Glendale Riverwalk Health Impact Assessment

Tri-County Health Department

Communities Putting Prevention to Work
Making healthy living easier.

Acknowledgements

This project could not have been completed without the tremendous help and dedication of the following parties. Thanks to all for their contributions, support, and generous use of time and resources throughout the process of this health impact assessment.

UCD Fall 2011 Planning Studio II: Gretchen Armijo (Professor; Built Environments Coordinator – Colorado Department of Public Health & Environment), Miguel Aguilar, Tim Cusick, Caitlin Hasenbalg, Kelly E. Matthew-Larsen, Rebecca Mossige, Chad Reischl, James "JR" Ronczy, Kim Varner

City of Glendale: Mayor Larry Harte, Mark Bullock (Director of Rugby/Recreation/Projects), Chuck Line (Deputy City Manager), Jerry Peters (City Manager), Bob Taylor (Director of Public Works)

Advisory Committee: Mary Logan (Glendale Planning Commission), Alyssa Knutson (Glendale Planning Commission), Rebecca Cales (Tribal Tech, LLC), James Shaffer (Streetscapes, Inc.), Doris Rigoni (First National Bank)

Tri-County Health Department CPPW Steering Committee: Anne Bennett – Director of Nutrition, Patty Boyd – CPPW Program Manager, Thomas Butts – Director of Environmental Health, Dr. Tista Ghosh – Medical Epidemiologist, Dr. Allison Hawkes – Planning & Evaluation Program Manager, Joann Holden – Nutrition Supervisor, Maura Proser – Chronic Disease & Injury Prevention Coordinator, Dr. Richard Vogt – Executive Director, Stacy Weinberg – Director of Epidemiology, Planning & Communication

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Volunteers: Amy Breunissen, Adam Perkins

Transportation Solutions & The Walkable & Livable Communities Institute

Glendale Whole Foods, Glendale Chamber of Commerce, Colorado Department of Public Health & Environment

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Executive Summary

Background

A growing body of research indicates that the built environment can have an enormous effect on human health in our communities. As a result, communities have begun performing Health Impact Assessments (HIA) to analyze the health impacts of new projects, proposed policies and the existing built environment. In conjunction with the planning and design of the Glendale Riverwalk Development, a 1.5 million square foot commercial and entertainment complex, the City of Glendale, Tri-County Health Department, and graduate students from the University of Colorado Denver School of Architecture and Planning have partnered to study the health impacts of the Riverwalk.

The primary objective of this HIA is to assess possible impacts on, and recommendations for, active transit in Glendale as it relates to the new Riverwalk. This report specifically addresses the three primary components of active transit: walkability, bikeability and public transit usage. It also touches upon three other focus areas that are significantly related to active transit use: automobile traffic, public safety and economic development. This HIA is funded by the Communities Putting Prevention to Work Initiative.

Methods

To ensure that the findings were evidence-based and community driven, several methods and tools were used to gather input and derive the final recommendations. Guidance throughout the process was provided by an Advisory Committee consisting of Glendale staff and officials, local residents, and bicycle and pedestrian advocates. Community input was received via the project website, setting up tables at community events such as the Metro Mile and Bike to Work Day, and a questionnaire on walking and biking in Glendale. Detailed and systematic observations of the current built environment were completed using the Active Neighborhood Checklist. To ensure the best possible chance of success, recommendations came from the literature and professional best practice guides.

Current Health Status

Experts in the field of public health have indicated that several populations are more prone to experience the negative health consequences of the built environment. These “at risk populations” include people of color, senior citizens, children (especially those in poverty), low income households, and people with disabilities. All of these populations can be found in the City of Glendale and are discussed in the report.

Specific data for the City of Glendale is difficult to obtain, but we do know the leading causes of death are heart disease (21%) and cancer (19%). Both of these can be affected by levels of physical activity that active transportation tries to address. In addition, while obesity rates are unavailable for Glendale specifically, the percent obese in Denver County is 20% and Arapahoe County is 18%. The percent overweight is 34% in Denver and 38% in Arapahoe County. These statistics demonstrate potentially significant risk levels for chronic diseases such as diabetes, high blood pressure, and high cholesterol. These chronic diseases can be mitigated and prevented through increased physical activity and active transportation.

The following is a summary of the key focus areas that were studied with accompanying recommendations. The complete HIA details, methods of data collection, individual findings, and specific recommendations will be available shortly in a detailed forthcoming report.

Active Transportation

Walking and bicycling are active and healthy alternatives to driving for many short trips. A primary benefit of more walking and biking is increased physical activity which leads to decreases in obesity and chronic disease. Due to its density, mixed use nature, and the close proximity of residences and offices to daily goods and services, Glendale has the potential to be very walkable and bikeable. Unfortunately, active transportation in Glendale is hampered by its large blocks, wide streets, lack of bike lanes, poor quality sidewalks, and numerous parking lots. While the Cherry Creek Trail is used intensively by cyclists, there is a lack of connections from the trail to the rest of the community.

The Riverwalk will attract thousands of workers and visitors every day. Given the pedestrian friendly nature of the proposed design and high numbers of jobs and destinations, the Riverwalk may draw many additional bicyclists and pedestrians to the site. If bicycle infrastructure is built in and around this dense pedestrian-oriented project, the number of bicycle commuters will only increase. The Riverwalk's location on the Cherry Creek Bike Path may bring increased congestion on the path and increase the number of bike-pedestrian conflicts reported along the trail.

Active Transportation (AT) Recommendations (not in priority order)

AT-1: Plan and implement a complete sidewalks network that improves the connectivity within the city. It is recommended that the sidewalk network resemble a grid-like pattern to further improve the community's overall connectivity.

AT-2: Install additional sidewalk access points to the walking path at Infinity Park, such as at the southeast corner of the park at Mississippi Ave and Cherry St.

AT-3: Create buffers between sidewalk and street ways.

AT-4: Revise city policy to allow on street parking on Glendale streets where appropriate.

AT-5: Promote safe roadway crossing through use of small block sizes, pedestrian refuge islands, and enhanced crosswalks.

AT-6: Provide pedestrian countdown signals to indicate how many seconds are left in the walk phase.

AT-7: Provide safe and convenient pedestrian connections to public and private amenities.

AT-8: Create a Birch Street bicycle and pedestrian corridor between the Riverwalk and Infinity Park.

AT-9: Work with the City of Denver to place bicycle lanes on S. Forrest and E. Exposition.

AT-10: Place bike lanes in both directions on Kentucky from Colorado Blvd. to Cherry Creek.

AT-11: Install bike lanes on other key, connecting streets, such as S. Ash St., S. Cherry St., E. Virginia Ave., and S. Birch St.

AT-12: Work with the City of Denver to make bicycle improvements to E. Mississippi Ave.

AT-13: Install bicycle sharrows on all feasible residential roadways, such as Dexter, Dahlia, and Tennessee.

AT-14: Encourage way-finding with signs, maps, and landscape cues to direct pedestrians to the most direct route. Provide signage indicating Glendale bicycle routes and local destinations at the Riverwalk, Infinity Park and at other bicycle route intersections.

AT-15: Provide streetscape amenities such as benches, landscaping, lighting, shade structures, and public art.

AT-16: Separate bicycle and pedestrian users along the Cherry Creek trail upon entering the Riverwalk.

AT-17: Ensure that design plans for open space at the Riverwalk include various programmed elements that encourage physical and social activities to replace those being lost at Creek Side Park.

AT-18: Incorporate retail establishments within close proximity of its residences.

AT-19: Encourage the development of street-level shopping and restaurants along pedestrian and bicycle routes.

AT-20: Provide secure bicycle parking and changing facilities at the Riverwalk and major employment centers.

AT-21: Encourage bicycle parking at shopping and entertainment destinations throughout Glendale.

AT-22: Provide B-Cycle stations at the Riverwalk and Infinity Park stadium to encourage ridership between the two destinations.

AT-23: Maintain or increase residential density throughout the city.

Automobile Traffic

High traffic volumes and unsafe streets, parking lots and alleys are the cause of numerous preventable automobile collisions which can result in injury or even death. Furthermore, without managed traffic systems walkability, bikeability and transit use suffers as too much traffic discourages active transportation. Currently the City of Glendale caters to motor vehicle usage by providing an abundance of surface parking lots and wide streets. The vast majority of people living and working in Glendale drive to work alone causing a great deal of traffic during the morning and evening commute hours. Traffic volume remains high even during non-rush hours due to the large number of restaurants, services and big-box retail establishments located in and around Glendale. Reported automobile accidents and collisions in Glendale are highly concentrated along Colorado Blvd, with smaller clusters at intersections throughout the city.

