial Avenue is currently designed for the needs of motor vehicles, but it has the potential to meet the needs of a broader community by incorporating inclusive design for all users. The South Commercial Avenue Corridor Plan provides recommendations that will help cue drivers that this is a place of complexity with a mix of vulnerable users. Accessibility concerns are particularly important for Anacortes because of the significant percentage of residents with disabilities. 13.1% of Anacortes residents have a disability, and 30% of Anacortes residents over age 65 have a disability. Overall, the American population is aging, disability is increasing, and the Corridor Plan represents an opportunity for Anacortes to plan for the changing needs of its future population.

Existing Conditions

Current conditions for Commercial Avenue show that it has a raised, paved sidewalk along its entire length; however, the sidewalk is narrow, about five feet wide in many places. This makes it difficult and dangerous for two individuals in wheelchairs to pass one another on the sidewalk without risking falls onto the roadway. The pavement is in disrepair in many places, posing risks of tripping and falling for older adults. Additionally, the sidewalk has many unnecessary obstacles, including light and electric poles placed in the middle of the sidewalk, and curb cuts are too narrow and steep. Another critical issue for persons with mobility impairments are the many driveways disrupting the sidewalk. Many of the driveways slope in such a way that people in wheelchairs are in danger of tipping over. Finally, Commercial Avenue's public right of way is over 70 feet wide, yet only five feet per side is provided for people who walk or use wheelchairs, and no accommodations have been made for safe bicycle travel. These overly wide streets often encourage excessive speed which presents challenges for the safe crossing of pedestrians at unsignalized intersections. This excessively limits accessibility and mobility of disabled and elderly people because they cannot easily and safely cross the street.

The Corridor Plan proposes strategies that will increase the amount of room available to vulnerable road users; it provides for increased sidewalk width and greater separation from motor vehicles. Although some of the existing sidewalks meet current ADA requirements, there are barriers scattered along the corridor’s sidewalk, compounded by additional safety issues, such as, the previously discussed driveways, and excessive street width. Anacortes and WSDOT both prioritize traffic safety. Anacortes has a high population of residents over age 60. The safety of older people is a priority for the city, and this is reflected in the proposed improvements to the pedestrian environment on south Commercial Avenue.

Research has clearly shown a direct correlation between pedestrian friendly street design and reduced injury from collisions. Based on this evidence, applying the complete street concepts proposed in the South Commercial Avenue Corridor Plan can be expected to reduce risk of vehicle-pedestrian collisions, injury and fatalities along the corridor.
Proposed Changes

The South Commercial Avenue Corridor Plan calls for creating environmental cues that help drivers recognize the risk of fast driving on a busy main street with many different people using the public right of way. These cues communicate to drivers that this space is used by people who walk, people who bike, older people and children. Slower vehicle speeds may provide an improved sense of pedestrian safety, which could positively impact health through increased utilization of walking and community spaces. This also holds positive implications for the economic development of the corridor; as increased foot traffic may encourage local and tourist shopping.

The South Commercial Avenue Corridor Plan includes suggestions for improving intersection crossings. This is critical to safety. According to the Insurance Institute for Highway Safety (IIHS), “among pedestrian crashes of all severities, the most common scenario involves pedestrians crossing in front of a passenger vehicle that is traveling straight. These crashes typically occur on roads with speed limits below 40 mph, and about half occur at intersections” 54. Additionally, when cars hit pedestrians at intersections 26% died and many more were seriously injured 54.

The proposed Corridor Plan would help the City of Anacortes improve accessibility and mobility for its most vulnerable residents by narrowing the distance to cross the street and widening the sidewalk, thus providing a more inviting, comfortable, and safe pedestrian pathway along south Commercial Avenue. Improving the ability of mobility impaired and elderly individuals to engage in activities that encourage independence has the potential to lower medical costs by improving health. This may also provide benefit by reducing isolation caused by poor accessibility for older disabled people 55. Reducing barriers which contribute to isolation and providing opportunities for increased physical activity among seniors has been linked to reductions in fall injuries, depression and cognitive decline 56,57. The fact that Anacortes is home to many assisted living facilities near south Commercial Avenue means that with support, older adults using mobility devices could remain active in their communities longer.

Health Impacts

According to Tefft 29, a person hit by a motor vehicle traveling at 17.1 mph has a 10% increase in risk of serious injury or death 29. The risk of serious injury and death goes up to 25% when a person is hit by a car moving 25 mph. It rises to 50% at 33 mph. By 40 mph people hit by cars have a 75% risk of death or lifelong disability 29.
Downtown Anacortes has a relatively high level of features that correlate with more people choosing to walk, such as shorter blocks with more intersections and proximity to goods and services such as, grocery stores within less than a half mile. Improvements to the walking network of the community could increase older adult’s levels of self-sufficiency, which may allow them live independently longer. The proposed improvements to south Commercial Avenue include many of the features needed by older individuals and individuals with mobility impairments.
Existing Conditions

Anacortes currently has limited public transit. There are no vanpools or co-driving initiatives that serve the Anacortes area, so transit options are limited to buses. The major bus options are routes 410 and 409, running every hour, six days a week. These routes aim to run in relative synchronization with the Washington State Ferries in order to achieve an efficient trip for ferry users, although unreliable ferry times can make proper time synchronization difficult. Limitations also exist due to the fact that the buses do not run as late as the ferries do. As of Summer of 2014, the average wait time at the ferry for bus users is 40 minutes for a weekday and 34 minutes on a Saturday (there is no bus service on Sunday). An additional transit service in Anacortes is the airport shuttle to SeaTac Airport. This shuttle serves multiple locations in Anacortes. One of these locations is within the project area of Commercial Avenue, located at 1312 Commercial Avenue. The shuttle runs 11 times per day.

Proposed Changes

One of the goals of the South Commercial Avenue Corridor Plan is to encourage economic development on south Commercial Avenue. By improving accessibility along the route, the corridor plan encourages more pedestrian usage and business opportunities. Transit is a crucial way to further encourage this development by increasing connectivity and accessibility. The preferred corridor plan option limits bus access with bicycle lanes on either side of the roadway. The corridor plan includes designs for covered bicycle facilities but doesn’t take bus waiting areas into account. An example of current bus stop facilities are illustrated in Map T.6. These facilities do not include covered waiting areas, though this may be a valuable consideration for the South Commercial Avenue Corridor Plan.
The proposed changes include bike lanes between 13th and 14th Avenue. This makes the shuttle station between 13th and 14th difficult to access. This is an important transit element to Seattle Tacoma International Airport.

**Health Impacts**

The impact of transit services on emissions is well documented\(^6\). Although buses themselves emit more pollutants per vehicle than personal vehicles, the impact of taking personal vehicles off of the roadway provides a net reduction in emissions\(^6\). The Transit Cooperative Research Program report indicates that transit makes up for its higher emissions rates with reductions in emissions by increasing access for bicycles and pedestrians, as well as providing benefits for businesses by increasing access for potential customers\(^6\). Previous work has shown that bus usage results in an aggregate 8% reduction in VMT, fuel use, and emissions\(^6\). This figure is diluted by the relatively small size of the transit network and land use implications in Anacortes, but is still a good indicator of emissions impacts. Since evidence has repeatedly tied vehicle emissions to asthma, cancer causing carcinogens, and other negative health outcomes, strategies and planning for mitigating the health risks associated with increased traffic volumes and urban growth should be incorporated into the South Commercial Avenue Corridor Plan.

A lack of accommodation for existing transit services such as Skagit Transit Routes and the Airporter Shuttle may lead to tendencies for prior transit users to utilize single occupancy vehicles for their travel needs. This in turn would increase congestion levels in the area, leading to higher emissions overall. In addition, providing additional public transit infrastructure will be beneficial to the aging population who might have difficulties accessing important destinations. Not providing public transit options along the corridor could lead to a sense of greater isolation within a population who commonly have mobility issues.

It should be noted that although use of public transit has been associated with improved health outcomes, it requires sufficient population density to be economically viable. If this density isn't present, the public transit system would likely need heavy subsidies to remain operable. Within the City of Anacortes, current and near term density is unlikely to support more than minimal transit options, but planning a street that allows for easy retrofitting will make future expansion of public transportation services easier.
PEDESTRIAN & BIKE INFRASTRUCTURE

Existing Conditions

The city of Anacortes has much to offer for cyclists of all ages and experience. In fact, Anacortes has created an intra-urban map of the local pedestrian and bike corridors to guide locals and visitors to common destination points. This map highlights the south Commercial Avenue corridor as a primary route for cycling; and yet, when one assesses the bike-oriented infrastructure along the corridor it is apparent that biking through the corridor would be difficult for all but the bravest of riders. Roger Geller from The Portland Office of Transportation has classified cyclists into four main categories. The “Strong and Fearless”, the “Enthused and Confident”, the “Interested but Concerned”, and the “No Way, No How” categories correlate to an individual’s comfort riding a bike on different roadway conditions. The “Strong and Fearless” ride without regard to road conditions (less than 1% of the population). The "Enthused and Confident" will ride on roadways with vehicles, but prefer to ride on bikeway infrastructure (7% of the population). Interestingly these two groups make up a very small percentage of the population. The remaining majority fall into two categories. The "Interested but Concerned" category, which describe the type of individual who has an interest in the idea of cycling either for pleasure, exercise, or transportation, but has concerns about safety, avoids main arterials, and rides only intermittently (60% of the population); and the "No Way No How" individuals who regardless of infrastructure will not ride (33% of the population). Geller argues that riding a bike “should not require bravery”, and roadways should accommodate cyclists of all abilities. In a follow up study evaluating these typologies, research further showed that women and older adults were lacking from the groups most likely to ride on less than ideal bike infrastructure. This speaks of an inequity that given appropriate roadway redesign could potentially be reduced.

Current bicycle infrastructure along south Commercial Avenue is not adequate to support or promote safe cycling. Support for bicyclists is limited and the corridor lacks continuous, bike lanes with clear demarcation. A recent report by the City of Anacortes states that just 24% of Anacortes residents reported using a bike in the previous year (2012). This supports the notion that bicycling is not an activity in which a large portion of the community currently participates; this also reinforces the typology described above. If on average 60% of any given population is interested but lacks the confidence to ride, one can imagine what might occur should the roadway support safe bicycle use. Given the existing vision of Anacortes to improve community health, economic growth and connectivity within the city, targeting this population, which has an interest in physical activity, seems natural for improving overall community health outcomes.

Additional barriers to bike usage along the corridor include the dearth of readily available bike racks. Anecdotally, upon short observation of the corridor, during our site visit, there was minimal bike activity. It should be noted that bike usage during the summer and peak tourism travel times would likely differ significantly, from off-season usage. However, regardless of the tourist season, those willing to ride on the corridor would still most likely fall into the upper 8% of serious riders.
**Proposed Changes**

There are many opportunities along south Commercial Avenue to create a more hospitable environment for bicyclists. The South Commercial Avenue Corridor Plan explicitly targets the largest population of potential bicycle riders: those who are "Interested but Concerned". The corridor plan includes the addition of extensive bicycle infrastructure to Commercial Avenue. Aside from protected bike lanes with buffer zones, the corridor plan provides additional support for bikes, including covered bike parking and public bike repair stations.

**Health Impacts**

Higher quality and quantity of bicycle infrastructure is associated with higher utilization. Creating a bike-friendly environment by installing bike lanes and appropriate signage has been shown to increase cycling. Thus, the corridor redesign is not only likely to draw current bicyclists to south Commercial Avenue, but is very likely to spur more Anacortes residents to begin cycling; if existing biking typology holds true.

There are 2 bike shops in Anacortes (one of which is on south Commercial Avenue) that offer fairly comprehensive support services for bicyclists. Thus, resources would be available to cyclists if the South Commercial Avenue Corridor Plan succeeds in increasing bicycle use among the large "Interested but Concerned" group. Anacortes is also home to bike rental businesses. These probably have little direct bearing on the health of residents because they target tourists. However, although not a direct connection to local health outcomes, increased tourist bicycle traffic along the main corridor could have a direct and positive impact on the economics of local businesses, which as individual income increases one's risk for mental health disorders and obesity decreases.

Bicycling is a way to achieve both physical activity and transportation. The US Surgeon General and the National Prevention Strategy recommend at least 150 minutes of physical activity per week. In this way, bicycling can be an avenue for advancing health as well as an efficient form of transit. Regular physical activity has been shown to improve health outcomes in as diverse conditions as musculoskeletal diseases, cardiovascular diseases, type 2 diabetes, pulmonary diseases, and neurological diseases, so an increase in bicycling could have myriad of health benefits. In the proposed South Commercial Avenue Corridor Plan there is mention of better integration between existing bicycle routes with south Commercial Avenue at the intersection of 22nd street. The Tommy Thompson trail, which runs parallel to south Commercial Avenue just to the east, is a good candidate for such a connection. When combined with appropriately designed wayfinding, this will help increase the attractiveness of south Commercial Avenue as a biking destination and may spur more biking among residents. Additionally, the focus on improving the availability and quality of bike parking and adding free repair stations will further increase the bike-friendliness of south Commercial Avenue.
RECOMMENDATIONS

SUPPORT OF THE DESIGN

- Support for road design and interventions that seek to decrease speeds, as suggested in the Corridor Plan.
- Support for intersections, under the premise that the city will ensure appropriate civil engineering applied, in form of signal timing and evaluation.
- Support for RRFB.
- Support for defining primary freight routes. Take into consideration long-term development potential and existing land use.
- Focus on ADA accessibility such as wider sidewalks since WSDOT will be improving the curb ramps.
- Reduce driveway intrusion into walking environments by consolidating parking entrances.
- Improve side street sidewalks and add bike and parking buffers to further make pedestrians feel protected from moving motor vehicles. This will add to accessibility to south Commercial Avenue.
- Continue to plan south Commercial Avenue around the safety of the city’s most vulnerable populations, as described in the Anacortes Comprehensive Plan.
- Consider implementing the temporary Quick Build changes to evaluate potential impacts of the changes on pedestrian and cyclist usage.
- Support the proposed pedestrian and bike infrastructure.

MODIFICATIONS TO THE DESIGN

- Consider alternatives to raised crosswalks that are less noise-inducing and not as detrimental to larger vehicles such as emergency vehicles, buses and semi-trucks, along with other negative impacts described.
- Consider further traffic studies on perpendicular streets to assess the potential unintended transportation, economic and health impacts of using raised crosswalks in crosswalks running parallel to south Commercial Avenue.
- Explore funding opportunities for increasing the efficiency of freight trucks.
- Balance speed and efficiency of freight with public safety by way of baseline and post installation traffic and collision studies. If collisions are too frequent consider looking at changing crosswalk timing, traffic signals etc.
- Consider promoting non-residential uses adjacent to primary freight route.
- Explore delivery and pick-up methods during alternative hours, although consider potential costs to businesses of changes.
- Locate the vehicle stop line farther away from the crosswalk.
- Provide signals that give pedestrians a head start and more time to cross. The extra time will enable elderly, children and other users to safely cross the roads. This may induce a slightly higher average vehicle delay, but will improve accessibility for all users, and potentially encourage elderly to further utilize the corridor.
- The preferred corridor design should consider integrating bus stops into the plan. The design should show how buses will work within the preferred design strategy, while also considering how transit retrofits can be accomplished as Anacortes grows.
According to the World Health Organization, “an estimated 12.6 million people died as a result of living or working in an unhealthy environment in 2012... Environmental risk factors, such as air, water, and soil pollution, chemical exposures, climate change, and ultraviolet radiation contribute to [the manifestation of] more than 100 diseases and injuries." Global estimations of death and disease burden may seem a grim comparison to the relative environmental security that the majority of individuals living within the United States experience. However, changes in the built environment, weather, and other unexpected environmental changes are not infrequent.

Concerns with the unintended consequences of human interaction with nature are valid. From reports of human drugs poisoning local salmon populations, to reports of lead and radon exposure among children and seniors, the balance between city growth and environmental preservation is delicate. Recent closures of fishing waters and coastal beaches for public safety are locally significant, affecting the economies and human health of people living in Puget Sound coastal cities. This section focuses on the potential environmental health impacts of the proposed South Commercial Avenue Corridor Plan. Key areas of emphasis include air quality, water quality, noise pollution, and green space.
“Zero decibels (0 dB) is the quietest sound audible to a healthy human ear. From there, every increase of 3 dB represents a doubling of sound intensity, or acoustic power. According to the U.S. Centers for Disease Control and Prevention (CDC) and the National Institute for Occupational Safety and Health (NIOSH), an individual is able to experience continuous noise at 85 dB for roughly eight hours without significant hearing damage -- approximately equal to the noise produced by a city roadway with an average amount of vehicular traffic. The acceptable time limit is reduced by half (to four hours) with every increase of 3 dB. These estimates vary based on vehicle type, speed, roadway material, surrounding infrastructure, traffic volumes, and time of day; for example, a passing diesel truck can emit 100 dB. When contemplating the proposed south Commercial Avenue redesign, it is important to assess the project’s effects on reducing unwanted and unhealthy noise levels. Figure EV.5 shows potential pathways to health impacts from environmental noise.

**Existing Conditions**

The noise along Commercial Avenue currently experienced by pedestrians could be considered excessive to sensitive ears. On a recent walking tour of the corridor, several authors of this HIA noted constant background noise from acceleration and deceleration of traffic, as well as loud rubber friction on asphalt. This anecdotal evidence could be comparable to the experiences that other visitors to the south Commercial Avenue corridor may have. To our knowledge, there are no existing data on noise levels along south Commercial Avenue, but design changes to the corridor could positively impact a reduction in unwanted and harmful noise levels.

**Proposed Changes**

The proposed South Commercial Avenue Corridor Plan addresses vehicular speed and road surface design for vehicular traffic. Reductions in vehicular speed in zones sensitive to excessive noise can impact overall noise levels. Construction of the roadway utilizing modern technology for noise reduction can further reduce noise from the roadway.

Vehicular traffic serves as one of the primary sources of environmental noise pollution. Reducing vehicular speeds decreases the amount of sound emitted by the roadway. This has the mutual benefit of making the roadways safer. Noise reducing pavement should be considered in the construction of the roadway. With the use of noise-reducing pavement, researchers observed a reduction of noise by 6dB at vehicle speeds of 35 MPH. Truck traffic should continue to be encouraged to use alternative routes whenever possible, because they tend to emit the highest noise levels.
A less obvious source of potentially excessive noise is evening nightlife, local concerts held outdoors, and outdoor public spaces such as restaurants. A typical neighborhood bar on a Friday evening is shown to emit 79 dB, a nightclub emits between 89 to 105 dB, and an urban patio emits roughly 73 dB. The majority of these frequencies fall within acceptable ranges for constant exposure without hearing loss for up to eight hours, but the appeal of community gathering may be reduced greatly when compounded with traffic and other sources of environmental noise.

Research suggests that “comfortable speech levels fall between 60-65 dB, so [overlapping or layered] noise levels that frequently rise into this range reduce intelligibility.” Additionally, individuals exposed to long hours of higher decibel noise falling outside of the CDC noise exposure time recommendations are much more likely to experience hearing loss. One such example would be restaurant and other nightlife workers who are exposed to the noise from restaurant operations, passing freight, vehicular traffic, ambient environmental noise, and ambulances, which have been shown to emit noise levels between 100-140 dB. While the economic benefits of providing a complete street for multimodal activity can be substantial, the potential for negative community health outcomes should be considered.