The construction of the Riverwalk will likely bring an additional 6,000 vehicle trips per day to the City of Glendale. This extra traffic will bring with it additional congestion and the potential for more collisions with pedestrians and cyclists. One benefit of the project will be the increased connectivity in Glendale brought about by the connection of Birch and Ash Streets via a bridge across the Cherry Creek.

Automobile Traffic (T) Recommendations (not in priority order)

T-1: Adopt and implement a “Complete Streets” policy.

T-2: Install roundabouts at key intersections linking Infinity Park to the Riverwalk and elsewhere throughout Glendale.

T-3: Institute traffic calming measures along Cherry, Virginia, Kentucky, Mississippi, and Cherry Creek Drive.

T-4: Increase on-street parking on streets with excess right-of-way, including (but not limited to) S. Ash St., S. Cherry St., E. Exposition Ave., E. Ohio Ave., E. Virginia alongside the Riverwalk.

T-5: Use bike lanes to narrow driving lane widths along S. Cherry St., S. Ash St., S. Birch St., E. Mississippi Ave., E. Exposition Ave., E. Kentucky Ave. and S. Forest St.

T-6: Implement traffic wayfinding system to create smooth traffic flow throughout the community.

T-7: Provide incentives to avoid driving while under the influence.

T-8: Connect E. Ohio Ave. to S. Cherry St. to improve automobile and pedestrian connectivity.

Public Transit

For those who cannot afford a car or cannot drive due to age or disability, public transit is a lifeline that gives them to the ability to reach their place of work, run errands, and access social, medical and or recreational opportunities. For those that can drive, choosing public transit has been noted to increase physical activity among users and reduce transportation costs. Glendale is relatively well served by public transit and 11% of Glendale residents use transit to commute to work. There are eight bus routes that serve Glendale and all residents are within a 1/4 mile walk of a bus stop. Much of this service is located along the northern and western edges of the city and therefore there are some deficiencies of service in the southeastern corner of the city that should be addressed. Recently Glendale constructed some signature bus stops, but many of the other stops are not nearly as comfortable, safe, or aesthetically pleasing.

Construction of the Riverwalk will greatly increase the number of people commuting into Glendale every day and will increase traffic congestion in the area. Glendale should think about any and all ways to promote transit ridership rates to and from Glendale in order to mitigate traffic congestion and create a healthier environment for its residents and workers.

Public Transit (PT) Recommendations (not in priority order)

PT-1: Prioritize infrastructure improvements near transit stops and public transportation stations.

PT-2: Provide signage/kiosks with bus related information (schedules, route maps, etc.) within the Riverwalk and near other key Glendale destinations such as Infinity Park and CitySet.

PT-3: Ensure that all bus stops adjacent to the Riverwalk are highly visible and provide adequate signage, shelter, lighting and seating for safety and comfort.

PT-4: Improve the safety and attractiveness of bus stops throughout Glendale with amenities such as covered shelters, benches, trash cans and improved lighting.

PT-5: Incentivize employers to subsidize employees who commute to work via mass transit, bicycle or foot.

PT-6: Work with RTD to extend the Route 1 bus south to Mississippi Avenue.

PT-7: Work with RTD to increase Bus service from the Riverwalk to Downtown Denver and the Denver Tech Center.

Personal Safety

Crime and perceived safety are important to the health of residents within a community. High crime rates often lead to greater fear and stress within a community and ultimately to restrictions in outdoor activities, including walking and cycling. Those who fear crime may therefore be less physically active, lead a lifestyle that increases the risk of poor health. While Glendale currently has a number of solid crime prevention programs in place, there are still concerns about public safety in Glendale, particularly after dark. Several concerned residents, most notably women, shared concerns about night-time safety along the Cherry Creek Trail. Poorly lit sidewalks, bus stops and parking lots and a general lack of night-time pedestrian visibility along the routes from the Riverwalk to Infinity are also public safety concerns that impact active transit.

The Riverwalk Project and its associated nightlife will certainly add to the number of people walking around Glendale in the evening hours, especially around Cherry Creek. While this increase in numbers of pedestrians may help improve visibility and perceived safety, steps should be taken to make sure that the Riverwalk and all additional new development in Glendale be designed to improve safety.

Personal Safety (PS) Recommendations (not in priority order)

PS-1: Promote crime prevention through environmental design (CPTED) within the Riverwalk area.

PS-2: Provide security call boxes within the public spaces and parking garages of the Riverwalk.

PS-3: Provide adequate way-finding signage to destinations and parking areas within the Glendale Riverwalk and important destinations outside the development.

PS-4: Ensure there is uniform and consistent lighting on pedestrian routes throughout the city.

PS-5: Promote eyes on the street in future developments around the Riverwalk.

PS-6: Encourage the elimination of litter, graffiti, and deteriorated property conditions (weeds, broken windows, etc.)

PS-7: Continue to support and promote community awareness programs and citizen alert systems.

Economic Benefits

Studies have increasingly shown a link between active transportation and economic development. Making existing shopping and entertainment districts more walkable has been shown to improve sales and increase revenue. Increasing the number of shopping and entertainment destinations in an area, encouraging mixed-use development, decreasing the number and size of surface parking lots, and bringing jobs closer to homes also help increase active transit usage. Glendale is a wonderfully dense, mixed use community. In addition to a large number of residences, there is great mix of employment, entertainment and retail destinations within the city.

This mix of uses can provide the basis for increased walking and biking if further development occurs to make the city friendlier to active transportation.

The addition of the Riverwalk will only improve this mix. It will provide more options for local employment and more destinations for residents to visit. The city hopes to create synergy between the new development, CitySet, and Infinity Park. The synergy between these dynamic centers has the potential to generate further economic development on sites in between the complexes. If the pathways between them are made increasingly friendly to active transit, it will only increase healthy outcomes and add to the economic success of Glendale.

Economic (E) Recommendations (not in priority order)

E-1: Assure access to daily goods and service needs within the Riverwalk.

E-2: Create a safe and aesthetically pleasant active transit link between the Riverwalk, Infinity Park and the Lowe's Hotel using the Birch St. Corridor.

E-3: Brand the Riverwalk and the City of Glendale as a place that is safe and easy for pedestrian and bicycle users.

E-4: Create a special recognition program for businesses and properties that encourage walking, bicycling, and transit usage.

Conclusion

In undertaking this HIA, Glendale has taken an important step toward improving public health for its residents and those working in the city. Implementing these recommendations will not only increase positive health outcomes in the community, but it will also increase the economic vitality of the city. Implementation of these measures should not be the end of this HIA, however. The city should continue to work with Tri-County Health to monitor the health impacts of whatever programs, policies and projects it undertakes. In this way the city can ensure that these public investments are making a positive difference and, if not, make necessary changes. We sincerely hope that this report ultimately makes Glendale a safer, happier and healthier community where people desire to work and live.

Introduction

The Glendale, CO HIA project is a partnership between the Tri-County Health Department (TCHD) and the City of Glendale and is funded by the Center for Disease Control and Prevention's Communities Putting Prevention to Work Initiative. Significant contributions were provided by the University of Colorado Denver Planning Studio II course.

The scope of the HIA is limited to the relationship of health impacts of the Glendale Riverwalk Development in regard to active transportation, and is limited to City of Glendale workers, residents and visitors. In general, we consider the relationship of changes to the built environment and changes in health in the community, and discuss relationships of the quality of the walking environment, the provision of places to ride bicycles, street separation, crosswalks, and the relation of buildings to the public realm.

Objectives

The objectives of the Glendale HIA are:

- Assess possible impacts on, and recommendations for, active transit in Glendale as it relates to the new Glendale Riverwalk.
- Create healthier options to access Glendale's Riverwalk.
- Increase physical activity among residents and workers.
- Utilize the location of the Riverwalk to make enhancements throughout the community.
- Develop a useful guide for future improvements.

Questions

Along with meeting the above objectives, this report aims to answer the following questions:

1. What are the impacts of adding a high-density (1 million SF) mixed-use office and entertainment district to the city of Glendale as it relates to walking, biking and transit usage, especially in terms of volume and congestion?
2. What health disparities within the community might be addressed by increased active transit?
3. What existing safety and connectivity issues exist today that will be further impacted by the additional traffic (active and vehicular) generated by the new development?
4. What improvements might be necessary to encourage local residents and employees to actively access the development rather than drive?

What is an HIA?