The South Commercial Avenue Corridor Plan is designed as a complete street and incorporates traffic calming features into its design, such as narrowed lanes and greenery. As the South Commercial Avenue Corridor Plan progresses, the City should consider evaluating the corridor plan for its various design features and their noise reduction measures. Rubberized asphalt pavement was shown to reduce noise levels by 3 to 5 dB when compared to traditional asphalt dense-graded surfaces. If the implementation of the Corridor Plan provides an overall reduction in traffic noise, the benefits of building a pedestrian and bike-friendly pathway have a higher chance of achieving the intended outcomes of increased community mixing, accessibility, and physical activity. Furthermore, evaluation of current municipal noise ordinances may be warranted to accommodate future community gatherings, concerts, and other public events while also factoring in the appropriate noise levels for various sections along the corridor (e.g., hospital overlay, restaurant and retail, mixed-use/live-work areas, spiritual gathering centers). External consulting with specialists who are experienced with ‘urban soundproofing’ (noise reducing) may provide additional design insights for future corridor plan changes. Map EV.8 is a conceptual diagram showing how different regions could be impacted by a corridor emitting excessive noise.

Health Impacts

The World Health Organization and Environmental Protection Agency recognize the association of noise with hazardous health effects. Noise-induced hearing loss, sleep disturbance, performance impairment, and cardiovascular and psychophysiological effects have all been attributed as negative health outcomes from noise. Nearby locations, including Island Hospital, Island View Elementary School, Anacortes Middle School, and Chandler’s Square Community Retirement Center, can be negatively impacted from a corridor emitting excessive noise.
Air quality should be taken into consideration in the final decision of the Corridor Plan. Creating ample distance between cycling lanes and traffic will reduce exposure to traffic-related air pollution among cyclists and pedestrians.

Existing Conditions

Air quality in Anacortes is relatively good. According to the EPA’s air quality index which monitors daily air pollutant levels of Particulate Matter (PM) 2.5 and Ozone, the annual average of PM2.5 was 23 and that of Ozone was 29. These are within the range of 0-50, which is considered “Good”: air pollution poses little or no risk. The existing Commercial Avenue corridor has an intermittent on-street bike lane without green medians and other physical barriers to reduce pedestrian and bicyclist exposure to air pollution caused by vehicular travel. In a study conducted at the University of Montana, 20-30% of all vehicle transport surveyed was used for tourism mobility. The World Trade Organization (WTO) Climate Report shows that tourism activity, especially mobility, is responsible for 4.9% of global CO2 emissions. With the main state route to the WSDOT Ferry Terminal running through the heart of the City, the health impact of seasonal vehicular travel from tourism should be included in an overall air quality assessment.

Proposed Changes

The proposed south Commercial Avenue redesign includes vegetation barriers, trees, and traffic calming measures. Additionally, there is mention that Anacortes envisions a shift in freight traffic to alternative routes. As Alta Planning + Design works with the City of Anacortes to further the vision of south Commercial Avenue, additional traffic studies should include a longitudinal review of seasonal traffic volumes, ideally after the installation of a temporary build-out.

Health Impacts

Air pollution has negative health effects on humans. Literature shows that cyclists are at increased risk for inhaling pollutants from vehicle emission. Some of the air pollutants associated with vehicle emissions are carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, lead, and particulate matter. Adverse health effects include asthma, cardiovascular disease, chronic obstructive pulmonary disease, breast cancer, stroke and lung cancer. Several studies have found that the individual air pollution exposure levels among bicyclists using on-road cycling lanes were higher compared to those using separated lanes. Increased distance from the road and the presence of vegetation barriers between cycling and vehicle lanes are two variables commonly associated with reduced exposure to traffic-related air quality health outcomes among cyclists.

“Traffic congestion increases vehicle emissions and degrades ambient air quality, and recent studies have shown excess morbidity and mortality for drivers, commuters and individuals living near major roadways.” The existing correlation among roadway congestion,
reduced vehicle speeds, and increased air emissions demonstrates that reducing speeds below 40 mph can dramatically increase toxic emissions. Interestingly, this phenomenon occurs primarily from idling, as well as frequent accelerations and decelerations caused by poorly managed traffic flows in reduced speed zones. In a pilot study conducted in the Netherlands, the main freeway speed was dramatically reduced with strict enforcement of the lower speed limit. The results demonstrated that even with a significant decrease in speed, the overall NO2 emissions were decreased along the pilot corridor. Researchers cited planning and traffic speed policies as complementary reinforcements to the speed and emissions changes. With such dramatic fluctuations in traffic volumes during peak tourism months, the South Commercial Avenue Corridor Plan is uniquely positioned to both address public safety and counter the potential negative health impacts of slower vehicles. Implementation of the South Commercial Avenue Corridor Plan’s recommended traffic calming measures will have an added benefit when combined with city policies to combat vehicle emissions (e.g. speed enforcement and traffic diversion techniques). Use of an efficient transportation emission reduction strategy, such as Transportation Demand Management (TDM), could reduce the potential harm to local residents and tourists from air pollution.
Water quality - sewage overflow prevention

The Washington State Department of Ecology (DOE) reports that 14 million pounds of pollutants flow into the Puget Sound each year, including petroleum hydrocarbons, pesticides, and fertilizers from surface water runoff. These pollutants cause shellfish bed closures and toxic algal blooms, and may cause cancer, birth defects, and developmental delays in humans. According to the EPA, overall water quality is good in Anacortes, but metal, microbiological, polychlorinated biphenyl (PCB), and pesticide pollutants have been found at some monitoring stations. The latest water quality report published by the DOE in 2011 found that surface water runoff is the greatest source of pollution in Puget Sound’s urban bays.

Surface water runoff results when impermeable surfaces prevent water from infiltrating into the ground. In urban areas like Anacortes, impermeable surfaces such as roads, sidewalks, and parking lots shed stormwater. This stormwater must be drained and treated or else it can lead to flooding, erosion, and increases in pollution in downstream aquatic ecosystems. Soil composition in Anacortes also impacts runoff volume; the soil along south Commercial Avenue has somewhat poor drainage and can infiltrate only a limited amount of stormwater.

While impermeable surfaces determine stormwater runoff volumes, drainage infrastructure determines how much stormwater can be treated before it is discharged into local water bodies. The drainage system in Anacortes is comprised of approximately 122 miles of stormwater conveyance systems, 100 detention and/or treatment systems, and 82 outfalls to marine waters, two of which are combined sewage outfalls (CSOs). Despite significant improvements to stormwater treatment capacity, since 1997 there have been eight overflows where untreated sewage and stormwater runoff were discharged into Guemes Channel. In addition to the CSOs, small municipal-separate storm sewer systems allow the city to discharge stormwater runoff from municipal drainage systems into streams, rivers, and lakes.

Proposed Changes

The South Commercial Avenue Corridor Plan would reduce the amount of impermeable surfaces along the corridor by installing planted medians and vegetative buffers in areas that are currently paved roadway. This vegetation would also serve as green stormwater infrastructure which would naturally reduce and treat runoff from south Commercial Avenue. Vegetation can reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. It also helps to slow down and temporarily store runoff, which further promotes infiltration, and decreases flooding and erosion downstream. Pollutants in water can also be taken up by vegetation in forms of nutrients and transformed into less harmful substances.

The South Commercial Avenue Corridor Plan proposes Silva Cells to support tree growth and provide water...
Stormwater runoff from roads, parking lots, and other paved surfaces can contain significant concentrations of copper, zinc, and lead, which can have toxic effects in humans.\(^{100}\) It can also contain nitrogen, phosphorus, oil, pesticides, and disease causing organisms.\(^{98}\) These pollutants pose a major threat to water quality and are linked to chronic and acute illnesses from exposure through drinking water, eating seafood, and recreational contact.\(^{101}\) If water quality becomes bad enough to warrant the closure of fishing or recreation areas, the resulting economic stress may cause negative health impacts among individuals whose livelihoods depend on the fishing or tourism industries. Improper grading of impervious surfaces could lead to unwanted pooling of stormwater, increasing potential breeding areas for mosquitoes carrying disease such as West Nile virus.\(^{101}\) By reducing stormwater runoff and increasing green treatment of stormwater the South Commercial Avenue Corridor Plan has the potential to improve water quality and the associated health outcomes in Anacortes.

**Health Impacts**

Stormwater runoff from roads, parking lots, and other paved surfaces can contain significant concentrations of copper, zinc, and lead, which can have toxic effects in humans.\(^{100}\) It can also contain nitrogen, phosphorus, oil, pesticides, and disease causing organisms.\(^{98}\) These pollutants pose a major threat to water quality and are linked to chronic and acute illnesses from exposure through drinking water, eating seafood, and recreational contact.\(^{101}\) If water quality becomes bad enough to warrant the closure of fishing or recreation areas, the resulting economic stress may cause negative health impacts among individuals whose livelihoods depend on the fishing or tourism industries. Improper grading of impervious surfaces could lead to unwanted pooling of stormwater, increasing potential breeding areas for mosquitoes carrying disease such as West Nile virus.\(^{101}\) By reducing stormwater runoff and increasing green treatment of stormwater the South Commercial Avenue Corridor Plan has the potential to improve water quality and the associated health outcomes in Anacortes.
GREEN SPACE

Existing Conditions

The Anacortes Parks and Recreation Department operates a total of 23 green spaces, including the trail, playgrounds and various sports fields. In addition to that, 14 parks, operated by other entities are also part of the Anacortes green space. In their 2009 publication, the department assesses the quantities and standards of the park, relating them to the National Recreation and Parks Association’s (NRPA) guidelines for community green space and parks facilities, including sports fields and other recreational facilities. While Anacortes does not aim to meet the standards set forth by the NRPA, it does provide some framework to assess the current conditions.

The Parks and Recreation Department found that in 2009 most standards are met or are currently in the process of being met, through construction of new facilities, except for off-leash dog areas, picnic shelters and play structures. The standards for smooth surfaced walking paths are almost met, and the plan suggests to connect a multi-use trail along an existing park area to the Tommy Thompson trail. It further recommends to support and encourage bicycling, by allowing residents and visitors to use all facilities for biking and walking.

The publication outlines a recommendation for enhancing the connection between parks and open spaces. It does not mention the current network and its connective qualities. The city focuses on three types of connections; forest land nature trails, city-wide trails and loop trail systems. The changes being made to the south Commercial Avenue corridor focuses on city-wide trails and sidewalk connectivity.

Proposed Changes

The proposed South Commercial Avenue Corridor Plan has some greenery elements, such as vegetation with trees and maritime flora, along the street, it is the service of providing a stronger connection to open space and parks that has the greatest health impacts. Having more access to parks has the opportunity to allow others to partake in physical and social activity. This is especially important for vulnerable groups in Anacortes as there are a number of senior retirement communities (i.e. Cap Sante Court Retirement Community), schools, and health centers within close proximity to the proposed development. This project recognizes access by providing an increased number of smooth walking surfaces, sidewalks with greenery that is aesthetically pleasing, more bike infrastructure and an increased number of crossings, facilitating the access to different areas of the city, across the corridor, and potentially to more open spaces, parks and recreational facilities. The direct connection to trails, such as the Tommy Thompson is not considered. Furthermore, the addition of parklets provides space for citizens to stop and enjoy the corridor, and with added greenery is an important asset to the streetscape and overall recreational quality of the corridor. The addition of vegetation has positive health implications. Vegetation elements are addressed in different forms throughout different design concepts in varying degrees of density and types.

Health Impacts

The South Commercial Avenue Corridor Plan allows more people access to opportunities for green space and facilitates connections to parks. In light of green space, parks provide opportunities for physical and social activity and can provide stress relief.

Parks and green space have a positive effect on health. Parks provide opportunities for all to enjoy physical and social activity and can provide stress relief and prevent obesity, diabetes, cardiovascular disease, and some cancers. Humpel, Owen, and Leslie (2002) in a literature review, reported that greater physical activity was related to accessibility of a cycle path as one of many important indicators. The connection to the Tommy Thompson Trail is not fully considered in the plan, and in order to obtain the highest possible health benefit, this should
The rate of prevalence of being overweight in children has nearly tripled in the past few decades. Having natural environments nearby has been shown to enhance children’s psychological and behavioral health. Access to park space also allows for regular physical activity which reduces depression, improves mood, and enhances cognitive functioning among children.

**Health Impacts: Hospitals**

A ten-year study of patients recovering from surgery showed that patients with a view of trees had shorter hospitalizations (8.0 days compared 8.7). This study highlights the health benefit of green space (either visually or physically accessible), among “in-recovery” populations. Creating connections and access to green spaces along the south Commercial Avenue corridor could have a similar impact on convalescing patients, and seniors in long and short term care facilities.

The health of certain vulnerable populations should especially be addressed. These vulnerable populations include young, elderly, and “in-recovery” (see glossary) populations of who often have the greatest restrictions in mobility; therefore, nearby parks, and the appropriate modes to reach them, are of critical importance. While the plan does not include parks, except for the parklets, it does aim to increase connectivity and access to the open and green areas, which can potentially be used by these vulnerable populations, to the benefit of their health.

**Health Impacts: Schools**

The rate of prevalence of being overweight in children has nearly tripled in the past few decades. Having be included, to ensure better connectivity and access for both residents and visitors.
RECOMMENDATIONS

SUPPORT OF THE DESIGN

• Support the proposed lane width reductions and vertical vegetative buffers for their potential to reduce vehicle speed and resulting noise.

• Building a separate cycling lane where there is ample distance between cyclists and traffics, with vegetation incorporated into barriers, can potentially minimize the degree of exposure to traffic-related air pollutants among cyclists. Tree canopies in between the cycling lane and traffic should be implemented to protect cyclists from potential hazardous vehicle emissions.

• Ample vegetation barriers are required to help reduce and remove pollutants from stormwater runoff and improve water quality to meet the requirement of stormwater quality. The Silva Cell facility is recommended to provide powerful on-site stormwater management. Maintain use of continuous stretches of street trees to encourage physical activity and especially combat health issues associated with overheating.

• Take advantage of the opportunity to place more greenery in the proposed parklets and pedestrian activation zones. Consider locating greenery in the hospital pedestrian activation zone so that it is visible from patient windows. In a similar vein, ensure and perhaps maximize the amount of greenery allowed in pedestrian activation zone on 17th Avenue - a major gateway to Anacortes schools for children.

• Maintain use of continuous stretches of street trees to encourage physical activity and especially combat health issues associated with overheating.

• Ensure plants used in planters and Silva cells are accessible to the public visually in order to facilitate physical activity and mental health.

• Support for the use of vegetated parklets, close to facilities of interest such as cafes and restaurants.

MODIFICATIONS TO THE DESIGN

• When zoning on the corridor, consider restricting the location, use, or hours of patios to reduce the impact of noise on schools, medical care providers, places of worship, and housing.

• Consider incorporating other methods for stormwater management into the implement of green stormwater infrastructure, like the application of infiltration vaults and increasing the use of pervious pavers in parking area.

• Ensure connection to the Tommy Thompson Trail, to allow residents and visitors alike easy access to recreational areas. This could be on 22nd Avenue.
Land Use & Public Space Health Logic Model

Figure L.10 Land use and public spaces health logic model
Source: EnvH/UrbDP 536 Land Use Team

- Land Use Along Commercial
  - Increase sidewalk connectivity
  - Reduce curb cuts
- Pedestrian Activation Zones (PAZ)
  - Mixed land use
  - Buffers
  - Greenspace
  - Tree canopy
  - Street furniture
  - Public art
  - Increase social cohesion
  - Reduce stress
- Other corridor segments

- Reduce injury
- Increase physical activity
- Reduce sun/heat exposure
This chapter assesses the proposed south Commercial Avenue Corridor Plan in terms of its potential health impacts related to public places and land use, both within the right of way and in the surrounding areas. Here, public spaces are defined as those areas in the right of way that are directly addressed through the south Commercial Avenue Corridor Plan. One of the most compelling elements of the proposed plan is its interest in bringing public life to the streets of Anacortes. Although the right of way comprises between 25 to 35 percent of all land in American cities, it largely serves only limited purposes as currently designed: to facilitate movement and storage of automobiles. The south Commercial Avenue Corridor Plan emphasizes the multifunctional potential of south Commercial Avenue to be a setting for social and commercial interaction, and not exclusively for vehicle movement. This has a number of implications for health.

This chapter outlines the existing conditions of public spaces and land use along south Commercial Avenue and summarizes proposed changes relevant to land use. This chapter also discusses the specific elements of the preferred corridor plan that address how the corridor improvements will interact with the surrounding commercial and institutional context in terms of land use including: The Pedestrian Activation Zones and the Hospital Overlay District. The chapter concludes with a list of related recommendations to improve health outcomes. This proposed corridor plan has a number of implications for health specifically related to its impact on public spaces and land use in the area, including increasing physical activity, reducing injury, reducing stress, and increasing social cohesion, among others. The logic model (Figure L.10) highlights these relationships.
CORRIDOR STREETSCAPE

Existing Conditions

Currently, south Commercial Avenue is designed with a focus on motor vehicular traffic. Wide intersections and large parking lots cater to people traveling in vehicles rather than by bicycle or on foot. Furthermore, the wide lanes increase the perception of how big the street is and results in people driving faster. This in turn discourages pedestrians and cyclists from using the street. Furthermore, obstacles in the sidewalk, lack of connections in the sidewalk network, and a large number of curb cuts all discourage residents and visitors from walking. Activation on the street is limited, with little commercial activity spillover onto the sidewalk, and no streetscape elements to encourage lingering. The city of Anacortes has conducted an inventory of local bike and pedestrian corridors, amenities, and attractions. The results showed that there is a significant lack of pedestrian facilities such as restrooms, bike racks, off-street bike lanes, benches, and drinking fountains located along the south Commercial Avenue corridor. Please see Map L.9 of the Intra Urban Bike-Pedestrian Pathways.

Proposed Changes

The proposed South Commercial Avenue Corridor Plan will create three Pedestrian Activation Zones along the corridor, in addition to the enhancements that are planned for the blocks surrounding the zones. According to Alta Planning + Design, the goal of the Pedestrian Activation Zones are to provide space that encourages pedestrian friendly activities and mixing, to foster economic growth, and physical activity. Within the three separated Pedestrian Activation Zones there is a focus on amenities that aim to increase pedestrian comfort level and encourage pedestrian traffic. The main differences between the proposal for these three sections of south Commercial Avenue and the rest of the corridor are the width of the travel lanes, the width of the sidewalk, width of the planted buffer between vehicle lanes and bicycle lanes, the presence of a median, and the removal of on-street parking.

Importantly, the corridor plan identified several opportunities to increase green space along the corridor, particularly within the Pedestrian Activation Zones. First,
within the Pedestrian Activation Zones the corridor plan includes 8’ planting zones between the car lanes and bike lanes and mid-block planted medians. Second, the corridor plan identifies opportunities to develop pocket parks along the corridor, creating additional small urban green spaces. Third, this South Commercial Avenue Corridor Plan includes the creation of a continuous tree canopy along the corridor, comprised of species that are appropriately sized and aesthetically pleasing. These trees would be planted in the buffer zone between vehicles and bicycles in the Pedestrian Activation Zones and between the sidewalk and bicycle lanes throughout the rest of the corridor.

**Health Impacts**

This section discusses the potential health impacts of each Pedestrian Activation Zone design element in redeveloping this corridor and other streetscape improvements included both within these zones and throughout the corridor. These health impacts are organized by most immediate to more-long term: Health Impacts of Design Features, Physical Activity Health Impacts, and Social Cohesion Health Impacts. While the design features will bring about immediate improvements to the street, the amount of health impact related to physical activity or social cohesion is dependent on the success of the corridor project to create active public spaces.

**Health Impacts of Design Features**

This proposed use of space in the 80’ right of way within the Pedestrian Activation Zones and the corridor as a whole—specifically the buffers, the addition of green space, the planting of street trees, and the addition of street furniture—has the potential for several important health benefits as shown in Figure L.17.

**Landscape Buffers**

The planted buffers specified in the south Commercial Avenue Corridor Plan can add both horizontal and vertical barriers. Horizontal separation between bikes and cars provides important protection for cyclists, and can reduce the rate of injuries due to vehicle-bicycle collisions. Within the Pedestrian Activation Zones, this buffer will include planted trees creating a taller buffer, while along the corridor it is comprised of lower vegetation. A vertical barrier between transportation modes, in this case between bikes and cars, can increase drivers’ perception of the edge of the road, reduce driving speeds, and increase the perception of safety. This type of barrier not only changes perception, but has also been shown to improve safety performance of the roadway. Improving the safety, attractiveness, and comfort of biking within these zones can result in increased use of the bikeway and thus increases in physical activity. While wide planted barriers separate bicycles from cars, smaller barriers separate bicycles from pedestrians within the Pedestrian Activation Zones. Within the Pedestrian Activation Zones, only 6 inches separates these two modes of active transportation. While light posts may be added to this strip to vertically separate the two lanes, these posts may obstruct the sidewalk.

**Green Space**

Increased exposure to green space has a variety of potential health effects. The scientific literature indicates that increased exposure to green space is associated with improved mental health, reduced cardiovascular disease mortality, and reduced overall mortality. Streetscape greenery specifically is associated with improved self-reported health.

**Tree Canopy**

These plantings have the potential to provide shade and thus reduce both sun and heat exposure. Providing shade and places to sit in the shade resulting from this new tree canopy offers particular benefits for more vulnerable populations, such as elderly individuals. Additionally, this tree canopy is an element of streetscape greenery, which, as previously mentioned, has been associated with perceived general and mental health.
**Street Furniture**
The Corridor Plan includes a proposal for street furniture, and a study of US communities found that street furniture was associated with increased rates of walking. Benches are especially important for individuals who are not able to walk long distances without resting, and the World Health Organization’s Age Friendly Cities checklist includes a requirement for outdoor seating. Twenty-three percent of Anacortes residents were 65 or more years of age as of 2014 and the population growth anticipated by the city’s Comprehensive Plan may bring residents with young children. Including benches and drinking water fountains will help the Pedestrian Activation Zones encourage physical activity among all age groups and mobility levels.

**Consolidation of curb cuts**
Another aspect of the proposal that will encourage walking along the entire corridor is the consolidation of vehicular curb cuts where possible. A vehicular curb cut is a driveway or other opening that allows a vehicle to access public or private property. By allowing vehicles to cross sidewalks, vehicular curb cuts add opportunities for pedestrian-vehicle crashes and make sidewalks less welcoming to pedestrians. Currently there are approximately 24 vehicular curb cuts in the proposed Pedestrian Activation Zones and many more outside the zones, and on some blocks more area is given to driveways than to sidewalks. Reducing the number of vehicular curb cuts will reduce the number of locations for potential pedestrian-vehicle conflicts and make the sidewalk more pedestrian friendly.

**Health Impacts of Design Features: Physical Activity**
One significant way the corridor enhancements and especially the Pedestrian Activation Zones will impact health in Anacortes is through its encouragement of physical activity. Regular physical activity has been shown to improve health outcomes in as diverse conditions as musculoskeletal diseases, cardiovascular diseases, type 2 diabetes, pulmonary diseases, and neurological diseases. The American Heart Association recommends adults engage in at least 150 minutes per week of moderate physical activity such as walking, and pedestrian-oriented streetscapes can help Anacortes residents meet this target. As noted above, there are several aspects of the streetscape and Pedestrian Activation Zones that may encourage physical activity, including the installation of street furniture and the consolidation of curb cuts.

**Health Impacts of Design Features: Social Cohesion**
Proposed improvements to the streetscape include: the addition of seating such as benches, tables and chairs in the Pedestrian Activation Zones; more attractive street lighting; public art; pocket parks and parklets; and trees and greenery. The south Commercial Avenue Corridor Plan expects that through this “activation of the public realm,” the area will experience “enhanced social cohesion.” Together, these elements create a streetscape that promotes social interaction and, in turn, social cohesion. The inclusion of seating in the Pedestrian Activation Zones invites people to linger and interact, either through intentionally planned meetings or casual ones. Streetscape greenery—such as the tree canopy, pocket park, and buffers—has also been shown to be associated with perceived social cohesion. Well-selected greenery, public art and improved street lighting will improve the attractiveness of the streetscape, which has been found to be associated with a sense of community and place attachment, which are both dimensions of social cohesion. The fact that the corridor plan emphasizes the installation of planting zones as an opportunity to highlight Anacortes’ marine character through plantings and/or artwork, points to the unique placemaking potential of this project. By tying in the local history and character of the town and its connection to the maritime industry, there is the distinct opportunity to improve social cohesion and social capital.
**Existing Conditions**

Island Hospital is located in the heart of Anacortes. Running adjacent to the west side of south Commercial Avenue, the hospital currently spans several blocks, beginning just south of 26th Street and ending on the south side of 24th Street. Island hospital is classified as a public hospital district, which is defined as "community-created, governmental entities authorized by state law to deliver health services—including but not limited to acute hospital care—to district residents and others in the district's service areas. Owned and governed by local citizens, hospital districts tailor their services to meet the unique needs of their individual communities." The hospital has been designed with the main entrance located on 24th Street and the Emergency Room entrance located on 26th Street. The hospital is surrounded by surface parking lots containing roughly 680 parking spaces. There is an emergency helipad located off of 24th Street. There is an entrance into the hospital parking lot from south Commercial Avenue, however this is not the main point of entry, and the roadway (25th Street) dead ends into the hospital campus. The hospital is located in one of south Commercial Avenue’s superblocks, which Alta Planning + Design defines as large blocks where the street network is an incomplete grid. The hospital is a key employer in Anacortes, employing over 700 individuals and paying nearly 33 million dollars in wages and salaries annually. With so many local individuals economically reliant on the hospital, establishing a strong working relationship between the City and Island Hospital is critical to the future growth of the city. It will thus be important to consider how south Commercial Avenue corridor interacts with Island Hospital to maximize positive health outcomes, while also not jeopardizing the functionality of the hospital. For this reason, the health implications of the proposed Hospital Overlay District, as it relates to south Commercial Avenue corridor, should be considered carefully, including: its connectivity to destinations other than the hospital and its ancillary services, green spaces for healing, and connections to the community. Please see Map L.10 for a rendering of the existing hospital map.

---

**Proposed Changes**

The South Commercial Avenue Corridor Plan does not explicitly state changes pertaining to the hospital zone, however, the 2016 Comprehensive Plan for the city has a proposed hospital district overlay. The purpose of the proposed hospital overlay is to provide for the coordinated expansion of Island Hospital and medical support uses in the immediate area, while minimizing the impacts on the surrounding land uses. The overlay would allow for medical land use and the development of ancillary services, but the underlying proposed city zoning along the corridor would also apply to the area. This would mean that with the overlay, south Commercial Avenue could see...
In evaluating the South Commercial Avenue Corridor Plan and its interactions with the proposed overlay, three primary questions were raised. 1) Does the corridor plan as proposed by Alta Planning + Design make considerations for special traffic, and pedestrian needs in the proposed hospital overlay district? 2) Does the proposed hospital overlay work effectively with the Pedestrian Activation Zones to further the Anacortes visions for destination access, connectivity, and a health promoting environment? 3) What other special considerations about future hospital expansion and the proposed Corridor Plan should be evaluated for health impacts?

Key Pedestrian, Bike and Vehicle Considerations
Hospitals by their very nature are entities of activity, and constant movement. Emergency vehicles delivering patients can occur at any moment throughout a 24-hour period, visitors to in-patients come and go, and patients are discharged throughout the day. In addition to its primary inpatient functions, the hospital also provides key clinical and outpatient services that residents of Skagit County may access with great frequency throughout any given day. Increased growth within a hospital overlay over time, has the potential to dramatically increase hospital and pass through traffic volumes, as well as parking needs.

Health Impacts
In evaluating the South Commercial Avenue Corridor Plan and its interactions with the proposed overlay, three primary questions were raised. 1) Does the corridor plan as proposed by Alta Planning + Design make considerations for special traffic, and pedestrian needs in the proposed hospital overlay district? 2) Does the proposed hospital overlay work effectively with the Pedestrian Activation Zones to further the Anacortes visions for destination access, connectivity, and a health promoting environment? 3) What other special considerations about future hospital expansion and the proposed Corridor Plan should be evaluated for health impacts?

132. Study has shown that ambulances are at a greater risk of collision while traveling with lights and sirens, traffic confusion or failure of oncoming traffic to yield, as-well-as unsafe ambulance parking. In a study conducted by FEMA, emergency vehicle crashes were most likely to occur at intersections, from excessive roadway speeds or curves. 133. South Commercial Avenue has three intersections within the proposed overlay. The road design is straight and the corridor plan is designed with traffic calming...
features, including narrowed lanes and raised crosswalks running parallel to south Commercial Avenue. A typical emergency vehicle is ten feet wide from mirror to mirror, and requires space for non-emergency vehicles to yield during an emergency response. Street redesign should consider the impacts of narrowed streets on response/delivery times, congestion, and complete blockage of passage for emergency responders 135. The corridor plan currently provides for 11 foot lanes in the overlay district, which is the same in the Pedestrian Activation Zones. There is a nine-foot median that could accommodate emergency response vehicles (ERV) if it remains free of planters. The Corridor Plan mentions the use of planted medians in two of the three Pedestrian Activation Zones; this should be carefully evaluated for its impact on ERVs in areas with no shoulder for vehicle yielding. Consider working with the Anacortes Engineering Department and the Fire Department as the plan progresses to ensure that medians and other traffic calming measures don’t hinder ERV passage 136. The city should consider the benefits that clear and appropriate modes of wayfinding can have on traffic flow, connectivity throughout the corridor and beyond. Wayfinding signs within the hospital corridor should be designed to direct hospital visitors to the primary entrance to reduce unnecessary traffic volumes along the corridor and the amount of vehicles entering the south Commercial Avenue entry at 25th Street. This redirection could reduce traffic flows in and out of the parking lot associated with the corridor’s Pedestrian Activation Zones, which can reduce the risks of pedestrian, bike and vehicle collisions.

Within the proposed hospital overlay, safety for pedestrian crossings and access to the hospital is key. In a study evaluating the link between the built environment, pedestrian activity, and pedestrian-vehicle collisions researchers found that mixed use and densification zoning when combined with increases in public transit will positively impact pedestrian activity, but without proper planning will also increase pedestrian-vehicle collisions 137. Importantly, major roadways, and arterials were found to be exponentially associated with pedestrian-vehicle collisions. The researchers argue for the expansion of complete street designs and demonstrated that reducing traffic volumes by 30%, and diverting unneeded traffic could reduce pedestrian-vehicle collisions by 35%, and would reduce overall risk of collisions by 50% 137. Research has repeatedly shown that traffic speed, volume, and poor pedestrian planning are strongly associated with negative pedestrian outcomes in a collision 138. This further supports the key features of the South Commercial Avenue Corridor Plan including: complete street design elements, incorporation of lighted crosswalks, the use of Pedestrian Activation Zones as well as the city of Anacortes’ Comprehensive Plan land use goals as a positive impact on health outcomes for Anacortes residents.

Study shows that public transit is positively associated with physical activity 24. Currently, bus route 409 makes its one stop along south Commercial Avenue north of the overlay district at 18th Street and south Commercial Avenue. Although outside of the scope of a street redesign, the city of Anacortes should consider the positive impacts an additional bus stop located within the proposed hospital overlay could have on health. The addition of a bus stop on each side of south Commercial Avenue within the overlay would improve access to the hospital and surrounding retail outlets. This is especially true for those that rely on public transit such as seniors, those of low socioeconomic status, or individuals who prefer to bike and walk as a main mode of transportation 138.

**Pedestrian Activation Zone and the Overlay: Key Considerations**

The Pedestrian Activation Zone proposed in the Corridor Plan is located within the hospital overlay. According to Alta Planning + Design, the goal of these zones is to provide space that encourages pedestrian friendly activities and mixing, to foster economic growth, and physical activity. Research shows that access to transit, improved pedestrian connectivity, and streets designed for walkability are negatively associated with collision injury 139. Seniors are at a significantly greater risk of fatal injury in collision and street design that accommodates
this population could greatly reduce their involvement in injuries.\textsuperscript{139} The hospital serves all ages, races, and incomes. According to the National Institutes of Health, aging and poor health can drastically change an individual’s ability to drive safely.\textsuperscript{140,141} This aging changes vision, hearing, and response times to potential collision with either emergency vehicles, bikes, or pedestrians.\textsuperscript{140} The Corridor Plan is designed with both vehicle and pedestrian scale lighting located along the corridor. This lighting should take into consideration the special needs of an aging population and the frequent comings and goings of individuals including staff, visitors and sick patients that may occur within the proposed hospital overlay.\textsuperscript{141} If the current number of proposed street lights does not support the needs of this and other special populations within Anacortes, the city should consider increasing the number of streetlights in the hospital overlay district.\textsuperscript{142} Increasing street and pedestrian lighting within the overlay also improves the perceived safety of hospital employees whose schedule may require night time travel.\textsuperscript{142}

In contemplating the overlay, future expansion of the hospital, and the complete street design of the Corridor Plan; connectivity to destinations other than the hospital and its ancillary services should be evaluated. The hospital overlay is proposed within one of the four superblocks located along south Commercial Avenue. These superblocks negatively impact pedestrian, bike and vehicle travel through the corridor because they can create long detours and undesirable lengths to reach destinations by bike or foot. This has special implications for mobility impaired pedestrians. Pedestrian resting stops, green spaces for healing and connection to the community are important aspects of hospital design.\textsuperscript{142} These concepts also apply to complete street design.

Within the main blocks of the hospital there are two lots designated for employees, one physician only lot, five visitor lots and also on-street visitor parking located on 26th Street.\textsuperscript{130} There is some question about the amount and location of the parking lots surrounding the hospital. The entrance from south Commercial Avenue leads into a visitor parking lot and has poor accommodation for pedestrian and bike access from the main entrance to south Commercial Avenue along this route. Since the 25th street entrance provides open views of the hospital it would seem a natural avenue of connection to provide pedestrian access between the main corridor and the hospital. This has the potential to improve overall community connection, walkability, and economic access to the businesses located on south Commercial Avenue. This type of partnership between the hospital and the city could be mutually beneficial because it provides quick bike or pedestrian access for employees to meals and services, and provides access to retail for visitors and patients, without the need for car-use. This can reduce the risk of collisions, unnecessary traffic volumes and increase the use of active modes of travel. Please see Figure L.11 for a rendering of the proposed future hospital expansion.

Island Hospital has limited green space within its compound. With the exception of planted parking strips located in parking lot dividers, there is no place for patients, visitors or staff to interact with nature, no obvious outdoor eating spaces or benches connecting to the main corridor, which evidence shows to have a direct effect on patient outcomes and personal mental and physical wellbeing.\textsuperscript{110,144} In an interest of maintaining a healthy workforce, and improving patient outcomes, the hospital should consider the space between south Commercial Avenue and the Main Hospital building as an ideal location to develop a green connection between the south Commercial Avenue and the hospital, furthering the City of Anacortes’ vision for mixed use, connectivity, green spaces, and economic growth. This should be taken into consideration before the approval of the proposed hospital overlay, and partnerships with the hospital, locally impacted businesses, and the city should be fostered. To improve the benefit of the corridor redesign, the City of Anacortes should reconsider the overlay and its direct connection to the main corridor. If the design of future hospital expansion remains as planned there would be significant main street frontage lost to parking lot and medical services that most likely would not offer mixed use.
and retail on the main floors. If the intent within the Comprehensive Plan, and the proposed Corridor Plan is to create an inviting, walkable Pedestrian Activation Zone; the interaction with the overlay and its planned design could have adverse economic and community cohesion consequences, as well as reduce the effectiveness of the Pedestrian Activation Zone as a health promoting zone for walking and biking.

One possible way to accommodate existing businesses is to establish development conditions that would allow existing businesses guaranteed retail space on the ground floor of proposed medical buildings. This could promote mixed use along the Avenue, maintain the location and success of long-standing businesses, and allow the hospital to expand in a predictable manner that is beneficial to the hospital and the residents of Anacortes. It would also provide an additional community gathering space and destination which is positively associated with active transportation.

Providing a bike and pedestrian environment is part of the challenge of promoting a healthy community, but understanding what other factors influence car-use behaviors is essential for the long term success of the south Commercial Avenue redesign. In a study evaluating factors which influence car use in bike friendly cities, commuting distance, and free workplace parking were strongly associated with increased vehicle use. Car availability and education were also identified as having a strong influence on an individual’s car-use behaviors. The hospital provides free parking in several locations to its employees. To promote active modes of commuting to and from work (walking and biking), the hospital should consider reducing the number of available spots, to support the efforts of the Pedestrian Activation Zones (lack of on-street parking), charging a nominal fee for employee spaces, or providing financial incentive for bike commuters. These methods have been positively associated with improving an individual’s motivation for active modes of transportation for work commute.
Since the city's incorporation in 1891, land use in Anacortes was dominated by industrial uses such as lumber, fishing, fish processing, and farming. With the exception of the introduction of oil refineries in the 1950s, land use trends in Anacortes largely shifted away from industrial use to more commercial, tourism, residential and retirement housing. The City of Anacortes released the proposed 2016 Comprehensive Plan, which outlines future plans for the city including land use and zoning recommendations. The key focus of the land use element is described as planning that allows the city to develop "land use capacity to meet projected growth, desired land use patterns, community design, historic preservation, resource protection, community gathering spaces, healthy community provisions, regional coordination, and a focus on special planning areas." This includes planning for a Complete Street design along south Commercial Avenue and consideration of a hospital overlay. The properties along the south Commercial Avenue corridor are zoned "C," as defined to the right.

The majority of the land along the corridor is used for commercial purposes, including grocery, retail, gas, automotive, and restaurant. Currently, only 2% of Anacortes' land is comprised of multi-family residential development, the majority of which is located near south Commercial Avenue, compared to 24% of all land devoted to single family housing. For a few blocks in each direction of south Commercial Avenue, the east-west intersecting streets are zoned for high density residential use (R4, R4A & R4B).