Health Impact Assessments (HIA) provide a systematic method for evaluating a policy, program, or project's potential effects on the health of a population, and the distribution of its effects within the population. Quantitative, qualitative and participatory data are used to help evaluate potential health effects of a proposed or sometimes completed project. An ideal HIA is prospective in nature, evaluating impacts prior to an intervention to enable decision-makers to incorporate health decisions on a project as it evolves. HIA's can provide recommendations to increase positive health outcomes and minimize adverse health outcomes. The HIA framework is used to bring potential public health impacts and considerations to the decision-making process

for plans, projects, and policies that fall outside of traditional public health arenas, such as transportation and land use. Social, environmental and economic factors can be considered by analyzing the policy or project from a broad perspective. The overriding objective of HIA is to provide recommendations that will increase positive health outcomes.[1]

The purpose of a Health Impact Assessment (HIA) is to:

- Consider the health benefits or costs of a proposed project, policy or program on residents and workers.
- Provide guidance to improve health of workers and residents affected by a project.
- Inform residents and decision makers regarding opportunities to improve the health outcomes of those affected by a project.

Recommendations made are based on scientific evidence. HIAs attempt to acknowledge that there is an opportunity cost for every choice made and that considerations should be made to increase positive health outcomes while also limiting negative health outcomes.

HIA Process

The HIA process generally consists of six steps: screening, scoping, assessment, reporting, recommendations and monitoring/evaluation. These steps are defined on the following pages and are put into the context of the Glendale HIA process.

Screening

The initial step in the HIA process is to determine whether the study is feasible and will add value to the decision-making process.

The Communities Putting Prevention to Work (CPPW) grant received by Tri-County required that two Health Impact Assessments be completed. One was carried out by the City of Thornton and the other (this one) was done in house by Tri-County.

The screening process determines whether or not an HIA is both necessary and feasible. It determines whether there is political will to complete such work, if there is sufficient time to study the proposed project or policy, and whether or not the health disparities in the area of study are large enough to warrant such a report. In this case, there was sufficient political support from the City of Glendale, a proposed development project, adequate time, and a significant presence of vulnerable populations. Therefore, the HIA was deemed appropriate.

The screening process also determines the explicit goals of the HIA and identifies important stakeholder groups, funding sources, local organizations and public agencies responsible for carrying out the work.

Scoping

The scoping stage creates a plan and timeline for conducting the HIA to prioritize issues, research questions, and participant roles. It identifies vulnerable populations and develops causal pathway diagrams, a work plan, and a timeline.

Due to the focus of the CPPW grant funding this project (healthy eating and active living), it was decided that the HIA would focus on active living (walking and biking) prior to any other decisions made regarding where or how the HIA was to be conducted.

TCHD looked at data, upcoming projects and political will across its jurisdiction to determine a proper candidate for this HIA. Through this process Glendale, with its new Riverwalk development, was identified as a good fit for an active transportation HIA. TCHD approached Glendale and the two parties drafted and signed a Letter of Agreement to work together on the project.

The scoping process was carried out primarily by TCHD staff, with assistance from the CPPW Steering Committee, and the HIA Advisory Committee.

Assessment

In the assessment phase, data is gathered and analyzed in order to identify how the built environment will affect the population's health. In this process a baseline condition for the community is established (including vulnerable populations and spatial inequalities within the neighborhood), health impacts are evaluated, and mitigation strategies or recommendations are devised. An HIA Advisory Committee made up of city staff and officials, local citizens, and bicycle and pedestrian advocates was formed to help guide the process and provide local context and input (see Acknowledgements for a list of Advisory Committee members).

Data collected for this report came from multiple local, state and national sources. These sources include:

- U.S Census 2000/2010
- 2009 American Community Survey
- Colorado Department of Health 2009 BRFSS Data
- CDOT Vehicle Counts; Bicycle and Pedestrian Counts on Cherry Creek Trail
- Glendale Police Department Crime Reports
- Glendale Police Department Collision Reports
- Glendale Police Department DUI Data
- City of Denver Planning Department
- Denver Regional Transportation District (RTD)
- Arapahoe County
- City of Glendale
- Denver Regional Council of Governments (DRCOG)

Additional data was collected on the ground via:

- The Active Neighborhood Checklist (developed by Saint Louis University School of Public Health, 2006)
- Pedestrian and Bicycle Counts (extrapolated to yearly figures using a calculator created by the National Bicycle & Pedestrian Documentation Project (NBPD))

Community input was collected via:

- Conversations (and mapping exercise) with residents and Glendale employees on Bike to Work Day on June 27, 2011, the Glendale Metro Mile event on July 18th, and at a Colorado Department of Public Health and Environment (CDPHE) event on October 18, 2011.

- A community questionnaire that was administered in person at the events and disseminated throughout the community via a paper and on-line version.
- A website (http://glendalehia.com) that was created to keep community members updated on the HIA and to allow them to submit comments anytime.

The process of creating mutual dialogue and information exchange between the project and the community is an essential part of an HIA. To do this the individuals or groups affected by the project need to be identified. Glendale's diverse resident and employee populations posed a challenge as far as reaching an appropriate representation of both groups. A survey was determined to be the best method to reach these different groups, because it was available both online and in paper form. Additional outreach was done to promote the survey at the Bike to Work Day and the Healthy Food Truck events. These events captured more of the employee than residential populations. In order to increase the residential responses to the survey we worked with the Glendale Sports Center and property and rental management companies to advertise the purpose and availability of the survey. In some cases, when permission was granted, flyers advertising the survey where left at the doors of several apartments.

Recommendations

The recommendations phase provides strategies to manage identified adverse health impacts and opportunities to promote healthy outcomes. The recommendations should be justified by evidence and also be concise and specific enough to be easily understood and undertaken by decision makers.

Reporting

The reporting process documents and communicates the findings found in the assessment phase. The report should also detail the earlier steps and discuss scientific evidence for the assessment and recommendations.

While this document is the primary means of fulfilling this phase of the HIA process for this project, other means of reporting include a presentation to HIA Advisory Committee in December 2011, as well as a final presentation to the Glendale City Council on March 6, 2012.

Monitoring & Evaluation

The monitoring and evaluation process is critical, as it helps determine if the recommendations generated in this report made a meaningful impact on the physical activity and health of Glendale residents and workers. This process should begin with an assessment of how many recommendations were adopted and what differences they made in the community. Care should be taken to replicate the methods used in this report to ensure consistency in the evaluation efforts. Other questions might look at why some recommendations were successful and others were not; or if all or only certain populations benefitted. [See the Evaluation Chapter for more detail on this process.]

Glendale Profile

Glendale Riverwalk

The Glendale Riverwalk is a planned 42-acre redevelopment, bounded by East Virginia Avenue to the North, Cherry Street to the east, Cherry Creek South Drive to the south, and Colorado Boulevard to the west. In 1996, the city designated this land as its future entertainment district. In 2010, the city adopted the zoning designation and design guidelines that would enable the project to move forward. In 2011, the city applied for funding under the Regional Tourism Act and issued Requests for Qualifications for the private development of the site.[2] The city envisions the Riverwalk as a world-class, multi-use, year-round corridor, attracting local, national, and international visitors, Glendale residents, conference attendees, and rugby fans. The Riverwalk will become a 1.5 million square foot mixed-use entertainment development that will run along a 1/2 mile stretch of the Cherry Creek Trail that runs through Glendale. As proposed, the development will contain nearly 22 acres of entertainment, retail, restaurant, hotel, concert space, a Rugby Hall of Fame, trolley system, 20 acres of open space and a navigable canal. The City of Glendale hopes that this development will become a year-round entertainment hub similar to the San Antonio River Walk. The city also hopes to make a direct connection from this development to Infinity Park, and use the project to enhance the branding of Glendale.[3]

It is estimated that at completion, the project will provide 3,400 permanent new jobs in Glendale at the Riverwalk project, with approximately 241 of those as net new jobs to the State. In addition, it is estimated that the project will draw visitor days reaching 868,000 annually after 9 years, representing an additional 2,400 visitors in the area daily.[4]

The design concept identifies improvements including widening, signalizing, detaching sidewalks, adding bicycle lanes, raising medians, and extending streets in order to improve pedestrian safety and traffic flow and add continuity to the area. Virginia Street will be widened and landscaped – serving as the gateway to the development. A new north-south connection will be established on Birch Street between Cherry Creek South Drive and Virginia Avenue with a highly visible iconic pedestrian and automobile bridge, allowing access into the District and a connection to Infinity Park. The Cherry Creek bike path will be re-routed to the south side of the creek, to accommodate pedestrians and cyclists. Several smaller pedestrian pathways will also be constructed over Cherry Creek. The intent of this public improvement project is to create a beautiful greenway in the heart of Denver that encourages a variety of active and passive uses. The Cherry Creek Corridor is a cherished and highly utilized public greenway, used by a variety of people for bicycling, jogging, rollerblading, and relaxation, and provides a major access point into the District. As currently planned, there will be no residential component in the project.