Over the next 20 years (2016 to 2036), Anacortes has a targeted growth of 5,910 new residents and 2,071 new jobs within the city. This equates to 296 new residents and 104 new jobs each year within that timeframe. To accommodate this growth, the city will allow up to 310 new housing units on the land surrounding south Commercial Avenue within the Commercial zoning designation. Height limits are being increased from 40 feet to 50 feet (with

<table>
<thead>
<tr>
<th>Purpose</th>
<th>This designation provides for a wide variety of general service and retail commercial uses, and mixed-uses that serves local and regional residents and the traveling public.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowed uses and density</td>
<td>A wide variety of general service and retail commercial, and professional office uses. Multi-family uses are encouraged on upper floors along South Commercial Avenue and allowed on side streets. Conditional uses include small scale manufacturing, regional scale retail uses, veterinary and medical clinics, hospitals, and limited outdoor storage uses. New residential uses must feature transit-supportive densities.</td>
</tr>
<tr>
<td>Maximum density</td>
<td>None</td>
</tr>
<tr>
<td>Maximum land coverage</td>
<td>50%</td>
</tr>
<tr>
<td>Maximum building height</td>
<td>40 feet</td>
</tr>
</tbody>
</table>
| Building requirements (select list) | - If a building wall is within twenty feet of a sidewalk, plaza, courtyard, or similar pedestrian area, it shall incorporate human-scale elements such as windows, arcades, lower roof overhangs, small-scale textural and color changes, moldings, balconies, projecting and recessed elements, doorways, landscaped areas, trellises, artwork and/or other small-scale architectural features so that people will not be walking past large blank wall surfaces.  
  - If a building exceeds thirty feet in height, its apparent height shall be modulated wherever it is within ten feet of a sidewalk, plaza, courtyard, or similar pedestrian area, by adding shorter (twenty feet or less) building elements such as a wing of the building, arcade, trellis, lower roof overhang, horizontal projection at least two feet deep, awning, balcony or other architectural feature to reduce the apparent height to a more human scale.  
  - Primary building entrances shall be clearly visible from streets, pedestrian ways and parking areas, with recessed or covered entrance areas to protect people from the rain. Projects shall be designed to facilitate pedestrian access, with pedestrian walkways connecting building entrances to adjacent public ways in locations which provide access to pedestrian street crossings. |
a potential for up to 65 feet) along the corridor, and single purpose residential housing will be allowed along side streets. Clearly, this corridor plays a crucial role in the city's plans to accommodate growth in the future, so it is fitting that the city would want to redevelop south Commercial Avenue to serve future residents in a manner that aligns with broader goals and policies outlined in the Comprehensive Plan. This in turn may spur and encourage the type of development that current land use regulation is encouraging—high density and mixed use—but not seeing redeveloped in reality.

**Proposed Changes**

Land use planning and zoning fall outside of the scope of the proposed South Commercial Avenue Corridor Plan, and as such, no directly relevant changes have been proposed. The city of Anacortes has updated its 2016 Comprehensive Plan, which addresses land use planning, as well as visions for the corridor. Because of this relationship it is appropriate to perform an impact assessment on land use along the corridor.

**Health Impacts**

Transportation and land use planning are inextricably linked. As such, the development of plans or policies for one is not complete without also recognizing the implications and impacts on the other. How any particular piece of land is used affects what demands there will be to access, and the type of quality of transportation infrastructure that exists in any given place impacts what types of uses can appropriately accommodated on the surrounding area. As such, while this HIA focuses on the health impacts associated with proposed transportation infrastructure investments, it is still important to note its relationship to land use decisions in Anacortes.

Land use planning occurs at the local level, and involves developing policies to guide where future development will be accommodated within city limits. This gives cities the power to encourage development and density in an organized manner. Land use planning should be considered in tandem with transportation and infrastructure planning to ensure infrastructure investments are appropriately sized to meet the needs of the surrounding land uses. Land use planning ensures that decisions made at the most micro-level (e.g., parcel) align with city-, county-, and statewide goals. The Washington State Growth Management Act has established a framework for robust comprehensive planning so that cities can take into account land use, transportation, and infrastructure needs in the same planning process. As a process and product, comprehensive planning allows cities to be organized and forward thinking on where and how the city expands.

**Health Impacts of Land Use: Physical Activity**

There is a wealth of evidence that land use impacts physical activity. Studies in the US, Europe, and Japan have found that car travel is lower in dense neighborhoods with a mix of uses. Numerous other studies show evidence that mixed land use, street connectivity, residential density, and destinations within a half mile of each other are connected to physical activity. This relationship also applies to older adults. A UK study found active trips more likely among adults 70 or older when eight or more destinations are nearby and a study in Vancouver found that key destinations for older adults are grocery stores, restaurants, malls/marketplaces, and others’ homes. The Vancouver study suggests that the combination of walkable neighborhoods and attractive destinations may help older adults achieve health benefits through physical activity.

The World Health Organization released a “Global Age-Friendly Cities” guide that recognizes the role the built environment and land use play in supporting physical activity for all ages and mobility levels. The guide recommends situating services together, locating venues for events and activities conveniently, ensuring housing is close to services, and ensuring buildings are accessible in order to make a location age-friendly.
Building form also impacts walkability, and changes in zoning represent an opportunity to impact form. Currently, the depth of building setbacks on south Commercial Avenue varies significantly. The Urban Land Institute reports that large building setbacks destroy the pedestrian-oriented character of a street, and that large variations in setbacks detract from the enclosure of the street as a pedestrian space. Standardizing and minimizing setbacks as buildings turn over may make the street more pedestrian friendly and encourage physical activity.

Ultimately, the more residential density that is allowed under the zoning code or even incentivized by the city along this corridor, the more impact the South Commercial Avenue Corridor Plan will have on health impacts. To realize the positive health outcomes associated with physical activity and social cohesion, people need to use the space. If more residents will live directly on or near this corridor, they will help to activate the space, hopefully then leading to increased vibrancy and attractiveness of the pedestrian area for others from surrounding areas to enjoy. The critical path to making this happen is to ensure that land use regulations allow for and encourage appropriate uses along south Commercial Avenue. The city should be looking to add more housing and commercial activity that is designed to engage directly with the sidewalk. Below is a table of land use goals outlined in the 2016 Anacortes Comprehensive Plan Draft that are relevant to the proposed South Commercial Avenue Corridor Plan. Overall, the proposed Corridor Plan would either directly positively impact these goals and policies or facilitate them to occur more easily. Many of the city’s land use policies are related to increasing density and developing mixed-use places. Through the comprehensive planning process, those who participated emphasized their interest in creating environments that focus on human-scaled design, inviting pedestrian access, and more public space in the form of informal gathering spaces, which are all addressed in the South Commercial Avenue Corridor Plan.

### Table L.10  2016 Anacortes Comprehensive Plan Land Use Goals and Policies That Are Addressed through Proposed Plan for South Commercial Avenue

| Policy LU-2.2. Design public facilities to support and strengthen Anacortes’ community character and identity. |
| Recognize that the character of public rights-of-way play a role in determining community character. Wherever feasible, promote complete streets and incorporate streetscape improvements, such as wayfinding signs, lighting, public art, enhanced landscaping and street furniture, to enhance community character. |
| Policy LU-5.2. Adopt development regulations that encourage the integration of usable public open space in commercial and mixed-use areas. |
| Policy LU-5.4. Pursue strategic public/private partnerships with large developments to leverage high quality public space integrated with new development. |
Goal LU-6. Residential uses. Preserve and enhance the quality, character and function of Anacortes’ residential neighborhoods.

Policy LU-6.2. Protect the character of single family neighborhoods by focusing higher intensity land uses close to commercial and community services and transit.

Policy LU-6.4. Adopt design standards for new multifamily development to promote neighborhood compatibility, enhance the livability of new housing, and enhance the character of residential and mixed-use areas.

Key concepts to emphasize in the design standards:

- Emphasize pedestrian oriented building frontages;
- Emphasize facade articulation consistent with neighborhood scale;
- Integrate high quality durable building materials and human scaled detailing;
- Provide for usable open space,
- Provide compatible site edges and sensitive service area design, and
- Provide for vehicular access and storage while minimizing visual and safety impacts of vehicles.

Policy LU-6.6. Explore the development of zoning incentives to help meet housing diversity and affordability goals.

Examples could include residential density bonuses, variations in allowed housing type, or flexibility in regulations, if a proposal meets community goals for affordable, senior, size-limited or other types of innovative housing. If not permitted outright or through discretionary review processes, consider providing for these incentives through pilot programs or other innovative measures.

Goal LU-7. Downtown and South Commercial Avenue.

Enhance the character and economic vitality of Downtown and the South Commercial Avenue corridor.

Policy LU-7.2. Strengthen the visual appearance and economic vitality of South Commercial Avenue.

A. Maintain and strengthen function of corridor for retail and commercial service uses.

B. Encourage residential development on side streets and in the form of mixed-use buildings (housing over shops) complementary to retail/service uses.

C. Craft and apply form-based design standards for South Commercial Avenue:

Key concepts to emphasize in the design standards:

- Provide for pedestrian-friendly building frontages;
- Promote facade massing and articulation that reinforces Anacortes' character and scale;
- Integrate high quality durable building materials and human scaled detailing;
Policy LU-10.1. Adopt development regulations that facilitate a complementary mix of uses within mixed-use centers that encourage more walking and bicycling between uses.

Policy LU-10.2. Adopt design provisions that provide for safe and attractive non-motorized connectivity between uses and amenities, with the frequency of connections commensurate with the envisioned intensity of land uses (i.e., housing, employment, community services, and amenities).

Policy LU-10.3. Adopt development regulations that encourage the integration of recreational space with multifamily development.

Policy LU-10.4. Integrate public recreational amenities accessible to all Anacortes residents, workers, and visitors, with highest priority on locations, facilities, and activities that best serve the community.

Policy LU-10.5. Increase access to health foods by encouraging the location of fresh food markets and community food gardens in close proximity to multifamily uses and transit facilities through zoning and business regulations.

Ultimately, the Corridor Plan reflects many of the goals and policies outlined in the city’s Comprehensive Plan related to land use. While not directly a land use project, this corridor project will have significant impacts on land use in Anacortes. As currently proposed, the project would allow for the city to make significant strides and progress in realizing a variety of land use goals identified by the city. This Corridor Plan supports the city’s documented interest and efforts to develop an environment that is human-scaled and pedestrian-friendly.
RECOMMENDATION

SUPPORT OF THE DESIGN

• Support implementation of horizontal buffer zones separating motorized vehicles from bicycles and separating bicycles from pedestrians along entire corridor.
• Support creating green space in buffers and medians.
• Support planting trees in the buffer zones and along corridor sidewalks for continuous tree canopy, to provide shade and reduce heat and sun exposure.
• Support proposed street furniture, especially benches, to encourage physical activity among people of all ages and mobility levels.
• Support opportunities for public art integration with streetscape.
• Support the proposed consolidation of vehicular curb cuts wherever possible.
• Support mitigating the negative impact of vehicular curb cuts by maintaining the elevation, slope, and physical appearance of the sidewalk across the driveway to indicate that the area is primarily a pedestrian travel zone.
• Support the proposed completion of missing sidewalks to increase connectivity to south Commercial Avenue.
• Support the proposed complete street design of the Corridor Plan as providing positive long term economic, and health outcomes for the area surrounding the hospital.
• Support the proposed lane width and the Corridor Plan’s consideration of EMVs.
• Support the Corridor Plan’s use of both street and pedestrian lighting within the hospital overlay.
• Support use of RRFB crosswalks within the overlay.

MODIFICATIONS TO THE DESIGN

• Consider installation of drinking water fountains in Pedestrian Activation Zones to further support physical activity for pedestrians and bicyclists.
• Consider installing age-friendly sidewalks by using non-slip paving in the Pedestrian Activation Zones to reduce the risk of falls among older or less mobile pedestrians.
• Consider a modular design allowing for future installation of additional visual or physical separations between bike lanes and pedestrian walkways. As usages increase, separation may become necessary to minimize the risk of bike-pedestrian crashes and reduce pedestrian stress.
• When possible, consider alternative placement for street lighting to limit sidewalk obstruction.
• More clearly articulate how this new street design will interact with existing and future transit in the area.
• Consider sharing this document with the hospital so that they can think about parking reduction to encourage healthy modes of transportation as a main method of commute for employees.
• Consider installing vehicle and pedestrian traffic signals that link directly to the main walkways to the hospital campus. Consider direct crossings from public transit stops throughout the overlay area.
• Consider additional street and pedestrian lighting to accommodate for the frequent comings and goings of both hospital and ancillary service staff, and patrons. Consideration for the special nature of the aging population in determining sufficient light volumes for roadway and sidewalks is recommended.
• Consider utilizing sound barriers and buffering to protect patients, surrounding commercial and residential properties from roadway and construction noise as the plan progresses.
MODIFICATIONS TO THE DESIGN

- Consider reducing speed limits and providing well lit crosswalks to reduce the negative impacts of traffic confusion from non-residents.

- Evaluate existing hospital and destination wayfinding within the proposed overlay and ensure that the design and volume remains adequate for seasonal traffic volumes, expanding hospital services and increased density along south Commercial Avenue.

- Encourage reevaluation of the economic and health impacts associated with the hospital overlay boundary extending to the south Commercial Avenue street frontage. Foster relationships between the city and the hospital that encourages hospital expansion and design incorporating green space, improving pedestrian connection between the hospital and the corridor via the 25th Street entrance and preserving the local livelihoods of long-established businesses within the proposed overlay district.

- Recommend evaluation of yield methods for non-EMV vehicles and the impacts that planted medians, when combined with reduced road widths may have on response times, collisions, and roadway blockage.

- Consider a HAWK beacon (see glossary) located at 25th Street. Consider the future addition of a bus stop at this location.

Establish specific land use policies for the Pedestrian Activation Zones that clearly outline the goals for these areas, similar to what has been done for the Central Business District (outlined in 17.20.130 of Anacortes Municipal Code). For instance, look into discouraging any future uses that:

- “Disrupt pedestrian/shopper circulation patterns;
- Create pedestrian safety hazards or nuisances;
- Lessen the attraction of the [Pedestrian Activation Zone] as [a retail] center;
- Preclude use of significant portions of first floor store frontage for retail trade.”

Clarify, as is done for the Central Business District land use policy (outlined in 17.20.130 of Anacortes Municipal Code), that sidewalk cafes and mini-parks are appropriate for the Commercial zone along south Commercial Avenue.

Support requiring parking in the rear of buildings along south Commercial Avenue to lessen number of curb cuts and bring building frontages closer to the sidewalk.

Consider adding density minimums to the development requirements of south Commercial Avenue in the future, particularly in the Pedestrian Activation Zones.

Support proposed changes to the Comprehensive Plan to increase building density and a mix of uses on and near south Commercial Avenue.

Encourage and incentivize a mix of uses likely to attract pedestrians and cyclists, such as grocery stores, restaurants, shops, and housing, especially within the Pedestrian Activation Zones.

Standardize and reduce setbacks on new construction on the corridor. Prohibit the use of setbacks for parking.
DIRECT EFFECTS OF PROPOSED STREET REDESIGN

BIKE LANES

WIDER SIDEWALKS

REDUCE LANE WIDTH

PEDESTRIAN ACTIVATION ZONES

IMPROVED STREET CROSSING

SHORT TERM IMPACTS OF PROPOSED STREET REDESIGN

REDUCTION IN PED/BIKE ACCIDENTS

SLOWER VEHICLE SPEEDS

INCREASED PED/BIKE USERS

IMPROVED TRAFFIC EFFICIENCY

IMPROVED CONNECTIVITY

INCREASED PERCEPTION OF SAFETY

INCREASED PHYSICAL ACTIVITY

DECREASED STRESS

INCREASED SOCIAL INTERACTION

LONG TERM IMPACTS OF PROPOSED STREET REDESIGN

IMPROVED PHYSICAL AND PSYCHOSOCIAL HEALTH
Although the United States Legal Code defines “public safety” as a sole domain of law enforcement and emergency responders, other sources refer to public safety as crime, noise, inappropriate social behavior, and other issues that can impact the quality of life and wellbeing of affected individuals. Safety is one of the most important factors for both current and future residents of a community, particularly those in an urban setting. Individuals living in urban areas tend to be more isolated from their neighbors, leading to a lack of attachment to the larger community. This phenomenon can lead residents to feel less safe within their neighborhood. The concept of community consistently changes and can be broadly characterized as place-based - which includes where people reside, work, and socialize - or place-less, such as online communities. However, the community is defined, feelings of safety and members’ satisfaction with the community are consistently correlated.

Safety and health are strongly correlated. Multiple studies have identified the connection between long-term stress resulting from a sense of continuous fear for one’s safety and poorer psychological, behavior and physical health outcomes. The fear of crime also influences frequency of outdoor physical activities, including pedestrian and bicycle usage. According to Foster et al (2010), residents of communities that incorporate design features to increase walkability benefit from increased opportunities for physical activities and the potential reduction of lifestyle related illnesses as well as an increased feeling of safety at the individual and community-level.

Car crashes and the resulting injuries are also a threat to safety. The National Highway Traffic Safety Administration (NHTSA) (2012) defines, “...a crash to be speeding-related if the driver was charged with a speeding-related offense or if an officer indicated that racing, driving too fast for conditions, or exceeding the posted speed limit was a contributing factor in the crash.” Exceeding speed limits contributes significantly to automobile crashes and induces substantial economic costs to society. A 2013 study by Yannis, Louca, Vardaki, and Kanellaidis revealed that there are several factors that contribute to exceeding speed limits that are mainly related to driver attitude. Most drivers that exceed speed limits do so because they believe everyone else is as well. Other variables include driver characteristics such as age or gender, the driver enjoys driving fast, they are in a hurry, or they feel that speed limits should overall be higher. Studies have shown a correlation between collision speeds and pedestrian injury severity. They estimate that about 5 percent of pedestrians would die when struck by a vehicle traveling 20 mph, about 40 percent for vehicles traveling 30 mph, about 80 percent for vehicles traveling 40 mph, and nearly 100 percent for speeds over 50 mph. According to the National Safety Council (2016), 30% of fatal crashes are caused by speeding, and a high percentage occur on neighborhood streets where drivers exceed the speed limit. In 2012 in Washington State, at
least 30% of pedestrian deaths that occurred took place on roads with posted speed limits between 15-30 mph. Speed management approaches that include traffic engineering components are often called traffic calming. Traffic calming has been defined as “...the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users” 156. This may be due to engineering changes that produce visible alterations to the driving environment. Studies have shown that an increase in pedestrians and bicycle lanes will have a positive effect on driver awareness. However, extensive research has been shown that street designs that promote traffic calming have the most effect on drivers to maintain speed limits. These include: raised pedestrian crosswalks, rumble strips, angled parking, traffic circles, neckdown/bulbout/curb extensions, reduced corner radii, and in-pavement lighting at crosswalks.