Currently the City of Glendale has all of the elements in place to move forward with the development. The city has selected Integral Real Estate Development as the project's Master Developer and has already spent roughly $13 million in infrastructure improvements needed to move the development forward. There has also been an ongoing public-private planning process to iron out the details of the proposed development. The City Planning Commission, the City Council and the property owners are all in support of the project.

The development is expected to break ground in 2012, and will take two years to complete.[5] Health impacts will be felt immediately in the community of Glendale due to potential changes in traffic volume and flow, increased access to jobs, services and entertainment and possible changes in crime and perceptions of safety. This HIA seeks to ensure that the construction of the Glendale Riverwalk Development and further civic investment enhances the health and well-being of Glendale residents and the people who work there.

Community Demographics

The City of Glendale was settled in 1859 and incorporated in 1952. Since that time the City's boundaries have remained largely the same. The city today is just over a half square mile (369 acres) and is home to nearly 4,200 residents. This makes Glendale the most densely populated city in Colorado. Although Glendale is surrounded on all sides by the City of Denver, it is part of Arapahoe County.[6] The city provides some services directly to its citizens, but due to its small size, contracts most services out to the City and County of Denver. The city consists of extensive commercial development, including low, mid, and high-rise office buildings and hotels, large-scale retail chains such as Target, Home Depot, King Soopers, and Whole Foods, and smaller-scale retail strip malls.[7] In addition, nearly all of Glendale's residents reside in multi-family developments, with only three single-family homes residing within the City's boundaries.[8]

Of note is that Glendale has a workday population of around 9,000, much higher than the residential population. As a result, thousands of people travel in and out of the city each day for employment. This employment base is an important economic driver for the city, and should be taken into consideration in the planning process.

Current Demographics

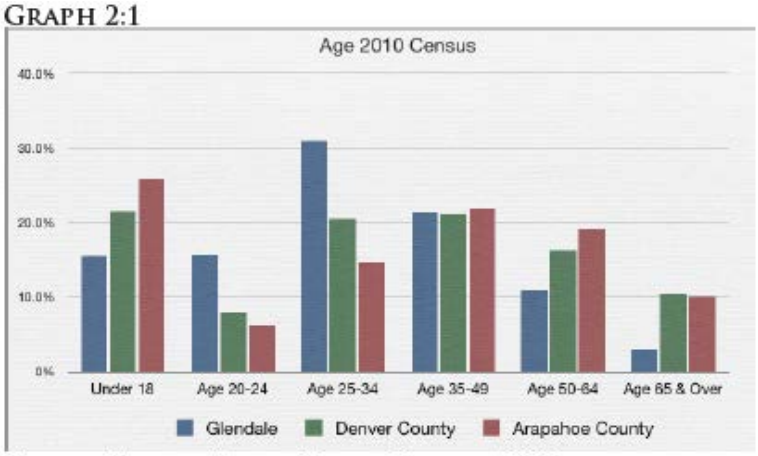
According to the 2010 U.S. Census, Glendale's population stood at 4,184; this has decreased slightly from an overall population of 4,547 in 2000. In 2010, there were 2,630 households within the city.[9] The following sections further define the population based on age, race/ethnicity, housing and economic characteristics. For this report, Glendale's population is compared with the populations of the City and County of Denver and Arapahoe County where Glendale is located.

According to the U.S. Census Bureau and the City of Glendale, the makeup of Glendale's 2,630 households is the following:

- 73% are single/non-families
- 17% are married couples living together
- 13% have children under the age of 18
- 58% are single-person households
- 2.5% are single-person households 65 years of age or older[10]

Age

GRAPH 2:1



SOURCE: UNITED STATES CENSUS BUREAU, 2010

As seen in Graph 2:1, Glendale has much higher percentages of individuals in the 20-24 and 25-35 age ranges than the surrounding communities. Glendale is an extremely young community with a median age of 28; Denver's median age is 6 years older at 34 and Arapahoe County is even older at 36. Even though the majority of adults in Glendale are in their child-rearing years, the number of children under the age of 18 is much lower than the adjacent communities. As expected with such a low median age, the number of senior citizens in Glendale is also very low at only 4.2% of the population.[11]

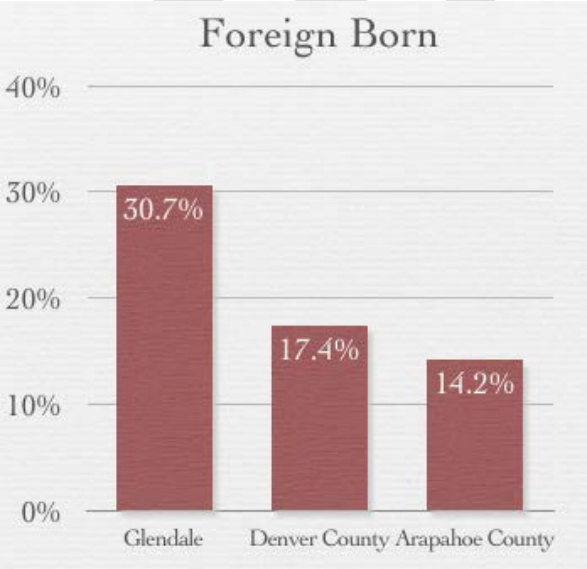
Race/Ethnicity

RACE/ETHNICITY COMPARISON

	GLENDALE	DENVER COUNTY	ARAPAHOE COUNTY
WHITE	51%	52%	63%
BLACK	7%	10%	10%
HISPANIC	32%	32%	18%
ASIAN	6%	3%	5%
OTHER	4%	3%	4%

SOURCE: UNITED STATES CENSUS BUREAU, 2010

Glendale is known for having a diverse population. Table 2:2 shows the breakdown of racial and ethnic groups in Glendale, Denver and Arapahoe counties. Much like the overall population of Colorado, Hispanics are the largest minority group represented in Glendale making up 32% of the population.[12]



A significant indicator of the diversity in Glendale is the high number of foreign-born residents living within the city. As indicated in Graph 2:3, nearly 31% of Glendale residents were not born in this country; this is almost twice the rate of Denver County and more than twice the rate of Arapahoe County. Nearly 45% of residents speak a language other than English in their home. According to the City of Glendale, there are at least 16 different languages spoken fluently within the city limits.[13]

Aside from the pure demographic breakdown it is also important to look at the spatial breakdown of the population. The City of Glendale is comprised of two census tracts. One of these tracts is quite small, only containing the blocks of Glendale south of Kentucky Ave. and east of Cherry St. This census tract is very densely populated and contains larger numbers of Hispanic (35%) and Asian (8%) residents and smaller numbers of Whites (47%) than the other tract which has 30% Hispanics, 5% Asians and 55% Whites.[14]

Housing

Over 92% of homes in the city of Glendale are rental units. This is perhaps the biggest demographic difference between Glendale and the surrounding communities.[15] Graph 2:4 shows the vast difference between the three geographic areas. While the high number of multi-family rental housing units in the city likely allows for the diversity of residents in Glendale, it has also led to the perception of a highly transient population.

According to the U.S. Census Bureau and the City of Glendale, the makeup of Glendale's housing is the following:

- 2,947 total housing units (2,706 occupied and 241 vacant), with 82% being built after 1969 and 59.2% being built between 1970 and 1989
- Median value of housing was $163,600
- Of the 2,706 occupied housing units, 92.5% were rental units and 70% of residents moved into such units in 2005 or later
- Median rent was $667 (U.S. Census Bureau, 2011)[16]

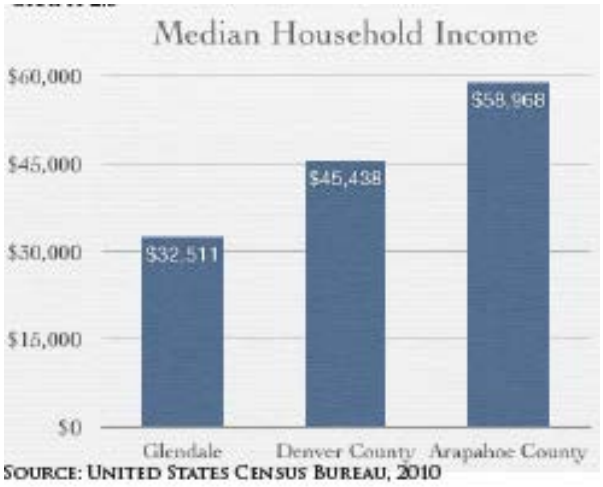
In comparison, such figures for the City and County of Denver are as follows:

- 39.2% of housing built after 1969
- Median value of housing was $236,700
- 53.8 were owned units and 39.9% of residents moved into such units in 2005 or later
- Median rent was $779 (U.S. Census Bureau, 2011)[17]

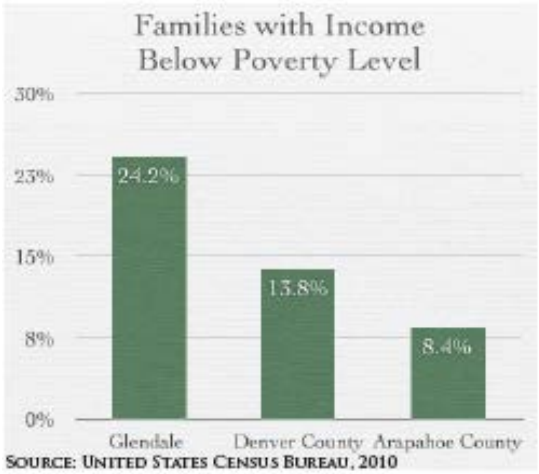
Even with the discrepancy in size between Glendale and Denver, such figures highlight that Glendale's housing stock is fairly new, its median value of housing and rent is significantly lower than Denver's, and its large rental volume contributes to a higher percentage of residential turnover than Denver.

Income

On average Glendale residents are poorer than those residing in Denver and Arapahoe counties. The median income in Glendale is almost half that of Arapahoe county and a third lower than Denver. The poverty rate is almost twice that of Denver and nearly three times greater than Arapahoe County. As discussed in the next section, these statistics are telling of potentially large health disparities in the population of Glendale.



SOURCE: UNITED STATES CENSUS BUREAU, 2010



SOURCE: UNITED STATES CENSUS BUREAU, 2010

At Risk Populations

Numerous studies have noted that certain demographic groups, including senior citizens, children, low income households, minorities, and the disabled face significant barriers to getting enough physical activity.[18] Therefore, these groups tend to show higher rates of physical inactivity, which has been scientifically correlated with poor health and chronic disease. Additionally these populations may face other challenges to living a healthy lifestyle, including poor access to employment, health services and healthy foods, a lack of positive social ties within the community, and the stresses of crime and poverty. Changes to the built environment in Glendale can help increase physical activity and diminish the barriers to a healthy lifestyle.

Senior Citizens

Senior citizens often have issues accessing health care, social and physical activity and healthy food choices. Increasing mobility is key to providing these resources, especially for those who can no longer drive. Since nearly one in five U.S. seniors does not drive at all, these individuals frequently rely on walking and public transportation in order to obtain their basic needs.[19] Barriers in the physical environment that make walking difficult (e.g. high traffic speeds, uneven or irregular sidewalks, long intersection crossings, a lack of shade and a shortage of places to stop and rest) as well as policies or infrastructure deficiencies such as insufficient transit service can have serious impacts on the heath of the senior population.

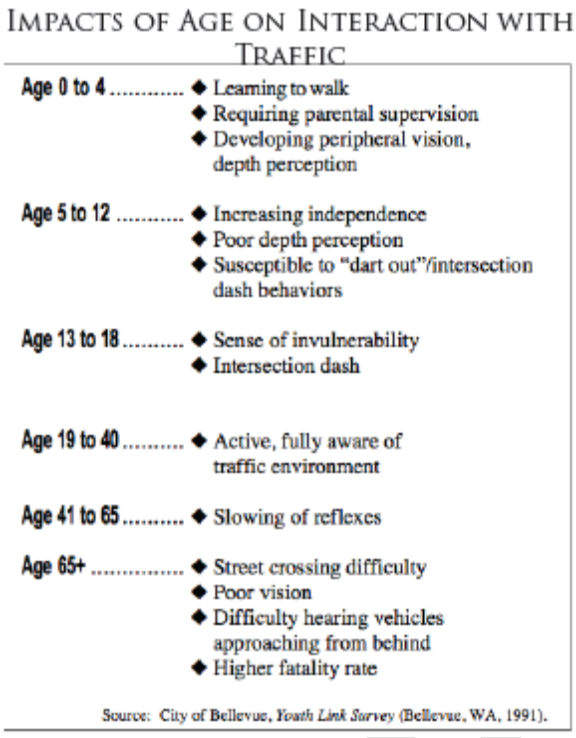
Vehicular safety is also a major health issue for seniors. Studies have shown that seniors are more likely to be killed in a motor vehicle accident than other age groups.[20] Injuries from accidents are also complicated by age.[21] Finding ways to reduce accidents can make life for senior citizens much healthier.

Currently there are 113 households in the City of Glendale with one or more people over the age of 65. While this represents only 4.2% of the population (a much smaller portion of the population than in adjacent communities) this age group is growing rapidly throughout the Denver region.[22] It is likely that Glendale will share in some of this growth in the future. Additionally, the Glendale Riverwalk will attract many visitors to the area many of whom may be seniors. Finally, it is widely accepted that any change made to the built environment that increases accessibility and mobility for seniors, improves the accessibility for all people. For these reasons, addressing the needs of this small yet growing population should be taken into consideration.

54% - *Percent of older Americans living in inhospitable neighborhoods say they'd walk & ride more often if things improved*[23]

56% - *Percent of older Americans expressing strong support for the adoption of complete streets policies*[24]

Children



Children are a special concern because of the special nutritional and exercise needs of growing bodies. Children need high levels of physical activity since active play supports physical, psychological, and mental development. Unfortunately, children in the urban environment often face many obstacles to achieving their recommended amount of daily physical activity. Some of these obstacles include high traffic volumes, lack of funding for physical education programs, crime (real or perceived), and poor access to parks, schools and playgrounds.[25]

Currently 18.4% of Glendale's population is under the age of 18.[26] While this percentage is lower than Denver or Arapahoe County, it is a significant portion of the population.

Historically, traveling to school by walking or biking provided great health benefits for many children.[27] In Glendale, however, the large distance between residences and the schools that serve them make walking and biking to school difficult for most children. Increasing safe access to park and recreation facilities is necessary to keep children in Glendale happy and healthy.[28]

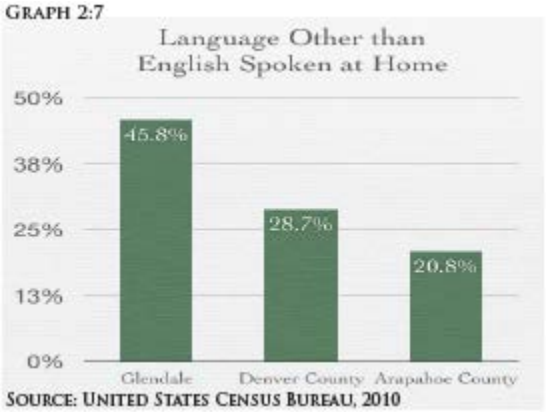
Low Income Residents

As noted above Glendale has a considerably larger low-income population than its surrounding counties. In general, low income populations are especially at risk for poor health. Poverty often leads to poor heath, as there is often a lack of funds for healthy food choices, proper health care and recreational activities that provide physical activity (i.e. joining a health club or soccer league). Neighborhoods with higher than average levels of poverty also tend to be the ones with the least recreational infrastructure, the most unsafe streets for walking (physically and due to crime) and the poorest access to health care services and healthy food options. Since many low-income residents do not have access to a car, this lack of access, becomes an even more pressing concern. Ensuring that all Glendale residents have equitable access to transit service that provides access to their needs is very important.

Minority Groups

Nationwide, pedestrian injuries and fatality rates for Hispanic and African American populations are several times higher than those among White populations.[29] The reasons are complex, though researchers believe they may include the road design in areas where minority persons walk, higher rates of pedestrianism among minorities and cultural factors such as not being accustomed to high-speed traffic.