Rates of crime and violence in a community also contribute to poorer physical and mental health outcomes of its residents. People who live in areas with higher crime are less likely to engage in recreational physical activity, which has negative implications for incidence of chronic disease, metabolic syndrome, and BMI. Living in areas with higher crime and violence rates has also been shown to increase psychological distress and other indicators of poor mental health.

Interestingly, perceptions of safety or vulnerability to crime in a community often has more influence over overall opinion regarding crime than actual rates and can prevent residents from interacting with their community in a healthy way. As with actual high crime rates, perceived high crime in an area has been associated with less physical activity, higher BMI, and poorer mental health. Additionally, it has been associated with less public transportation use and less social cohesiveness.

Several interventions have been found to prevent the health impacts of both actual and perceived crime, including installing street lighting, decreasing the number of vacant lots and vacated buildings, and eliminating graffiti. An approach to urban planning called Crime Prevention through Environmental Design (CPTED) is a growing movement towards the recognition of the importance of taking these elements into account before a development or revitalization project is started.

Although south Commercial Avenue is dominated by vehicular transport and business, the area to the west of the avenue is designated as a residential zone. Because of this, it is critical to integrate an evaluation of the impact this redesign will have on the perceived and actual safety of the area’s residents, as well as the larger Anacortes community.

The four domains of focus are: (1) disaster risk reduction and response, (2) pedestrian and bicycle safety, (3) traffic speed, and (4) crime & violence in the area. The South Commercial Avenue Corridor Plan will be utilized, as well as City of Anacortes documents to compare best practices in design for community safety to the current proposal.
Two important aspects of public safety are the reduction of risk and prompt responses by public safety entities such as police, fire, paramedics, and other first responders during an emergency or disaster event. The City of Anacortes supports these aspects of public safety as evidenced by the budget allocations outlined in the 2015-2020 Capital Facilities Plan. Budget allocations include: the construction of a new fire station, emergency management mitigation at fire stations, personal protective equipment for firefighters, and replacement of aging police and fire vehicles.

The Draft Anacortes 2016 Comprehensive Plan includes value statements on Environmental Sustainability, and the importance of preparing for natural disasters and climate change. The Natural Hazards section of the Corridor Plan identifies multiple policies that support hazard mitigation and partnership with County, State, and Federal agencies.

The Hazard Assessment documents concerns including: earthquakes, tsunamis, flooding, and geologic hazards (e.g. landslides, wildfires, windstorms). Man-made hazardous concerns include the proximity to two oil refineries which present the risk of explosion, hazardous materials incidents including oil spills, and the release of toxic chemicals. Several major rights-of-way are used to transport hazardous materials and traverse Anacortes, including rail, the SR 20 spur, and the Port of Anacortes Marine terminal facility.

The National Tsunami Hazard Mitigation Program's Center for Tsunami Inundation Mapping Efforts developed a tsunami inundation model for communities at the east end of the Strait of Juan de Fuca. The model uses an initiating event of a 9.1 Cascadia Subduction Zone earthquake off of the Pacific coast. In the simulation, the first tsunami wave would hit the area two hours after the quake. The maximum projected wave height expected to reach the Anacortes area is 6.5 feet. This model does not include potential tsunamis from landslides or nearby crustal faults. The 2016 Anacortes Comprehensive Plan predicts areas of inundation to include: Skyline Marina, Ship Harbor, Eastern Guemes Channel, Cap Sante Marina and March's Point. A National Oceanic and Atmospheric Administration Technical Memorandum corresponding with these maps predicts little to no inundation in downtown Anacortes. The city's map also adds a 20% buffer from the predicted boundary of a potential tsunami wave front. The map shows recommended travel routes to high ground for residents to evacuate. The Comprehensive Plan includes dispatching public safety resources to high ground to assess the number of evacuees and to determine shelter resources.

In the event of an offshore earthquake, the chain of notification includes initiation by the West Coast/Alaska Tsunami Warning Center in Palmer, Alaska to the Washington State Military Department to local communities that may be impacted. Once notified, the City of Anacortes will determine the level of risk and, if appropriate, will use the Community Alert Network to notify residents to seek higher ground. Notification procedures can also include the Emergency Broadcast System. Public safety resources, if not already committed, will be deployed to utilize their mobile vehicle loudspeakers to warn affected residents and visitors and direct them to higher ground.

Walking Tour Observation

- The current road configuration appears it could be reconfigured to allow unidirectional traffic and speed evacuation egress.
- There were no observed evacuation route postings, this may be because this is not an identified risk for this area.
- The hospital and proposed hospital overlay district is central to the proposed South Commercial Street Project, however the main hospital entrance was not seen on the walking tour.
Proposed Changes

Disaster risk reduction is not directly addressed in the South Commercial Avenue Corridor Plan. However, a series of design choices in the Corridor Plan may impact the activities following a disaster, including the evacuation of the citizens of Anacortes. One primary goal of the implementation of the Corridor Plan, is to lower overall traffic speeds. This is done through changes to the design of the road:

- Narrowing of lanes is one of the main design decisions in the Corridor Plan. By inputting wider sidewalks, bike infrastructure, vegetative buffers and medians, the lanes are narrowed with the goal of lowering speeds.
- Raised crosswalks are implemented in 31 crossings in an attempt to make crossings safer for pedestrian and bikes. See previous discussion in the Transportation Section (Chapter 1).
- Wide sidewalk aprons are installed in several places, in an attempt to further increase safety for pedestrians.

Health Impacts

As speeds are lowered through measures of physical infrastructure, it complicates and slows both the access for emergency response teams, that are trying to access a disaster zone, as well as facilitating the evacuation of the citizens. The narrowing of the lanes does not necessarily have a direct impact on emergency vehicles, but does make navigation more complex for the first responders. In the event that other vehicles are already on the road, it makes navigating out of the way, to allow for emergency vehicles to pass through, challenging and potentially dangerous. As speeds are lowered through road design, the evacuation might take place in a slower fashion. It has not been quantified if this will have an impact, but it is important to consider and to be aware of, especially as a city in a tsunami area. The raised crosswalks on side streets could be problematic in a disaster event, as laid out in the Transportation Section (Chapter 1).

The health impact to Anacortes residents in the event of a disaster or emergency event, where shelter or evacuation is required, are difficult to quantify and relate to the South Commercial Avenue Corridor Plan, as depicted in the causal pathway below, Figure PS.12.

Planners should consider both the positive day-to-day health impacts of the project on the population and the negative health impacts that could result from delayed emergency response and evacuation in the unlikely event of a disaster.
Existing Conditions

The current conditions along south Commercial Avenue do not encourage walking and cycling through the area rather than driving. With no designated bike lanes, speedy and noisy traffic and limited crosswalks, south Commercial Avenue is not attractive to active transportation. Cyclists currently share the road with motor vehicle traffic, including trucks and buses. While the City of Anacortes’ 2007 Bike Survey showed an increasing amount of residents depending on bicycles for everyday transportation, the negative perception of safety experienced by residents and tourists on south Commercial Avenue likely inhibits walking and biking on this roadway. Without safe, designated paths for separate modes of transit, residents in Anacortes may choose not to bike or walk to nearby destinations for their everyday tasks and for recreation. Instead, residents will opt out of healthier, environmentally friendly modes of transit such as biking and walking, and continue to depend on motor vehicles.

Proposed Changes

The proposed changes to south Commercial Avenue will likely significantly improve pedestrian and cyclist safety in the following ways: The largest increase in safety for active transit utilizers and vehicles is through the implementation of a complete street. Having designated lanes and increased separation for different modes of transit has proven to be an effective safety improvement.

A vertical vegetation buffer between the cycle lane and the vehicle traffic in the Corridor Pan will also likely increase bikers’ perception of safety. Where parking is retained along south Commercial Avenue, the proposed vegetation buffer will minimize conflict points for bikers with parking cars and car doors. The different materials used for pedestrian designated lanes (concrete) and cycle lanes (asphalt) will visually distinguish the lanes, limiting pedestrian-cyclist conflict. Increasing the number of painted crosswalks across south Commercial Avenue will minimize jaywalking across the busy street by reducing the distance pedestrians need to walk along the avenue to reach a designated crosswalk.

Walking Tour Observation

Pedestrian Safety:

• Narrow sidewalks
• Sidewalk obstruction (e.g., light and electrical poles)
• Non-ADA compliant
• High traffic speed, yielding high traffic noise
• Limited crossing points, forcing crossings in undesignated areas
• Lengthy crossing light waiting times when lights present, incentivizing crossings when undesignated
• Numerous large driveways, presenting numerous conflict points

Bike Safety:

• No designated bike lane (except for southern most block), forcing lane sharing and providing no safety buffer
• High vehicular traffic speed, yielding high traffic noise
• Parking along the length of the avenue, posing car and car door conflict points with cyclists

Reducing the vehicle traffic lanes from fifteen-foot to eleven-foot lanes will naturally reduce vehicle speed by using visual and psychological mechanisms that induce slowing. The raised crosswalks for both pedestrian and bike crossings on the lateral sides of south Commercial Avenue, in the Pedestrian Activation Zones may reduce turning speeds, forcing drivers to slow down and yield to bikers and pedestrians before turning, thus minimizing collisions. See previous discussion.
The Rectangular Rapid-Flash Beacons (RRFBs) implemented at bike and pedestrian crossings in dense, unsignalized intersections will promote bike and pedestrian crossing safety through boldly alerting vehicles to yield. The bulbouts at intersections, which narrow the intersections by removing the parking lane, will benefit cyclist and pedestrian safety in three ways: first, the curb extension demands a sharper turning radius, which then slows vehicular turning speeds; second, pedestrians and cyclists on these extensions are more visible to drivers; and third, curb extensions shorten road crossing distances, reducing length of potential conflict and making crossings feel more manageable for children and older adults.

Lastly, the bike lane transitions at 11th avenue, when exiting or entering the Historic Downtown area, will help facilitate the transition into the complete street. Transition points pose safety challenges for cyclists and automobiles if no clear transition signaling exists. The dashed green lines at 11th avenue signal bikers to enter their designated cycle lane.

**Health Impacts**

These proposed changes all positively affect pedestrian, cyclist and automobile safety through minimizing conflict points within and between all of these modes of transportation. Additionally, the proposed changes not only positively impact health through reducing collision potential, but also through creating a safer, more welcoming environment for individuals of all abilities to be active along south Commercial Avenue. As complete streets tend to draw in people and create community, an increasing amount of Anacortes residents and tourists will stroll or bike along the avenue for various purposes, which in turn will increase their physical activity and overall health.
Existing Conditions

Anacortes tourist activities increase during the summer, which results in an increase in traffic and pedestrians. The section of south Commercial Avenue that is part of the Anacortes Corridor Plan spans from 11th St to 34th St with four signalized intersections within 23 blocks: 12th, 17th, 22nd, and 32nd Streets, respectively. This strip of the corridor is a 35 mph speed zone. Because the signalized intersections are several blocks apart, drivers may have the tendency to increase speeds between lights. The South Commercial Avenue Corridor Plan will bring more pedestrians, cyclists, and vehicles to this avenue. With this in mind, maintaining speed limits and increasing driver awareness is crucial to the success of this project. The Anacortes’ Police Department 2015 Annual Report states the city had an increase of total collisions from 192 in 2011 to 260 in 2015 185. When fully staffed, the Anacortes Police Department includes 25 commissioned and 7 non-commissioned employees of Patrol, Detectives and Administration and serves approximately 16,000 citizens. With stretched resources, it would be impossible for the Anacortes police to enforce traffic speeds on a consistent basis 186.

Proposed Changes

The proposed changes will significantly impact the perceptions of speed among drivers along south Commercial Avenue. A major goal of the South Commercial Avenue Corridor Plan is to increase pedestrian and bicycle usage. This alone will provide mechanisms to ensure drivers are more aware of their surroundings. Secondly, narrowing the streets will induce slower overall speeds and the more frequent interruptions in flow, has the potential to deter drivers from speeding up from one traffic signal to another. Lastly, the increase in curb radii, when turning right, will force drivers to slow down at intersections.

Health Impacts

The proposed changes will have positive effects on pedestrians, bicyclists and motorists of Anacortes. These changes will decrease collision and injury rates between all modes of travel. Decreasing the actual speeds by just 5 mph along the Anacortes Corridor will reduce the number of crashes involving motor vehicles while simultaneously reducing overall severity of injuries and mortality rates if a collision were to occur. Vehicular collisions have high costs both monetarily and to one’s physical well-being. Crashes cause damages that may not be affordable to most and injuries that are not only costly but may place someone out of work temporarily or permanently. These are undue stressors that have their own impact on health and overall well-being.
Proposed Changes

The proposed street redesign will serve to enhance community perception of safety by creating more opportunities for pedestrians and bicyclists to traverse south Commercial Avenue, creating a greater sense of community and social cohesion. Improved crosswalks and sidewalks will facilitate better access to recreation, businesses, and services for residents and business owners along the corridor. This will likely increase the number of non-vehicle users of the corridor and subsequently more opportunities for community building. Although non-residents and tourists will continue to represent a substantial portion of the users of south Commercial Avenue, this redesign will provide Anacortes residents with more spaces to interact with each other and with their town. The decision to maintain the street lights will also provide more security for users of the corridor.

Health Impacts

These aspects of the Corridor Plan will ultimately improve physical and psychosocial health in both the short and long term. Although actual rates of violence and crime are low in the town, the presence of non-residents in the town on a routine basis can create perceptions of safety issues, particularly in areas such as south Commercial Avenue, which have historically not been claimed for pedestrians or bicyclists. Creating safe zones for residents to gather and traverse will encourage more physical activity and social interaction, ultimately benefiting both physical and mental health.

Existing Conditions

In 2014, Anacortes had a crime rate of 63.2/1,000 residents. This was about half of the rate of Seattle for the same year. The most frequent crimes reported involved larceny theft, destruction of property, and minor drug violations. According to the Anacortes Police Department's 2015 annual report, both violent crimes and misdemeanors have been trending downwards since 2011, arriving at their lowest recorded levels last year (2015). There is no published literature or reports on perceptions of safety among Anacortes residents. The Anacortes 2016 Comprehensive Plan provides a brief overview of recent crime statistics but does not highlight violence and crime as a priority concern for the town.

Anacortes experiences a substantial increase in vehicular and pedestrian traffic in the summer months due to the high season for ferry usage. There is no data available on how many non-Anacortes residents pass through the town during this period of time, but the town's Civil Engineer estimates that the daily population doubles. The literature highlights an important connection regarding the increased perception of danger in a community with an influx of "outsiders" drawn to retail or other local attractions. This is critical to consider when assessing the health impact of the South Commercial Avenue Corridor Plan.
Overall, the Corridor Plan for south Commercial Avenue will positively impact the public safety of both Anacortes residents and visitors. At its core, the Corridor Plan has prioritized the well-being of the community by including many pedestrian and bicycle friendly features, encouraging slower vehicle speeds, and providing more opportunities for social gathering and community building. As depicted in the Health Logic Model (Figure PS.13), it is believed that the Corridor Plan will have an overall positive effect on the health of the users of south Commercial Avenue and should be implemented in its entirety.

The following recommendations suggest additional features and concepts to integrate into the Corridor Plan to further enhance aspects of public safety. Some of these recommendations are out of the scope of the current Corridor Plan, however, it is believed they are important to note for future enhancement of this project.

**SUPPORT OF THE DESIGN**
- Support the proposed bike and pedestrian infrastructure.
- Support for the use of standard countdown timers in pedestrian crossings. Though it might slightly increase average vehicle delay, it will allow children and elderly more time to cross, ensuring a safer experience for pedestrians.
- Support the proposed traffic calming measures, especially lane width reduction, increased turning radii and plantings.
- Support the proposed bike and pedestrian infrastructure for its ability to increase the public perception of safety.

**MODIFICATIONS TO THE DESIGN**
- Support the proposed bike and pedestrian infrastructure.
- Consider the impact of the South Commercial Avenue Corridor Plan on Evacuation Routes and Plans.
- The South Commercial Avenue Corridor Plan needs to consider hospital access and the long-term plan for the hospital overlay district, particularly the need for increased access in the event of a catastrophic event affecting Anacortes, the surrounding area, and the San Juan Islands.
- Update city evacuation plan to include the changes made to south Commercial Avenue.
- Consider alternatives to raised crosswalks, and evaluate their impacts on disaster evacuation routes.
- Include signage that defines the city’s evacuation route with information on what to do in case of a disastrous event.
- Consider working with a research team to examine the resilience of the community and the potential impacts of a disaster, including options for rebuilding.
- Create responsive crossing signals to reduce the time pedestrians and cyclists must wait for their signal, reducing the likelihood of jaywalking and encouraging pedestrians to follow the crossing signals.
- Expand the installation of RRFBs beyond the Pedestrian Activation Zones and to the newly designated crosswalks.
- Elaborate on existing and proposed bicycle lanes, and way-finding signage connecting the Tommy Thompson Trail to south Commercial Avenue, at 22nd Street;
- Improve safety of crosswalks at R and Q Avenues for pedestrians and cyclists accessing the trail.
- Ensure street lights are maintained in new design, especially at Pedestrian Activation Zones.
- Gather data on public perceptions of safety from crime, focusing on residents along south Commercial Avenue as well as owners and patrons of businesses along the avenue.
- Incorporate CPTED principles when designing Pedestrian Activation Zones and bike lanes.
Economic Health Logic Model

Figure EC.14 Causal pathway leading from economic changes to health outcomes

- **Project Activity**
  - Increased sales and jobs
  - Facilitation of non-motorized transportation
  - Increased perception of pedestrian safety
  - Increased property value

- **Change in**
  - Financial security
  - Physical activity
  - Accessibility of material needs and basic services
  - Displacement of vulnerable communities

- **Change in**
  - Experience of chronic stress
  - Risk of chronic disease\(^1\) and other health outcomes\(^2\)
  - Ability to maintain healthy lifestyle behaviors
  - Risk of poor mental health outcomes\(^3\)

---

1) Hypertension, diabetes, heart disease
2) Weakened immune system, obesity, muscle pain, accidents, ulcers, cirrhosis
3) Depression, overall mood
ECONOMIC HEALTH

An individual’s income is a primary social determinant of an individual’s health, and is determined by the strength of the economy in which the individual is employed. The Corridor Plan proposes to develop street design options that strengthen the visual appearance of and support a vibrant economy along the corridor. The South Commercial Avenue Corridor Plan includes design options such as non-motorized access and pedestrian-friendly building frontages that will likely promote private investment in the corridor, thereby expanding businesses and employment opportunities, attracting residents, and drawing in more tourists.

This section will explore how this anticipated economic development will impact human health. The envisioned robust retail and commercial use along the south Commercial Avenue corridor will foster financial security for employees and business owners alike, allowing them to access goods and services. The Corridor Plan’s active transportation walking and bike lanes will increase connectivity across the city and allow employees to get physical exercise while commuting to work, thereby increasing their productivity at work and decreasing sick days. Additionally, through active transportation individuals may save money on automobile costs and healthcare. The modified on-street parking will encourage Pedestrian Activation Zones to flourish and may boost business revenue. The Corridor Plan is expected to increase walkability ratings, a metric that is associated with increased property value, which has the potential to both increase revenues for the city and also cause displacement. Overall, increased business revenue and property values will contribute to higher incomes and resources for many residents to pursue healthy lives. Please see figure EC.14 for the causal pathways to negative health outcomes as they relate to economics.