GRAPH 2:7



SOURCE: UNITED STATES CENSUS BUREAU, 2010

Glendale has a large Hispanic population and a high proportion of individuals that are foreign born. In 2009 30.7% of the population was foreign born in comparison to 17.4% of the population in Denver County.[30] Cultural factors from some of these groups may have an impact on the ability and willingness of these individuals to be physically active. It is important to make all efforts to make sure minority groups feel safe and secure in the built environment of Glendale. Given the large number of individuals who primarily speak a language other than English, it may also be necessary to post information regarding health, recreation, and active transit opportunities in multiple languages.

Disabled Population

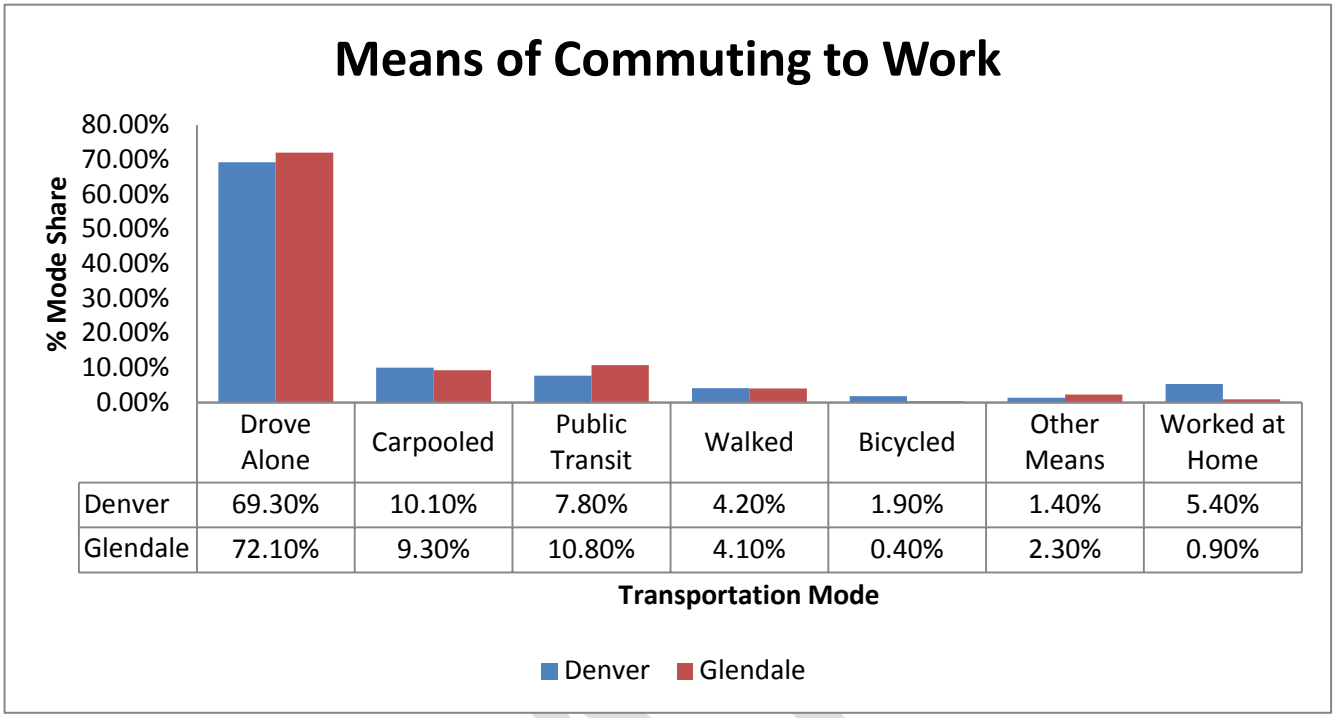
People with disabilities may have fewer options for physical activity because of barriers in the built environment. Due to their disabilities, it can be more difficult to navigate the city and get to their needed destinations. Additional crossing time is often needed to cross at intersections. They are also more at risk of a collision in difficult traffic situations and may recover more slowly when injured.

The 2010 census data on disability has not been released yet, but assuming that things are not dramatically different today than ten years ago, there is a significant portion of the Glendale population with a disability. In 2000, 8% of the population in Glendale ages 5-20, 17% of the population ages 21-64, and 45% of the population ages 65 and over had a disability.[31] Special considerations should be made for these people in the design of the built environment to ensure the city is navigable by people of all ages and abilities.

Considerations

Based on an analysis of “at risk” demographics, it is apparent that there is the potential for health disparities within the population of Glendale. While the bulk of the population consists of young to middle-aged adults, who are more likely to be active and healthy, the generally low income levels, and high numbers of minority and disabled residents, may mean that even this generally healthy population is at risk for poor health. While there are small numbers of children and seniors in Glendale, increasing mobility and opportunities for active transit for these groups will greatly benefit the young to middle age adult demographic as well.

Commuting Patterns



	Drove Alone	Carpooled	Public Transit	Walked	Bicycled	Other Means	Worked at Home
Denver	69.30%	10.10%	7.80%	4.20%	1.90%	1.40%	5.40%
Glendale	72.10%	9.30%	10.80%	4.10%	0.40%	2.30%	0.90%

The figures above highlight that Glendale's population commutes to work via public transportation and walking at higher rates than Denver's population. In regards to public transportation usage, this may be due to Glendale's lower level of income than Denver's which may prevent some residents from owning a vehicle. In regards to walking, this may be due to Glendale having a large amount of commercial development and employment residing within and near its boundaries, allowing residents to walk to such employment centers.

Glendale Health Conditions

General health status is an important measure of quality of life that factors in a person's physical & social environment & a person's perceived level of health

The Glendale Riverwalk has the potential to change the health status of those who live and work in Glendale. In order to better assess these impacts it is important to take a look at the existing health conditions of the local population. This section will look at the existing health statistics of Glendale. Unfortunately, much of the data commonly used to assess the health of a population is not available at the city level. Therefore, this report often draws on data from the county level (specifically Denver and Arapahoe Counties) and compares them to state and countrywide data.

Glendale Leading Causes of Death: 2007-2010 (Percent of Total Deaths)	
Heart disease	21.3%
Cancer	18.9%
Unintentional injuries	9.8%
Source: Health Statistics Section, Colorado Department of Public Health and Environment.	

Table 3:1 summarizes the leading causes of death between 2007 and 2010. Glendale is comparable to Arapahoe County, Denver County, the State of Colorado and the United States in rates of heart disease and cancer leading to death. Glendale, however, has a

higher rate of unintentional injuries than the others. Unintentional injuries include vehicular accidents and may be indicative of safety issues in and around the community. Note that physical inactivity and traffic safety play an important role in each of these three categories.

The distribution of chronic health problems in Glendale was estimated by using the Behavioral Risk Factor Surveillance System (BRFSS) data for both Denver and Arapahoe Counties. Key findings are summarized below.

Distribution of Chronic Health Problems			
	Denver County	Arapahoe County	Colorado
Asthma	8.5%	9.1%	8.7%
Diabetes	6.0%	6.2%	5.6%
High Blood Pressure	24.3%	23.6%	21.9%
High Cholesterol	34.8%	36.4%	34.8%
Rated general Health (Fair or Poor)	14.3%	9.4%	11.3%
Obesity (BMI over 30)	19.6%	17.7%	20.1%
Overweight (BMI over 15)	34.4%	37.8%	36.4%
Have health insurance? (Yes)	83.7%	88.3%	84.6%
Did not take part in any physical activity in the last 30 days other than job	18.3%	16.5%	17.1%
Source: Colorado Department of Health BRFSS Survey 2009-2010			

Note that Glendale is completely surrounded by Denver County and more closely resembles Denver in terms of built environment and demographics than Arapahoe County.

Many of the chronic health problems that are highlighted in the BRFSS data are preventable. The 2008 Physical Activity Guidelines for Americans states that physical activity plays a role in many health outcomes, including:

- Premature death
- Chronic diseases, such as coronary heart disease, stroke, some cancers, type II diabetes, and depression
- Risk factors for chronic disease, such as high blood pressure and high cholesterol
- Physical fitness[32]

The guidelines state that for substantial health benefits, adults should do at least 150 minutes a week of moderate intensity aerobic physical activity. For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes a week.[33] Importantly, these recommended times for physical activity do not need to be distributed into 30 minutes a day for 5 days a week. Rather, any accumulation of at least 150 minutes, whether it is all at once or 10 minutes at a time, demonstrates health benefits.[34] This link between health and physical activity indicates that increasing physical activity correlates to decreases in the rates of poor health outcomes, including the risk factors for heart disease and other chronic diseases. Encouraging physical activity and active transit through the built environment is part of the solution to a healthier Glendale.

> ***60% -*** *Percent of Adults are at risk for diseases associated with inactivity*
>
> *Regular physical activity protects against obesity & many chronic diseases*
>
> *A strong association exists between the level of wealth & positive health status.*[35]

Literature Review

***Health:** a state of physical, mental & social well-being, & not merely the absence of disease*

Health, as defined by the World Health Organization (WHO), is a state of physical, mental and social well-being, and not merely the absence of disease or infirmity. Today we are seeing an increase in many preventable chronic diseases, such as type II diabetes, high blood pressure, high cholesterol, cardiovascular disease (CVD) and obesity.[36]

There are many factors that influence the ability to be healthy. Increasingly, the surrounding environments of our communities are being looked at to address these health disparities. Science has shown that many health determinants are based on behavior, like diet and activity levels.[37] Factors such as geography and the external environment are often outside of the control of individuals. A strategy to improve our ability to be healthy must address external factors that influence our behaviors. For the purposes of this report, the physical environment is where the interventions will be focused to help impact the health of the Glendale population.

Regular physical activity protects against obesity and many chronic diseases, including type II diabetes, cancer, and CVD. The design decisions we make in our community's built environment can influence the health and mental well-being of that community's residents. Characteristics of cities such as traffic congestion, environment, real and perceived sense of safety and access to quality goods and services can influence the mode of transportation people choose. An environment that causes people to rely on the automobile to get around encourages sedentary lifestyles. People who chose to walk or bike rather than drive, however, have shown a positive association with fitness. Men and women who use active transit are inversely associated with body mass, triglycerides, high blood pressure and CVD risk.[38]

A few health outcomes need to be defined before further discussion:

- Body Mass Index (BMI) is a ratio of a person's height to their weight
- Overweight is defined as having a BMI between 25 and 30
- Obese is defined as having a BMI over 30
- Inactivity is defined as having no physical activity outside of normal work and household activities

A growing body of research indicates that the built environment can have an enormous effect on human health.[39] [40]Urban planning decisions, therefore, can significantly impact physical and mental health, equity, safety and social well-being. As such, these decisions should be assessed in order to understand their effects on the residents, workers and visitors in a given community, especially those who are potentially most vulnerable. In recent years many communities, organizations and local governments have begun performing Health Impact Assessments (HIA) to analyze these health impacts.

The 2008 Physical Activity Guidelines for Americans published by the U.S. Department of Health and Human Services examines the existing research regarding "the role that physical activity plays in many health outcomes." These include:

- Premature (early) death
- Diseases such as coronary heart disease, stroke, some cancers, type 2 diabetes, osteoporosis, and depression

- Risk factors for disease, such as high blood pressure and high blood cholesterol
- Physical fitness, such as aerobic capacity, and muscle strength and endurance
- Functional capacity (the ability to engage in activities needed for daily living)
- Mental health, such as depression and cognitive function
- Injuries or sudden heart attacks[41]

Specifically, the guidelines established in this publication recommend that "for substantial health benefits, adults should do at least 150 minutes a week of moderate-intensity aerobic physical activity," and that "for additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes a week."[42] These guidelines state that the recommended activity may be accumulated in any way throughout the week, and does not need to be achieved 30 minutes a day for 5 days a week because there is no research which definitively shows that consistent activity throughout the week is better than 150 minutes all at once. In addition to physical fitness and other health outcomes, physical activity fosters social interactions. Increased social capital has its own health benefits, as those people with strong social networks of support tend to have better overall health.[43]

Modifications to the built environment have proven to be effective measures that reduce the rates chronic disease and improve public health metrics. For example:

- People who commute by active transportation modes experience significant improvements in cardiovascular indicators of fitness compared to those who use motorized modes.
- Data from national surveys on travel behavior and health indicators show that countries with the highest levels of active transportation have the lowest obesity rates.
- Men who cycle at least 25 km/week or do vigorous brisk walking have less than half the non-fatal and fatal coronary heart disease of those who are not physically active.
- Active commuting is associated with an 11% reduction in cardiovascular risk.
- Walking approximately 30 minutes a day, 5 days a week is associated with a 19% reduction of coronary heart disease risk.[44]

There are many improvements to the built environment that can increase the rates of active transportation within community. These include the following examples:

- A survey of 11,500 participants in 11 countries found residents of neighborhoods with sidewalks on most streets were 47% more likely to get moderate to vigorous physical activity at least 5 days per week for at least 30 minutes each day than residents in neighborhoods with sidewalks on fewer or no streets.[45]
- More & better quality sidewalks are associated with adults having higher rates of walking and meeting physical activity recommendations.[46]
- Infrastructure modifications such as separated cycle lanes, connected networks of sidewalks, and signalized crossing points can reduce injury risks and encourage new users to try active transportation modes.
- There is a positive relationship between total length of bicycle pathways and % of bicycle commuters in U.S. cities.[47]
- Every 1% increase in length of on-street bicycle lanes = 0.31% increase in bicycle commuters.[48]

- The presence of bicycle lanes and paths is positively related to cycling and more adults meeting physical activity recommendations.
- Cities that invest in bicycle facilities exhibit higher levels of bicycle commuting.[49]
- People reporting the presence of sidewalks, compared to those reporting the absence of sidewalks, are more likely to be physically active.[50]
- On-street bicycle lanes increased the odds of bicycle use among subjects living within 400 meters (1/4 mile) of such a facility compared to those living more than 1600 meters (1 mile) away[51]
- Rates of collision, injuries, and fatalities per capita decline when the numbers of people walking or bicycling increases (safety in numbers).[52]
- If the built environment is retrofitted to maximize walking and bicycling, individuals can experience lower levels of stress and a sedentary lifestyle caused by driving, and enjoy more time outside of the car.[53]
- In addition, in the same study it highlighted that each hour spent in a car per day was associated with a six percent increase in the odds of being obese.[54] Further, each kilometer walked was associated with a 4.8 percent reduction in the odds of being obese.[55]

Mixed-use developments have also shown to have a wider array of transportation options than non-mixed-use developments. These include automobile, public transit, walking, and bicycling. A study conducted in San Francisco showed that residential density, mixed land use, and the presence of sidewalks was associated with modal split, a means of travel other than the automobile.[56] In addition, a study in the Minneapolis metropolitan area concluded that individuals living within 200 meters (0.12 miles) of retails establishments walked more than those who lived 600 meters (0.4 miles) from retail establishments.[57]

Finally, there is a vast amount of literature providing evidence that population density and employment density have the strongest relationship with mode choice in mixed-use development.[58] In regards to population density, the literature states that to fulfill a shift from automobiles to transit and walking, the population density must be at a minimum of 13 persons per acre.[59] In regards to employment density, the literature states that a density of 75 employees per acre is needed for an increase in proportion to transit trips.[60]

As highlighted by such information, modifications to the built environment play an essential role in increasing rates of active transportation within communities. Communities that are well planned and include essential pedestrian and bicycling infrastructure have proven to be safer environments for all transportation modes, facilitate higher rates of active transportation, reduce chronic disease risks and rates, and improve public health. Additionally, in order to maximize the amount of active transportation and health benefits within a community, it is important the public is made aware of such improvements through various marketing and communication strategies that highlight the improvements and their benefits and encourage their usage by all parties.

Community Outreach Findings

In order to gather essential active transportation data for this HIA from the Glendale community, a HIA Community Questionnaire was developed by Tri-County Health Department and administered to Glendale residents, employees, and visitors via hard copy and electronic versions. The survey was posted on the project website and distributed through local email networks. Hard copies were on hand at community events and flyers for the online version were distributed to residents and businesses throughout the community. In total, 188 individuals responded to the questionnaire. Of these 188 respondents, 36% said they live in Glendale, 52% said they work in Glendale, and 41% said they visit Glendale (more than one option could be chosen). This matches relatively well with the fact Glendale has nearly twice as many people working in the community as living there, and that many people from the region visit Glendale to shop and recreate. A copy of the survey can be found in the Appendix. Selected findings from the questionnaire included:

During a typical week, about how many times do you walk in Glendale for each of the following purposes?	**Average Times Per Week**
To travel to and from work or school	0.9
For entertainment (e.g. dining out) or errands	1.7
For leisure (e.g. going for a stroll) or exercise	2.9

During a typical week, about how many times do you bike in Glendale for each of the following purposes?	**Average Times Per Week**
To travel to and from work or school	0.6
For entertainment (e.g. dining out) or errands	0.4
For leisure or exercise	0.8

The rates of cycling among respondents are significantly lower than the rates of walking. This also corresponds to the bicycle and pedestrian counts that were conducted in the community. This is potentially indicative of the lack of bicycle infrastructure in Glendale. Perhaps not surprisingly given presence of the Cherry Creek Trail, leisure is the most reason for active transportation.