To better serve the residents, businesses, and visitors of Anacortes, city officials should remain committed to community engagement, especially as the South Commercial Avenue Corridor Plan proceeds through its various planning stages. Garnering public support, understanding the needs of the community and incorporating concepts of equitable economic development into future zoning and ordinance policies will allow businesses improved access to opportunities such as parklets (see glossary).

It is recommended that the city of Anacortes strengthen their background understanding of community needs in relation to the Corridor Plan, incorporate active transport infrastructure both on the street and in worksites, ensure equitable economic development, and facilitate zoning so that businesses can carry out design elements such as parklets.
**Existing Conditions**

South Commercial Avenue offers a wide range of professional service and convenience-oriented retail establishments, including a hospital, restaurants, and chain retailers. Although city officials have expressed interest in economic development and job growth, from June 2014 to June 2015 the city experienced a decline in available jobs by 0.19 percent. This is compared with an average job growth rate of 3.2 percent in Washington State and 6.3 percent in the United States during the same time period. However, there are opportunities for improved economic conditions considering the growing number of visitors in the area, prospect for downtown redevelopment, and the ample supply of eating and drinking places and niche retail shops.

**Health Impacts**

It is anticipated that the south Commercial Avenue corridor will provide the infrastructure and conditions to attract locals and visitors to businesses in Anacortes. As the area becomes safer and more accessible for pedestrians and bicyclists, it will become a more pleasant, lively place to linger, eventually resulting in an increased demand for recreational and leisure goods and services. As a result, business leaders and those employed will have a greater likelihood to access goods, services, and psychological factors that promote good health. Financial security normally decreases susceptibility to untreated chronic stress, which is known to contribute to heart disease, high blood pressure, depression, muscle pain, obesity, and a host of other morbidities. Specifically, the ability to access financial security has positive implications on the experience of several morbidities including hypertension, heart disease, mental health disorders, injuries, ulcers, and cirrhosis. By providing an infrastructure for active transportation, Anacortes may attract new residents, draw in more tourists, and incentivize locals to remain in the city.

In doing so, businesses should have a greater likelihood of having a strong clientele base and be in a position to offer employment opportunities.

A statewide study by the Vermont Agency of Transportation measured the impact of bicycle-pedestrian infrastructure in the state on net new spending in terms of sales, labor earnings, and employment. It found that every one million dollars of infrastructure spending generated nearly 32 jobs. These largely came from construction trades, program/planning support, and professional/technical services (e.g., engineering and architecture firms). The study also found that this infrastructure attracted over 16,000 visitors within a year of project completion, and that these visitors spent over $6 million in the state. Another smaller scale project in the historic downtown business corridor of Salt Lake City converted parking spaces into nine blocks of protected bike lanes and added planters, crosswalks, public art, and colored pavement. Retail sales increased along the redesign by 8.8 percent and throughout the city as a whole by 7 percent within a two-year period. An extensive survey of 90 percent of businesses along the corridor found that 59 percent of business owners reported being very supportive or supportive of the changes; 23 percent were neutral. A national study analyzed 58 pedestrian and bicycle infrastructure projects in 11 cities in terms of average full-time employment impacts. It found that for every $1 million dollars in spending, the average project created 4.7 direct jobs, 2.1 indirect jobs, and 2.1 induced jobs through the design, construction, and materials procurement. It also found that bike and pedestrian infrastructure construction projects create significantly more jobs than vehicle infrastructure construction, and that once construction is complete bike and pedestrian infrastructure increases economic activity and raises property values. It is anticipated Anacortes will experience similar economic benefits to those outlined above by pursuing the South Commercial Avenue Corridor Plan.
WORKPLACE HEALTH & ECONOMIC GAIN

The Anacortes Comprehensive Plan 2016 envisions healthy retail and commercial use along the south Commercial Avenue corridor, which will likely bring in more businesses and increase the demand for employees. Employees must have a way of commuting to and from work. In addition to commuting trips they also need to make utility trips to get lunch or run errands. The current infrastructure along south Commercial Avenue doesn’t encourage or allow safe bicycle and pedestrian use for employees to travel to and around work. The multi-modal South Commercial Avenue Corridor Plan will serve to enhance the appearance and economy along the corridor and also support active, non-motorized, transport to and from work, meeting another goal of the Corridor Plan.

Existing Conditions

According to the 2010-2014 American Community Survey, 77.2 percent of workers 16 and over in Anacortes drove to work alone, nearly five percent higher than Washington State’s average. These unfavorable conditions hinder opportunities for employees to actively commute to work and increase the economic vitality of their company, as well as pose a barrier for residents and employees to fulfill their daily exercise requirements.

Health Impact

Active transport entails physical activity undertaken as a method of transportation and includes walking, cycling, and often public transportation, as it involves walking on either end of the trip. In areas with appropriate infrastructure, such as in the South Commercial Avenue Corridor Plan, active transport is commonly used as a means of commuting to work. The south Commercial Avenue plan will greatly improve the cycling and walking conditions along the corridor and encourage locals to partake in active transport to and around work.

The benefits of active transport do not stop at immediate improvement of health, they provide economic benefits for both employees and employers. If local employees are able to actively commute to work and thereby increase their daily physical activity, it will result in improved productivity, fewer sick days, lower healthcare costs (see Economic Savings for Residents) and monetary savings for both the employers and employees. When an employee misses work, employers are often forced to pay more for replacement workers or pay overtime to existing employees. Healthy employees are less likely to call in sick, while overweight and obese men miss 56 percent more workdays due to illness than normal-weight men. Similarly, overweight and obese women miss between

Figure EC.15 Retail Sales Health Logic
14-41% more workdays due to illness than their normal-weight counterparts\textsuperscript{202}.

Worksite promotion of active transport is an opportunity for businesses to encourage the adoption of and maintenance of healthy lifestyle behaviors and promote a sense of community and cohesion among their employees\textsuperscript{203}. Employees often view workplace health programs as an investment made by their company for their well-being and a reflection of how much the company cares about its employees, which may improve employee job satisfaction and morale\textsuperscript{204}. Companies that support employee health have a higher percent of workers at work each day\textsuperscript{205}. Further, Shepherd (1992) found that companies with a fitness program revealed no increases in medical costs, while companies without one had a 35 percent increase\textsuperscript{206}. A 14-year long study found that the employees of the fittest health had one-eighth the number of injuries as unfit employees (who also brought about twice the cost in injuries)\textsuperscript{207}.

Ensuring the health and wellbeing of local employees through employer-sponsored promotion of active transport will help ensure the success of new businesses the South Commercial Avenue Corridor Plan hopes to attract. Employee wellness programs incentivizing and encouraging active transport are prevention-focused and beneficial to all through reduced employee absenteeism and overtime, increased productivity, and reduced medical expenses and disability costs\textsuperscript{208}. There are many common barriers to active transport that employers can address to encourage active transport, including safety concerns and fear of looking unprofessional in the workplace. With the help of the city, Anacortes businesses can successfully encourage non-motorized means of commuting to work and capitalize these economic co-benefits\textsuperscript{209}.

Figure EC.16 Workplace Health Logic
RESIDENT SAVINGS

Existing Conditions

As previously noted, the majority of Anacortes residents drive to work. The US Department of Transportation estimates that in 2014, the average yearly cost to own and maintain a car was $8,698, whereas it cost only $308 to own and maintain a bicycle. Anacortes residents may want to take advantage of this transportation cost savings given that in 2014, an estimated 10.1 percent of the Anacortes population was living in poverty, and the per capita income was $33,107. Between 2000 and 2010, the number of bicycle commuters grew 40 percent in the United States. In a national poll, more than 80 percent of Americans stated they support increasing funding for biking and walking infrastructure. Building the bike path could allow individuals the option to bike to work, thereby providing them the option for considerable cost savings on transportation.

Not only does the Corridor Plan’s active transport infrastructure provide direct cost savings for residents, but it will also facilitate increased physical activity, which could have indirect health care cost savings. Increasing physical activity levels can improve health status, decrease risk for chronic disease, and decrease overall healthcare costs for individuals. Given that the median age of residents in Anacortes is 40 years, structuring the built environment to promote a healthy lifestyle is paramount.

Health Impacts

The CDC’s report on Health in the United States highlighted that people who earn more income have lower rates of several chronic diseases, including obesity, compared to people with lower incomes. They have a higher sense of control over their health and more social support, and are more likely to engage in healthy behaviors and avoid unhealthy ones. The South Commercial Avenue Corridor Plan will allow some individuals the option to choose biking over driving, potentially resulting in considerable cost savings for individuals. These savings could be spent on a healthy lifestyle, such as fresh food or a shared experience with the family. It should however, be noted that there is no way to determine how many residents could or could not bike, even with a newly rebuilt, complete street, as such is proposed in the South Commercial Corridor Plan. The potential savings to individuals would only be realized by those individuals who have the physical and mental capacity for using the corridor for active transportation.

Investing in a bikeway can create more than just fuel and car cost savings, it can create considerable savings in healthcare costs. In one study, thirty minutes of daily cycling was credited with $544 individual health care savings annually, by decreasing treatment of coronary heart disease, hypertension, type II diabetes, colon cancer, depression, anxiety, and osteoporotic hip fractures. Increasing cycling can simultaneously improve a person’s health and decrease their healthcare costs, which could be invested back into their healthy lifestyle.
Existing Conditions

There are 233 on-street parking stalls along the corridor. According to the Anacortes South Commercial Avenue Corridor Plan, total average off-season utilization of the corridor is around 35 percent. Highest-use blocks in the corridor have a 65-80 percent usage. Moreover, less than 30 percent of parking is utilized during the highest observed utilization period (3pm) in Pedestrian Activation Zones identified by Corridor Plan.

One of the problems along the corridor is that there are too many parking spaces and many of them are underutilized. Research in Phoenix showed that on-street parking reduces the need for off-street parking. Thus, in this case, reduced on-street parking in Pedestrian Activation Zones can increase the demand for off-street parking in nearby parking lots.

Proposed Conditions

The South Commercial Avenue Corridor Plan created three design alternatives for the city to consider but gives preference to Alternative B. Alternative A is an avenue scenario which incorporates vehicle protected bike lanes in the corridor segment and a planted buffer between vehicles and the bike lane in the Pedestrian Activation Zones. Alternative B proposed a planted buffer between vehicles and bike lanes. The sidewalks in alternative B are narrower than those in alternative A. Alternative C suggested a two-way cycle track on one-side of the street. Overall, these strategies maintain on-street parking but offer preservation or consolidation of existing parking along the Pedestrian Activation Zones.

Health Impacts

Both bike lanes and on-street parking can help adjacent businesses thrive and encourage pedestrian activity. Firstly, on-street parking acts as a shield of several thousand pounds of metal between pedestrians and the moving traffic which means people will feel safer along sidewalks with on-street parking. Secondly, on-street parking may encourage people to walk farther distances along the street than they otherwise would by walking from a parking lot. On the other hand, parklets and bike lanes can also serve as protective barriers for pedestrians and increase pedestrian perception of safety. Bike lanes and safer sidewalks with more walking pedestrians may increase the sales along the south Commercial Avenue.

It is possible that many business owners will worry about their sales if the on-street parking is replaced by bike lanes. However, a case in Salt Lake City showed that a certain amount of reduction in street parallel parking did not harm the neighborhood businesses since bike lanes had a positive impact on retail sales. On 300 South, also known as Broadway Street, Salt Lake City shifted parallel parking away from the curb on three blocks and converted six blocks of diagonal parking to parallel parking to create nine blocks of protected bike lanes on its historic downtown business corridor. As mentioned above, the City did a study on the impact of this project using sales tax data and found that the sales along the project rose 8.8 percent. Along the project, the sales rose 25 percent quicker than city wide.

Figure EC.18 Anacortes Parking Data (Alta Planning + Design, 2016)
Existing Conditions

The supply of new properties in Anacortes is low. At the end of April 2016, there were only 100 housing units for sale in the market, which also reflected the 2015 market. Moreover, the vacancy rate of apartments for rent in the area is lower than in Washington at large; in April 2016 the vacancy rate was 0.63 percent in Anacortes and 2.5 percent in Washington state. Additionally, most housing units in Anacortes are quite old, with a median real estate age of 29 years.

While the supply of new properties is low, the demand for housing is high, and median household income is $59,857—higher than other nearby cities and much higher than last year. Household income is a significant factor in raising the demand for housing. Windermere Real Estate (2016) reports that in April 2016, the absorption rate (see glossary) in Skagit County was 51.2, an increase of 36.8 YOY (year over year). People in the area also pay relatively high rent. According to the statistics taken from Zillow (2016), the average rental rate of an apartment in Anacortes is $1,590, compared with $1,425 in Oak Harbor and $1,472 in Mount Vernon. The apartment market in Anacortes shows an upward trend: the rent increased 47 percent from the last year YOY. Figure EC.19 demonstrates absorption rates in Skagit County.

It is quite difficult for low and medium income people as well as people from other areas to buy a new house in Anacortes because the listing price has been continuously increasing. According to Trulia (2016), the median listing price in the area is $387,000 which is an increase of $100,000 (35 percent) in median home sales over the past year. Using 100 as the average cost index in the US, Anacortes cost of living rates 124.20 and Housing rates 164.00, so clearly it is more expensive to live in Anacortes than the average place in the US. Despite high costs of living, the homeowner rate is high at 72 percent. However, low and medium income people experience a housing cost burden.

Health Impacts

Redeveloping south Commercial Avenue could raise property values, thereby increasing overall economic revenue for individuals and the city, which as previously mentioned, can have positive health benefits. However, the city will need to be careful when encouraging this process, as gentrification can displace vulnerable populations and exacerbate existing health disparities.

When measured by quantifiable metrics, including sidewalk width and continuity, slope, perceived safety, and aesthetics, walkability produces higher property values, reflecting a shift in the marketplace that has not been fully appreciated by appraisers. On a 100-point scale, a 10-point increase in walkability scores increases property values by 1 to 9 percent. When the demand for the properties increases, so will the price of rent. This is a financial benefit for the city and homeowners but also has the negative consequence of gentrification, or displacing long-time low to middle-income earning residents and businesses. This.
is particularly problematic considering that, according to City-Data (2000-2013), the percentage of residents below the poverty level was as high as 23 percent in one major area of the corridor project (from M Avenue to R Avenue between 32nd and 22nd) \(^{221}\). According to the CDC, studies indicate that gentrification contributes to health disparities among vulnerable populations, including the poor, women, children, the elderly, and members of racial/ethnic minority groups \(^{222}\).

These communities may face undue hardship as a result of this project as they face barriers to achieving affordable housing, transportation choices, quality schools, healthy food choices, and social networks. This can result in changes to their experience of stress, injury, violence and crime, mental health, and social and environmental justice.

Image EC.12 Some retailers are designed for drive-thru and do not have seats to accommodate consumers.
Image EC.13 There are a few bike racks along the corridor
Image EC.14 Increased traffic lights and signage could improve pedestrian safety
RECOMMENDATIONS

To accommodate and promote active transportation with the new infrastructure, the city may consider the following strategies:

- Develop promotional materials to inform employers of the cost savings of accommodating a workforce that utilizes active transportation for both commuting and shorter utility trips such as lunch breaks.
- Coordinate events that can attract tourists and locals to the new corridor to increase awareness and utilization of the pedestrian-bicycle infrastructure.
- Incentivize businesses to provide benches and outdoor seating such as dining opportunities to promote a lively street front culture.
- Facilitate a process by which businesses can receive assistance with obtaining and installing bike parking and storage facilities. Bike lockers can be installed on off-street parking spaces when the lot is underutilized.

The city may want to consider encouraging new and existing employers to encourage active transportation by:

- Offering secure lockers for employees to store their cycling or walking gear.
- Designating a private area where employees can shower and change out of their commuting clothes and into professional attire.
- Incentivizing employees to take alternative forms of transportation. (Incentives could be monetary, including monthly raffles or drawings for bonuses or local gift cards and additional paid time off, or non-monetary, including recognition, merchandise, shift priority, etc.)

Lastly, to help assure that the project meets the needs and preferences of the community it is recommended that an independent research organization or a university-affiliated group be tasked with the following:

- Coordinate survey research to determine potential utilization and need for a bicycle-pedestrian corridor along south Commercial Avenue among the Anacortes community.

- Conduct focus groups and key informant interviews with those that can represent the elderly population (30 percent of population is 60+) to evaluate what this group needs to access the south Commercial Avenue corridor and maintain a healthy, active lifestyle.
- To prevent parking shortages, conduct further parking demand research to identify the parking requirements for future developments.

SUPPORT OF THE DESIGN

- Implement the proposed parklets, wider sidewalks, Pedestrian Activation Zones, and bike lanes.

MODIFICATIONS TO THE DESIGN

- Consider placing parklets adjacent to retail and outdoor dining establishments.
- Consider increasing the connectivity of the south Commercial Avenue bike lanes with other bike lanes and trails. Connect the south Commercial Avenue bike lane to the Tommy Thompson trail at 22nd Street.
- Consider adding signage and other wayfinding for pedestrians and cyclists that indicate the location of this trail as well as other main attractions.
- To support equitable development to preserve the health of residents, consider:
  - Developing incentives that promote new local hiring and living wages.
  - Utilizing strategies that allow existing residents to stay within the neighborhood market such as providing affordable housing or rent control when feasible.
  - Possible encouragement of the expansion of existing agriculture vendors near Island Hospital, to foster financial gains for a variety of businesses and to increase access to nutrient-rich foods.
Community Health Logic Model

Contextual Factors:
- Transportation infrastructure
- Green space
  - Noise
  - Air quality

Intervention:
Reinvigorate the South Commercial Avenue Corridor

Mechanisms:
- Stress
- Health related behavior
  - Social interaction
    (i.e. social capital, social connectivity, community cohesion, community engagement, community empowerment)

Health Outcomes:
- Improved mental health
- Improved physical health
- Improved health equity
- Improved quality of life
COMMUNITY COHESION & SOCIAL CAPITAL

The South Commercial Avenue Corridor Plan provides a robust opportunity for the City of Anacortes to improve connectivity among residents and promote the growth of an already vibrant region. In order for these efforts to best promote the growth and fostering of social ties, the City of Anacortes must consider how they can support community cohesion and social capital. Social capital refers to the relationships established between community members. Community cohesion is a function of social capital and describes to the extent to which members in a society feel a sense of belonging and connection with one another. Community cohesion is intimately linked to community design with both the built and natural environments. Included in this design are neighborhood characteristics such as transportation connectivity and accessibility, access to green space (i.e., trees, plants and other vegetation), as well as noise and environmental pollution. These factors intersect and contribute to mental and physical health outcomes related to community cohesion. One method of addressing this is by promoting overall stronger relations between groups of people with each other and with the planning processes of improving the south Commercial Avenue corridor. For example, building on Anacortes’ unique location near two Native American tribes can promote equity and inclusion by incorporating tribal feedback in planning this project. Although not extensively addressed in the 2016 Anacortes Comprehensive Plan, connections to health and neighborhood design make community cohesion a compelling and important theme to consider when exploring revitalization efforts. Please view Figure CC.20 for a causal pathway to health outcomes.

The south Commercial Avenue corridor provides some opportunities for community cohesion via retail establishments, restaurants, and a vibrant farmers’ market.

Still, there is opportunity for growth and improvement by making these spaces accessible to all community members. For example, the infrastructure for active transportation could be enhanced by more intentionally considering the ways in which community members dynamically use this area, as well as the diverse people who access this space. Sidewalks along the 1.2-mile-long corridor offer minimal protection from rain and sun exposure, which can pose health risks and decrease pedestrian feelings of safety and comfort. South Commercial Avenue feeds into the existing Anacortes Downtown Commercial District—an area with much promise for bringing community members together via public amenities such as a farmers’ market, commercial shopping opportunities, and proximity to Ship Harbor, which offers an exquisite view of Rosario Strait. However, the aforementioned issues related to automobile-oriented design represent significant barriers for maximizing this area’s potential for fostering community cohesion.
**Existing Conditions**

The Anacortes area is unique in its diversity because it includes U.S. residents, as well as members of the surrounding Indian Nations: The Samish and the Swinomish. The Samish tribal headquarters are located within Anacortes, on south Commercial Avenue, and Swinomish are located in nearby La Conner, WA. Previous examples of collaborations between the City of Anacortes and these local tribes include the Tommy Thompson Trail with the Samish and the purchase, ownership, and joint use of SIMULCAST law enforcement radio equipment with the Swinomish (among multiple other examples). Currently, the number of Native Indian and Alaskan Natives in the area has grown from 0.9 percent to 1.2 percent of the area population from 2010 to 2014. This growth in population provides an opportunity for the City of Anacortes to collaborate with these local Indian Nations to create a more inclusive, culturally rich environment.

**Proposed Changes**

To foster and strengthen collaborative efforts between the City of Anacortes and the local Indian Nations, planners should consider involving the local Indian Nations in the development of the corridor. This may include involving local Indian Nations in planning new art pieces and garnering input on other aspects of the corridor project.

**Health Impacts**

This inclusion could help promote feelings of belonging, appreciation, and mutual respect between the Nations and other citizens of Anacortes. It could also have positive impacts more broadly within the community as well, such as promotion of social ties, feelings of inclusion, and supporting positive social interactions. Previous collaborations with these Indian Nations could be used as a jumping point for further work together. By incorporating the Samish and Swinomish Indian Nations into this project, it may further strengthen a sense of community between the two Indian Nations and the City of Anacortes, promoting better health outcomes and lessening of stress and other causes of poor health outcomes. Community endeavors have been shown to be effective in improving mental health within this marginalized population. Other studies have found it important for Native youth to also have community grounding to promote positive mental health outcomes. Moreover, another study found that modifications to the built environment (along with other factors) can decrease adverse health behaviors in the native community. Furthermore, introducing more diversity into the built environment of the City of Anacortes may lead to greater feeling of social support and social ties in all populations in Anacortes. Built environments have been shown to create strong social attachments, social ties and social support when found attractive to individuals.
Existing Conditions

Current conditions on south Commercial Avenue pose multiple barriers to able-bodied pedestrians. One barrier to walkability is the long stretches between signalized intersections and safe crosswalks. For example, there are no signalized intersections or safe crosswalks between 22nd Street and 32nd Street. Streets are uneven and at some sections the sidewalk is too narrow to accommodate groups traveling together. South Commercial Avenue is currently not conducive to pedestrians of all ages, lacking infrastructure such as play spaces for children and safe spaces to stop and rest for all residents. Finally, south Commercial Avenue contains no legible signage that benefits those who are not quickly passing by in an automobile.

The south Commercial Avenue corridor leads to a ferry terminal which provides service to the San Juan Islands, resulting in an influx of families that travel to Anacortes during the tourist season. The City of Anacortes should consider the safety of these pedestrians as well, as they will not have had the benefit of becoming substantially familiar or acclimated with south Commercial Avenue. The City of Anacortes should strive to make south Commercial Avenue a safer space for community members of all ages, including children and adolescents. There has also been recent population growth in the area, which may lead to a younger population influx in the coming years. There are also an elementary school, middle school, and high school within a mile of the avenue. The City of Anacortes should consider these factors when developing improvements for south Commercial Avenue.

Proposed Changes

The South Commercial Avenue Corridor Plan includes several recommendations that will improve mental health and wellbeing among pedestrians. This includes the reduction of speed limits to reduce noise pollution and adding more crosswalks along south Commercial Avenue. Although the South Commercial Avenue Corridor Plan mentions mental health in the health logic model, the City of Anacortes should consider how the built environment of south Commercial Avenue affects the mental health and wellness of community members more thoroughly. Incorporating more play spaces and safe spaces could be one method for the City of Anacortes to improve mental health. Legible signage could also be an important consideration along the corridor, as signage can make pedestrians feel safer and better informed.

Health Impacts

Considerations from the viewpoint of mental health include factors such as walkability, noise, legibility, play spaces, and safe spaces. These factors can affect aspects of mental health, such as depression, mental fatigue and stress, cognitive ability, and emotional security.

One of the most important mental health considerations for pedestrians on south Commercial Avenue is walkability. For older pedestrians, there is an association between neighborhood walkability and depressive symptoms, adjusting for individual factors. Researchers have also found that people living in more walkable neighborhoods have more opportunities for health-promoting social interaction. A suggestion for making south Commercial Avenue more walkable is creating more crosswalks, especially for the long stretches between the signalized intersections to improve pedestrian safety.

Noise level is also a factor to consider for the mental health of pedestrians. Noise pollution can lead to noise-induced hearing loss, which has negative effects on mental health including interpersonal communication, increased stress, and reduced productivity. The South Commercial Avenue Corridor Plan specifically mentions that a reduction in vehicle speed to 25 miles per hour would decrease traffic noise and improve mental health. This is a feature of the
Safe gathering places are crucial to help pedestrians of all ages positively identify with a space. By creating child-friendly streets and incorporating play spaces within short walking distance of the main avenue, children and families can achieve health and social benefits through informal exercise and social interactions. Safe spaces often also include the incorporation of benches and rest areas along a pathway (e.g. roadway, trail), which may be important because of the high number of older people living in the City of Anacortes. These play and safe spaces could be easily incorporated in the Pedestrian Activation Zones or in nearby green spaces.
Existing Conditions

The City of Anacortes could potentially change several features of south Commercial Avenue to create a more accessible pedestrian environment for community members with disabilities. This includes several light poles that obstruct sidewalk usability, making it difficult at times for civilians using wheelchairs to navigate. South Commercial Avenue lacks pedestrian crosswalks in multiple key locations, and in the areas that do have crosswalks, many lack audible crosswalk sounds for community members with sight-related disabilities. Several street corners along south Commercial Avenue either do not have curb ramps, or lack adequate curb ramps that allow wheelchair-bound civilians to cross the street with greater ease. As well as this, there are multiple driveways along south Commercial Avenue that cut into the sidewalk and create unsafe slopes and uneven walkways.

Proposed Changes

The new design of south Commercial Avenue could foster an equitable environment where persons with physical disabilities can be mobile and independent. This equitable community design will allow persons with disabilities to engage with community members and participate socially. Ensuring usability for all people—including those with physical disabilities—should be a priority.

The City of Anacortes should consider ensuring that the new design of south Commercial Avenue will include at least six feet of sidewalk space on either side of light poles, which currently obstruct sidewalk space. The City of Anacortes should consider replacing all street corners with perpendicular curb ramps that make it easy to cross both south Commercial Avenue and side streets that connect with it. These sloped curb ramps assist both wheelchair-bound citizens as well as visually impaired citizens, as these sloped curb ramps provide a tactile message indicating that a shift from sidewalk to street is about to occur. These curb ramps should include raised, colorful tactile surfaces such as truncated domes as these also serve as a detectable warning for visually impaired citizens.

Similarly, the City of Anacortes should consider ensuring that sidewalks, bike lanes, and streets are different textures to provide these cues to disabled persons. The City of Anacortes should consider removing cross-slopes in driveways so that sudden, steep changes in slopes are less likely to injure wheelchair-bound persons. The City of Anacortes should consider requiring commercial properties along south Commercial Avenue to update their driveways to be ADA compliant. To make south Commercial Avenue more safe and accessible for disabled persons, the City of Anacortes should consider creating a plan to install traffic WALK sign lights and audible crossing signals over the next 10 years.
People with disabilities—whether they be cognitive impairments, mobility impairments, vision impairments, and/or hearing impairments—all face physical and/or social vulnerabilities when their surrounding environment is not accommodating. For example, unaccommodating built environments put people with disabilities at risk of social isolation, physical inactivity, and injury. Older adults with disabilities report a greater sense of independence when their neighborhood has safe sidewalks and access to transportation.
Existing Conditions

Currently, The Anacortes Housing Authority provides a variety of low-income housing programs. Anacortes Housing Authority owns and manages their own units, which include the Bayview Apartments (24 Project-based Section 8 units and 22 Tax Credit units), various public housing sites (62 units), the Harbor House (49 units for elderly/disabled) and The Wilson Hotel (25 Tax Credit units). The City has a variety of zones with low, medium, and high densities, as well as allowances for mixed uses. The City of Anacortes also has a planned unit development and cottage housing approval process. There is an undersupply of affordable rental units as well as a county-wide under-supply of total housing units. By 2036 about 40.4 percent or 6,000 units of the future housing stock will need to be available at affordable levels. That is above and beyond addressing the current needs of the 17,000 households that are cost-burdened.

Proposed Changes

In the Anacortes Comprehensive Plan there is a goal to provide a range of housing opportunities to address the needs of all economic segments of the community. Future housing developments may consider the benefits of mixed land use on south Commercial Avenue. According to Guide to Community Preventative Services rules and scientific evidence, there is sufficient evidence that physical activity can be increased via street-scale urban design and land use policies to support physical activity in small geographic areas, generally limited to a few blocks. Redesigned streets, improved lighting, and enhanced aesthetics are specific examples of helpful practices, as measured by an increase in the percentage of people engaging in active transport or other measures of physical activity.

As mentioned in the Comprehensive Plan:

- Policy H-4.2. Encourage the development of senior-friendly housing opportunities, particularly in areas near services and amenities.
- Policy H-4.4. Support ways for older adults and people with disabilities to remain in the community as their housing needs change by encouraging universal design or retrofitting homes for lifetime use.

Health Impacts

The importance of affordable housing to improved health outcomes is increasingly prominent in public health policy and research. With the improvement of south Commercial Avenue, it is important to consider improving housing for those living and working in the area. Being in close proximity to the port and water can improve and contribute to improved mental health outcomes, as the quality and characteristics of the settings we inhabit - the place in which we live, work, and play - influence our mental health.

Considering the health of the Anacortes community, it is important to consider active living for older adults, as active aging can benefit both individuals and the entire community. There is a limited demand for large family dwellings, as the median age population in Anacortes is 40 years of age and the average household size is two. Promoting active aging depends on a community's ability to provide safe and walkable streets, a range of transportation options, and land use patterns that permit easy access to services and amenities. The City of Anacortes should consider these factors as they develop south Commercial Avenue to be accommodating for all community members.
RECOMMENDATIONS

SUPPORT OF THE DESIGN

COMMUNITY COHESION

- Increase connectivity and opportunities for social bridging by linking bike lanes along south Commercial Avenue with other bike lanes and trails (e.g., via R Avenue and/or the Tommy Thompson Trail).
- Solicit Anacortes resident input by engaging diverse community members and offering multiple neighborhood forums (on various days and at different times).

PEDESTRIAN MENTAL HEALTH

- Reduce traffic noise.
- Support for an increased number of crosswalks along south Commercial Avenue.

COMMUNITY MEMBERS WITH DISABILITIES

Support for the replacement of street corners with perpendicular curb ramps that make it accessible to cross both south Commercial Avenue and side streets that connect with it.

MODIFICATIONS TO THE DESIGN

PRESERVING NATIVE CULTURE

- Work with Samish and Swinomish Indian Nations to implement at least one form of Native artwork on south Commercial Avenue, and at least 2 other new art pieces highlighting the diversity of the area by the time the Corridor Plan reaches completion.
- Solicit feedback from the Samish and Swinomish Indian Nations from the start of the Corridor Plan implementation to garner input on activities or fixtures that could be implemented to promote inclusion and diversity.

PEDESTRIAN MENTAL HEALTH

- Incorporate more signage along south Commercial Avenue to improve connectivity on the corridor and to areas around it.
- Incorporate play spaces for children and safe spaces for residents of all ages.

COMMUNITY MEMBERS WITH DISABILITIES

- Include at least six feet of sidewalk space on either side of light poles, which currently obstruct sidewalk space.
- Add different textures to different parts of the ground, including raised, colorful tactile surfaces for curb ramps and different textures for sidewalks, bike lanes, and streets.
- Improve driveways and ADA compliance by removing cross-slopes on both city-owned properties and commercial properties.
- Consider researching charging stations for wheelchairs along the corridor or at key greenspaces.

AFFORDABLE HOUSING

- Encourage the development of senior-friendly housing opportunities, particularly in areas near services and amenities.
- Support ways for older adults and people with disabilities to remain in the community as their housing needs change by encouraging universal design or retrofitting homes for lifetime use.
CONCLUSION

Conducting an HIA as part of any design and development process is an effort to pro-actively identify and address potential public health impacts prior to project implementation. The HIA’s overall goal is to examine and understand which positive and negative health consequences certain design decisions may have for a community and its citizens. The findings of this HIA highlight the current conditions in the area, including environmental quality, physical health, economic conditions, and the physical infrastructure. It seeks to thoroughly evaluate the South Commercial Avenue Corridor Plan based on the potential positive and negative impacts resulting from its implementation, while also providing recommendations for supporting positive and mitigating negative impacts of the plan.

The Health Impact Assessment conducted on the South Commercial Avenue Corridor Plan has found the plan to have significant potential to improve the health of the corridor and its users by providing protected bike lanes, curb bulbouts, wider sidewalks, increased vegetation, and overall better conditions for all types of users. All sections of this HIA reinforce this statement by highlighting how the design and implementation of these strategies will reduce traffic speeds, promote pedestrian and bicycle activity, support economic development, and improve environmental conditions for humans such as noise, air quality, and water quality. Research shows that these types of improvements are directly related to improved public health through increased physical activity, resulting in improved cardiovascular outcomes, improved mental and social wellbeing, and a decrease in the prevalence of obesity. This HIA also supports the construction of the proposed Quick Build Street for its ability to generate public input and support and to test usage assumptions prior to a final design decision. Many of the HIA recommendations support aspects of the existing design to emphasize the important health impacts of each feature. While it may be necessary to modify the plan in response to budgetary or other constraints, consideration should be given to the health impacts of each aspect of the plan before removing them from the scope.

This HIA identified some potential negative public health impacts that can potentially be mitigated via design changes, while other potential impacts require additional analysis and assessment prior to finalizing the design. Research has shown that raised crosswalks, which are proposed on most side streets, increase noise due to the jarring of the vehicle and the increased noise associated with the need to accelerate and decelerate, along with increasing pollution and material damage. With the other traffic calming strategies being proposed, the removal of the raised crosswalks will reduce noise and should not significantly impact the pedestrian experience.

As part of the noise and air pollution reduction strategy, the city should consider the effect the plan may have on freight traffic. If traffic speed is lowered and congestion increases, freight traffic may shift from South Commercial Avenue.
Avenue to R Avenue or Q Avenue. South Commercial Avenue carries a large amount of freight as it is a T3 Freight Economic Corridor, and if large amounts of freight shift to the surrounding residential streets the resulting noise and air pollution may have negative health impacts on the nearby residents. It is important to consider and accommodate freight and its movement within the City of Anacortes.

The proposed changes may also have impacts on the surrounding community through potential increased land values and resulting increases in rents. This may cause the cost of living to exceed current residents’ earnings, potentially requiring them to move. The city’s Comprehensive Plan states that there is a need to create more living wage jobs, signifying an effort to resolve part of the issue. It is a recommendation to the city to make affordable housing and work-force housing, both on and within walking distance of the corridor, a key element in the development of the corridor.

Like affordable housing, many of the design recommendations fall outside the scope of this project but are directly related to its success. Foremost of these is the handling of building setbacks. As a way to establish an order to the corridor, it is recommended to have building setbacks standardized and minimal in depth to maintain an intimacy and a sense of closeness between both sides of the street. A small five-foot setback with a pedestrian-oriented frontage zone would increase the sense of safety on the street and support increased physical activity. An additional way of improving people’s awareness of their surroundings is to establish a detailed and accessible wayfinding system that helps people navigate the different neighborhoods and natural areas of Anacortes and the region, while highlighting retail and recreational opportunities. As part of this, there is a need for an increased level of community engagement that goes beyond standard planning meetings to seek input from groups who are not represented at current meetings. This could be home visits, informal discussion groups or the option to contact the city through a variety of different channels. In many cases, the groups who are not being represented in these efforts are also the most vulnerable.

The HIA’s overall recommendations are designed to be used to inform the ongoing decision making for both the City of Anacortes and Alta Planning + Design, who are responsible for the execution of the plan. The implementation of the recommendations will likely result in a final design that improves health outcomes for the city. It is hoped that the findings and recommendations from this report will be used to inform decision making and design choices made going forward in the South Commercial Avenue Corridor Plan, to obtain the highest possible level of health in the community and of the City of Anacortes, for current and future residents as well as visitors.
Based on the individual group findings and in discussion with the class conducting the HIA as a whole, the key recommendations are as follows:

**Take action to lower the overall traffic speed through the corridor.**

**Action:** This HIA supports the inclusion of traffic calming design features into the south Commercial Avenue redesign. The existing design elements proposed within the South Commercial Avenue Corridor Plan including: narrowed lane widths, curb bulbouts, Rectangular Rapid Flashing Beacons (RRFB), medians, and vertical vegetation, will likely have a positive impact on speed reductions and overall pedestrian/bicyclist safety.

**Health Impacts:** 1) Reduced rate and severity of injury and mortality from crashes and vehicle-pedestrian/cyclist collisions. 2) Improved mental and social well-being derived from a perceived sense of security along the corridor. 3) Reduced morbidity and mortality from diseases associated with insufficient physical activity, such as: diabetes, cardiovascular disease, and obesity. 4) Reduction in traffic noise along south Commercial Avenue may improve comfortable ambient noise levels along the corridor, and reduce health impacts of overlapping, excessive environmental noise, such as: hearing loss, sleep disturbance, cardiovascular and psychological effects. The consideration for noise reduction may be low with the current surrounding street and residential densities, however, as rezoning and infill occur, and natural population growth continues, developing noise reducing strategies early may have long lasting positive impacts.

**Ongoing evaluation of stakeholder engagement at each phase in the design process.**

**Action:** 1) Identify all potentially impacted stakeholders including: local residents within a 5-mile radius of the corridor, Chamber of Commerce, businesses along the south Commercial Avenue affected by redesign, and vulnerable populations (elderly, disabled persons, and minorities). At each phase in the design, actively seek creative ways to engage stakeholders in the adaptation and implementation of the plan. 2) Consider options for obtaining input from long and short-term visitors as well. 3) Consider culturally appropriate public art that reflects the existing culture and histories of Anacortes and the region.

**Utilize Quick-Build Street to aid in further planning and visioning**

**Action:** Endorse recommendations for proposed Quick Build street along south Commercial Avenue. The utilization of a Quick Build street will help Anacortes align their vision with the community’s needs. People for Bikes has created a nine-step toolkit for implementation of a Quick Build street. Quick Build streets have no one specific set of components and vary widely based on the community needs. However, all quick-build streets have four main components which include: 1) Led by a city government or other public agency. 2) Installed roughly within a year of the start of planning. 3) Planned with the expectation that it may undergo change after installation. 4) Built using materials that allow such changes. If implemented, we encourage starting from the older north end of Commercial Avenue and if possible, implementing along the entire corridor for a more complete overview of how the corridor will change. If the entire corridor is not feasible, consider encompassing both a Pedestrian Activation Zone and regular stretch of roadway to evaluate potential unintended consequences of specific design features.

**Indirect Health Impacts:** Small tactical street changes are more financially feasible, and require minimal resource investment from the city of Anacortes. A quick-build street
(see glossary) that has been “tested” by locals, tourists, freight and non-vehicle users will have stronger support within the community. The unique opportunity to ‘try it before you buy it’ provides designers, users, and the city to evaluate key design components for their effectiveness and intended functional and health outcomes. Furthermore, should any early design elements, traffic revisions, or pedestrian and bike friendly design features prove incompatible with the Anacortes culture, changes can be made with minimal loss of investment. Additionally, a pilot-proven corridor may find attracting grants and construction funding easier. By reducing the financial risks associated with an intensive main street redesign, the city preserves funding to allocate to other public goods, community services, and public health measures. This indirect health effect is far reaching.

Support and suggest complementary elements to proposed bike infrastructure

Action: Support the existing proposed bicycle infrastructure within the South Commercial Avenue Corridor Plan. Capitalize on the expanded bike friendly roadway (along the corridor) to promote a link between the Tommy Thompson Trail to the corridor via 22nd Street. Additionally, consideration of clearly identified markers between the local bike store located on south Commercial Avenue and the trail via the nearest cross street would aid cyclists in wayfinding and improve connections between the Tommy Thompson Trail and south Commercial Avenue. 2) Consider a modular design allowing for the future installation of an intermittent protective barrier between bike lanes and pedestrian sidewalks, such as flexi-posts or Riley curbs. Barriers may not be necessary at current usage levels but may become necessary as usage increases in the future. See Figure C.19 for an example of these specific design elements.

Health Impacts: 1) Reduction in the rate and severity of vehicle-bicycle collisions and fatalities, by way of protected bike lanes, well designed mixing zones, and appropriate cues for motorists, pedestrians, and bicyclists. 2) Reduction in the rate and severity of injury from bike-pedestrian collision by way of clearly demarcated lanes for pedestrian and bicycle pathways. 3) Installation of flexi-posts between pedestrians and bicyclists could reduce the risk of bike-pedestrian collision, and improve pedestrian perceived sense of physical safety. This can prevent injuries and lead to a lower stress environment, increased utilization of the corridor for physical activity, and a reduction in diseases associated with poor exercise including diabetes, cardiovascular disease, and obesity. 4) A reduction in cyclist exposure to roadway and air pollutants via a designated bike lane with protected buffers may reduce morbidity and mortality associated with excessive air pollution such as: asthma, cardiovascular disease, chronic obstructive pulmonary disease, breast cancer, stroke, and lung cancer.

Develop effective destination wayfinding

Action: The use of signage for both pedestrians and motorist will help improve wayfinding and promote specific cultural, recreational, and retail destinations. Additionally,
appropriately located wayfinding signage within the proposed hospital overlay may reduce traffic confusion associated with the hospital and unnecessary traffic volumes along south Commercial Avenue, by directing hospital users to the appropriate entrances off of 24th and 26th Streets. Wayfinding, when designed correctly, has the potential to improve traffic flow, thereby reducing excessive vehicle emissions, confusion from tourists, and congestion during heavy seasonal traffic.

Health Impacts: 1) This traffic reduction, which is associated with improved air quality, could reduce morbidity and mortality associated with air pollution including asthma and chronic obstructive pulmonary disease. 2) Increased ease of destination finding provides for greater chance of tourist and local spending to remain within the community. Improved utilization of local tourist attractions, retailers, and accommodations provides revenue for the city and its business owners. Increased revenue is indirectly related to equitable access to health and public services for Anacortes residents most in need. Sustainability through secure revenue streams provides equitable access to services for the most vulnerable residents. This improves health outcomes including mental, cognitive, and physical well-being. 4) Individual income is positively associated with reductions in personal stress, mental health, cardiovascular health, diabetes, and access to healthcare resources; wayfinding to local establishments provides local business owners greater income earning potential.

Proposed hospital overlay district and corridor interactions
Action: Support the plan’s consideration of emergency response vehicles (ERVs) in roadway design. Evaluate how medians when combined with a lack of on-street parking in the Pedestrian Activation Zones may impact the ability of non-emergency road users to yield. Two of the three proposed Pedestrian Activation Zones incorporate green medians; recommend against medians within the section of south Commercial Avenue that interacts with the proposed hospital overlay. Recommend further design phases evaluate light source intensity, and lamp post frequency along the section of the corridor associated with the overlay. For example, hospitals produce around the clock pedestrian and vehicle travel, which may have lighting needs that differ elsewhere along the corridor. Consider the impact of the Pedestrian Activation Zones on off-street parking utilization; recommendation for further traffic studies on driving behaviors of the region. Consider the addition of a HAWK beacon running perpendicular at the intersection of 25th Street and south Commercial Avenue, to discourage unsafe pedestrian crossings at a ‘convenience point’ in the overlay (“Pedestrian Hybrid Beacons Explained”, 2013). Consider incorporation of a public transit stop on both sides of south Commercial Avenue at 25th Street, to reduce the impacts of a super block on the safe crossings of special populations.
**Health Impacts:** 1) The ability of non-emergency vehicles to yield is associated with reduced ERV-vehicle collisions, and is also associated with improved emergency response timing and delivery of critical patients. 2) Improved visibility of the roadway and pedestrian-bike infrastructure will account for the special population (e.g. elderly, disabled, injured or sick hospital visitors, emergency response vehicles, employees) roadway users within the proposed overlay. Age related vision changes, hearing changes, as well as pain and other illness-induced symptoms have been associated with collisions and dramatic increases in the severity and fatality of pedestrian-vehicle incidents. Seniors and children are at greatest risk for severe injury and death caused by a collision. 3) HAWK beacons are associated with reductions in mid-block fatalities and provide safer crossings on super blocks, in heavy pedestrian areas such as a hospital zone.

**Consider the implications of freight on the community**

**Action:** Recommend further investigation of the major thoroughfare and alternate freight routes. In this investigation, clearly define the corridors where freight is moving and evaluate the impact a complete street design may have on this main truck route. Consider the potential long term consequences to future land use and urban growth along Q and R Avenue, and whether there are economic and health implications associated with freight traffic diversion for residents and businesses located along the proposed alternative routes.

**Health Impacts:** Largely unknown, but could include loss of revenue to businesses along south Commercial Avenue (either via reduced traffic or via increases in delivery costs/times). Increase in morbidity and mortality for diseases such as cancer, asthma, cardiovascular disease, low-birth weight and lead poisoning for residents along the proposed alternative routes. Impacts to local flora, fauna, marine and wildlife are also largely unknown, but without proper drainage and environmental protection features, it could be significant.

**Public Transit, Buses, and Shuttles**

**Action:** Recommend further evaluation of public transit conditions and availability along south Commercial Avenue, especially Skagit Transit bus routes 409 and 410. As the South Commercial Avenue Corridor Plan progresses, consider explicitly stating locations and identifying structural design elements like bus stops and signage that will be incorporated into the street infrastructure. Consider the need for transit scale-up in the future as corridor density and overall city population increases. Explore options for collaboration between the city of Anacortes and the Washington State Department of Transportation to evaluate shuttle usage and unnecessary long-term parking on south Commercial Avenue from ferry users.

**Health Impacts:** 1) Early planning and adoption of transit-ready street design has the potential to improve long-term roadway efficiency and improve access to services and retail outlets along south Commercial Avenue. 2) Over time, as the city population continues to grow, strengthening local public transit may stabilize the growth rates of single-occupancy vehicles traveling through the main corridor. A reduction in single-occupancy vehicles is associated with reductions in air pollution from vehicle emissions and overall reductions in morbidity and mortality associated with environmental (air, noise, water) pollutants. 3) When considering bus stop locations along south Commercial Avenue, having an understanding of the unique needs of individuals of all ages and abilities is important. For example, inappropriately spaced bus stops could potentially deter seniors from utilizing the bus for transportation thereby reducing the effectiveness of the intended design, and its positive impact on health outcomes.

**American Disabilities Act Compliance**

**Action:** The South Commercial Avenue Corridor Plan includes design elements that accommodate accessibility for all users, such as widened sidewalks, reduced driveway angles, and pedestrian curb cuts installed into sidewalks.
using 90 degree angles. Recommend future design phases consider wheelchair accessibility that extends beyond widened sidewalks, and includes charging stations along the corridor for individuals confined to custom, electric wheel chairs. Similar to Anacortes in size and resident ages, Pendleton, Oregon (population size 16,612 roughly, 40% > age 45), has begun installing electric wheelchair charging stations in some of the city's greenspaces (Sierra, 2016). This can be done as a free standing station as shown in the Image C.20 and Image C.21, or could potentially be incorporated into electric vehicle charging stations. Recommend shifting the vehicle stop-line farther away from designated crosswalks and providing pedestrians a head start by using smart crosswalk signaling. Consider sidewalk widths that accommodate passing wheelchairs and/or electric wheelchairs. Incorporate access to drinking fountains along south Commercial Avenue, to complement active transportation, and all-age friendliness of the corridor.

Health Impact: Federal law requires that all persons, regardless of abilities, be provided equitable access to public spaces. Evaluating the current ADA standards and incorporating them into existing and future design phases will allow the city of Anacortes an opportunity to improve ADA compliance along the corridor. This provides safer and greater access to all street users including those with disabilities. This access may lead to more usage by individuals with impaired mobility or vision, which may improve an individual sense of connection, improved mental and psychological well-being, and modified forms of physical activity.

Other recommendations, outside of the plan's scope
In addition to the key recommendations outlined above, several external factors were identified that will influence the degree to which the plan will improve health outcomes. Specific proposed changes to land use, zoning, storm water management, and long-term visions outlined in the Anacortes 2016 Comprehensive Plan may prove to have a positive or negative synergism when combined with various design elements proposed by Alta Planning + Design. Some of the key external considerations for the City of Anacortes, Island Hospital, and the Washington State Department of Transportation include recommendations for:

1. A required setback of no more than 5-feet with a pedestrian-oriented frontage zone along south Commercial Avenue. If the city chooses to allow for larger setbacks, consider creating governing ordinances that prohibit the use of setback areas for parking or other non-pedestrian friendly activities.

2. In general, growth, infill, and densification of a town center is associated with positive economic and community health outcomes. This is especially true for the individuals who move into newly urbanized areas. This progress however, is often associated...
with gentrification of entire neighborhoods and communities. As the city of Anacortes expands, consideration for the impacts that mixed-use, new development, and overall neighborhood desirability may have on vulnerable populations (e.g. minorities, seniors, persons living below the Federal Poverty Line) is warranted. If the risk of gentrification is high, consider establishing governance policies that encourage mixed-use developers to offer on-site affordable housing with each new development. This will maintain community diversity and limit the negative health impacts of displacement and financial stress.

3. Long-term sustainability and buy-in will be required for the South Commercial Avenue Corridor Plan to reach fruition. Stakeholder buy-in not only throughout the design phases, but also once the corridor has been completed is essential to the successes and potential for positive health outcomes. A great road does not make the town, it is instead a key feature inviting locals and visitors to stop and stay awhile. To extract the greatest value from the completed corridor, the city should develop a communications and marketing campaign to attract tourism and corridor users. If this is already a strategy incorporated by the City, the recommendation is to evaluate the process and strategy to ensure that it aligns well with the visions for the corridor.

4. Consider working with local vacant land owners, excessive surface parking lots, and the hospital to coordinate potential privately owned spaces that could be further activated and vegetated to provide green space, connectivity and positive health benefits. For example, consider adding a greenway connecting the hospital to the main corridor, by way of 25th Street. Reductions in unnecessary parking or temporary conversions of unused land into semi-permanent green spaces can provide the city with additional destinations along the corridor that provide opportunities for physical activity and social mixing.

5. Consider adding public restroom facilities along south Commercial Avenue.

6. Consider the long-term impacts of allowing the hospital overlay to expand to the street frontage on south Commercial Avenue. If local businesses are impacted by hospital expansion the city may want to consider negotiating for an alternate overlay, and establishing developer agreements or incentives such as up-zoning that make special exceptions and considerations for existing businesses in the proposed overlay. Sharing resources about the health benefits of connectivity, accessibility, and green spaces on patient outcomes may strengthen the hospital’s support of the corridor design plan.

7. Ensure the city of Anacortes' emergency evacuation plan is updated to reflect any changes to the south Commercial Avenue corridor.
REPORTING, MONITORING, & EVALUATION

Reporting

This HIA report is the final reporting product of the HIA process and was made available to stakeholders in early June 2016. It aims to inform decision makers in the design process, and enables a more informed discussion of the health impacts of the plan. Among other reporting products, was a presentation to the stakeholders in early June 2016, made by all the authors of this report. It is recommended that the HIA will be publicly accessible to citizens and other interested parties, to ensure a transparent and inclusive process. Furthermore, it is recommended that public comments be accepted online and by mail or in person to allow for feedback and questions pertaining to the HIA report.

Monitoring & Evaluation

The monitoring of an HIA seeks to track and document decisions and initiatives that are made towards the facilitation of health. This section lists potential monitoring topics, drawn from the priority recommendations of this HIA, with the goal of documenting the impacts of key recommendations on public health in Anacortes. The process of monitoring collects evidence of changes in the aforementioned health determinants, which enables the responsible parties to evaluate consequences and impacts of decisions made along the corridor. The following is a list of suggested monitoring strategies for the city to assess the short and long term health outcomes of different interventions:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels of pollutant exposures in the corridor, including PM2.5</td>
<td>City of Anacortes and WSDOT</td>
<td>Annually</td>
<td>Measure PM levels in the field using existing equipment.</td>
</tr>
<tr>
<td>Increasing enforcement of truck route restrictions</td>
<td>City of Anacortes and WSDOT</td>
<td>Ongoing</td>
<td>Field Surveys</td>
</tr>
<tr>
<td>Number of living wage jobs held by residents in Anacortes</td>
<td>City of Anacortes</td>
<td>Annually</td>
<td>Evaluate Census and Commerce Data.</td>
</tr>
<tr>
<td>Pedestrian infrastructure assessment of the corridor, Alta Planning+Design</td>
<td>Prior to completion of plan</td>
<td>Conduct field surveys along the corridor and collect pedestrian counts</td>
<td></td>
</tr>
<tr>
<td>Bicycle infrastructure assessment of the corridor, including bike paths and crossings</td>
<td>Alta Planning+Design</td>
<td>Prior to completion of plan</td>
<td>Conduct field surveys along the corridor and collect bicycle counts</td>
</tr>
<tr>
<td>Community assessment, as described in the Community Chapter Alta Planning+Design and City of Anacortes</td>
<td>Prior to completion of plan</td>
<td>See Community Chapter</td>
<td></td>
</tr>
<tr>
<td>Displacement of heavy traffic to surrounding streets, following the construction and completion of the corridor City of Anacortes</td>
<td>Ongoing</td>
<td>Field Surveys and Counts</td>
<td></td>
</tr>
<tr>
<td>Changes in noise level and noise patterns, stemming from lower speeds and altered road design City of Anacortes and WSDOT</td>
<td>Prior to completion of plan</td>
<td>Establish a baseline noise level through modeling and field visits, and continue monitoring of measured noise</td>
<td></td>
</tr>
</tbody>
</table>
In addition to the monitoring of the health indicators and impacts, it is suggested that an evaluation of the effectiveness of incorporating an HIA in the process be made. This might inform similar communities and cities, the City of Anacortes and Alta Planning + Design of the benefits or the lack thereof of including such assessment in the process and its impact on the achievement of a successful outcome. The evaluation could include, but is not limited to how the process and decisions were informed by the HIA, any new capacity built or relations between stakeholders facilitated and, any future use of HIAs in similar projects and plans, or in other areas of business.

Study Limitations

This HIA included no primary data collection, though some secondary data was used to inform the report. It had a limited number of methods used, as the less than 10-week time-limit excluded possibilities for conducting surveys and interviews. Readily available data, such as literature and health datasets were utilized.

Next Steps

Having the HIA completed during this phase of the design process allows the city of Anacortes to hear an outside perspective on the design and how it may impact the community. This HIA outlines many ideas, ranging from broad to very specific, that have the potential to impact the final design of the South Commercial Avenue Corridor. With this resource the city has a document that defines many of the potential health benefits and risks that may result from the design, and this document can be used to begin collecting and monitoring data associated with public health indicators and environmental quality. Having the initial baseline data will help in quantitatively or qualitatively evaluating the impacts of the design.

The need for data collection provides a great opportunity for partnering with local schools or community groups to have this done by the people and for the people. In addition, there are many inexpensive do-it-yourself ways of building measuring tools using resources such as public lab (https://publiclab.org/), which stems out of the effort known as “citizen science”. Engaging the public and keeping them involved throughout the process can be significantly beneficial to everyone involved, and the relationship built can continue to grow and flourish long after the project is completed. As a first step in initiating a discussion around the project, it is recommended to publish and potentially present this document to the public. This will build upon the other public efforts in establishing complete transparency early in the process potentially resulting in stronger community inclusion and support.

As the plan evolves, so will the associated health impacts. New iterations of the plan should be continuously evaluated to ensure that the final version will produce the desired health outcomes.
REFERENCES


27. Saleeba C, Alta Planning + Design. South Commercial Avenue Corridor Plan; City of Anacortes, WA. Seattle, WA: Alta Planning + Design; 2016.


64. Anacortes GIS Department. City of Anacortes Bike-Ped Corridors. online: City of Anacortes; 2012.


100. City of Anacortes. CSO Post Construction Monitoring Plan Appendix E. Anacortes, WA: City of Anacortes;2015.


133. Richards D. Island Hospital Parking Map. online: Island Hospital; 2015.


172. Anacortes GIS. City of Anacortes Comprehensive Plan Zoning/Plats/Short Plats. online: City of Anacortes; 2013.


204. Proper K, Mechelen Wv, Department of Public and Occupational Health, EMGO Institute, VU University medical Centre, Body@Work. Effectiveness and economic impact of worksite interventions to promote physical activity and healthy diet: Background paper prepared for the WHO/WEF Joint Event on Preventing Noncommunicable Diseases in the Workplace. World Health Organization; 2007:1-63.


220. New York City Department of Transportation. Measuring the Street: New Metrics for 21st Century Streets. online: New York City Department of Transportation; 2015.