Which of the following do you use when you walk in Glendale? (Select all that apply).	**Response Percentage (respondents could select more than one)**
Major Streets	34%
Neighborhood Streets	47%
Sidewalks	72%
Bicycling/Walking Trails	63%
I don't Walk	12%

Which of the following do you use when you bike in Glendale? (Select all that apply).	**Response Percentage (respondents could select more than one)**
Major Streets	18%
Neighborhood Streets	26%
Sidewalks	21%
Bicycling/Walking Trails	49%
I don't Bike	49%

Sidewalks and trails are the primary means for walking and biking in Glendale. Most respondents avoid the major streets, which may be due to the high traffic volume and speeds. Note that while biking on sidewalks is illegal, 21% of respondents indicated the do so anyway. Conversations with residents indicate the likely reason for many is that they do not feel safe biking in the street. It is also notable that 12% of respondents do not walk in Glendale and 49% do not bike. This is a large percentage, particularly for biking, that is not even getting on a bicycle, leading to lost opportunities for more physical activity. Given Glendale's compact size, there is significant untapped potential to get more community members riding a bike.

Challenges to Walking & Biking in Glendale	**Response Percent**
Traffic volume/speed	34.1%
Other (please specify)	29.1%
Ignorance about bicyclist / pedestrian rights or rules of the road	26.9%
Driver behavior	24.2%
Lack of bike lanes	23.1%
Street/Sidewalk conditions	19.8%
Number of sidewalks	15.4%
No direct way to go where I want to go	13.7%
No challenges to biking/walking in Glendale	13.2%
Street lighting	10.4%
Crime	9.3%
Street width	6.6%
Don't know	5.5%
Dogs or other animals	2.7%

Among residents only, the top three issues were "Ignorance about bicyclist / pedestrian rights or rules of the road (39.7%)," "Lack of bike lanes (30.9%)," and "Street/Sidewalk conditions (30.9%)." Top challenges within the "Other" category included:

- Conflicts between bicyclists and pedestrians (especially speed of bicyclists on the Cherry Creek Trail)
- Lack of sidewalk connectivity through parking lots to reach various businesses
- Lack of adequate facilities such as sidewalks, signage/markings to remind drivers, and broken signals or lights
- Lack of connection to other bike paths and trail systems

Other comments on the questionnaire included:

- Desire for more bike lanes
- Improve access to the Cherry Creek Trail
- Resolve conflicts between bikers and other users on the trail
- Improve sidewalks, specifically along Cherry Creek Drive South

The results of this survey indicate that walking and bicycling are not prevalent activities among employees, residents, and visitors to Glendale. Walking and biking are more commonly used for exercise than they are for commuting or for errands. The comments from community members corroborate the results found through the Active Neighborhood Checklist. There is a lack of pedestrian and bicycle infrastructure and connectivity throughout the city, in part due to the large number of surface parking lots. Vehicular traffic also poses a

challenge to physical activity because people tend to not feel safe walking or biking around heavy traffic volumes and speeds. Conflicts between different users on the Cherry Creek Trail make pedestrians feel unsafe, even though the Trail is meant to be shared by all users. The results of the HIA Community Questionnaire reveal ways in which Glendale may make changes to promote safety and physical activity within the city.

Additional community outreach was also conducted at several events in Glendale and through the project website. At these events, a map of Glendale was available for the public to indicate those areas which they felt were unsafe for walking and/or biking due to traffic, lighting, access issues, or discontinuous sidewalks or bike routes. They were also asked to mark the routes they commonly used or felt were safe or comfortable paths to walk and bike.

On the map and in conversation community members noted the following:

- Sidewalks are severely lacking on Ash Street between Cherry Creek Drive South and Ohio Avenue. In particular, many employees noted a desire for a pedestrian connection between the CDPHE campus and Whole Foods.
- While the Cherry Creek Bike Path is a popular feature in Glendale, it has a significant amount of user conflicts, typically between pedestrians and bicyclists.
- The Cherry Creek Bike Path needs better lighting along the section running through Glendale. Users often feel unsafe riding to work in the dark in the morning.
- Many of the surface lots were marked as impediments to safe walking and biking.
- Several intersections along Cherry St., Colorado Blvd., and Leetsdale Ave. were marked as dangerous or difficult to cross.
- Mississippi Ave. was marked as a good transit route, but also as a difficult place to walk and bike along.
- There are limited connections to Infinity Park.

One comment submitted to the website nicely summed up some of the issues around navigating parts of Glendale and its parking lots:

> "Many people like to walk to Whole Foods from CDPHE for lunch and/or shopping and walking is very difficult and unsafe. The only way I have found is to walk along the West side of CDPHE and then through the drive way into Home Depot. There isn't a sidewalk and the driveway is unsafe with cars going both directions. I have tried to cross the landscape rocks, however I still need to use the driveway or drop down to the street. I would like for the City of Glendale/CDPHE /Whole Foods/Home Depot consider improving access for pedestrians."

Taken together, the input received from the public tells of a community that has much potential to increase its physical activity through active transportation if some key improvements can be made. Many community members expressed their excitement for the upcoming Riverwalk development, which if properly connected to the rest of Glendale will become a key destination for those on foot and bicycle. Additionally, many of the comments and survey results corroborate closely with the other findings presented in the following sections.

Focus Area Findings & Recommendations

Active Transportation

For the purposes of this report, Active Transportation refers to walkability and bikeability.

Walkability can be defined as the extent to which the built environment is friendly to the presence of people living, shopping, visiting, enjoying or spending time in an area on foot. It is a measure of how responsive an area is to walking. Walkability has many health, environmental, and economic benefits and is shaped by a variety of factors. These include traffic conditions, land use patterns, building accessibility and orientation, access to goods and services, street design, street furniture, access to sun and shade in appropriate seasons and safety.[61] Other infrastructural factors include the presence or absence and quality of pedestrian right of way, access to mass transit, buffers from moving traffic and pedestrian crossings. Landscaping, eye-level attractions, shade and other amenities, make communities walkable by catering to the senses of pedestrians.[62]

> ***Walkability:*** *the extent to which the built environment is friendly to the presence of people walking*
>
> ***What does a "Walkable Community" Look Like?***[63]
>
> *- People of all ages and abilities have easy access to their community "on foot"*
>
> *- People walk more and the community and neighborhoods are safer, healthier, and friendlier places*
>
> *- Parents feel comfortable about their children being outside in their neighborhoods; they don't worry about the threat of motor vehicles*
>
> *- Children spend more time outside with other children and are more active, physically fit, and healthy*
>
> *- Streets and highways are designed or reconstructed to provide safe and comfortable facilities for pedestrians and bicyclists – They are safe and easy to cross for people of all ages and abilities*
>
> *- Pedestrians are given priority in neighborhood, work, school, and shopping areas. Motor vehicle speeds are reduced or removed to ensure compatibility with pedestrian traffic*
>
> *- Motor vehicle operating speeds are carefully controlled to ensure compatibility with adjacent land uses and the routine presence of pedestrian*
>
> *- Drivers of motor vehicles operate them in a prudent, responsible fashion, knowing that they will be held strictly accountable for any threat, injury, or death caused by their lack of due care or violation of the vehicle code*

Surveys have shown that one of the most important factors that get people to walk and ride bicycles are well developed sidewalks and dedicated bicycle lanes.[64] Evidence has shown a direct relationship between the built environment, physical activity, and public health. One study showed that among several variables, residents in neighborhoods comprised of high density, a grid street network, sidewalk continuity, and proper street crossings exhibit higher volumes of pedestrian and transit trips.[65] Therefore, a built environment that contains these

elements increases walking and bicycling in a community, increases physical activity, and contributes to better health outcomes related to various chronic diseases.[66]

Connectivity, another key factor in walkability, is the ability to easily navigate a community via a network of well-connected, direct, and convenient routes. Evidence shows there is a direct correlation between connectivity and higher walking rates in walkable communities leading to physical activity and healthy lifestyles.[67] A study conducted in the Puget Sound region of Washington State, identified that pedestrian volume is three times higher in communities with smaller blocks and complete sidewalk network than those with large blocks and incomplete sidewalks.[68] In addition, communities with higher residential densities and smaller block sizes have a higher volume of people walking, have a lower body mass index (BMI), and were less likely to be obese and have hypertension.[69] The overall trend for street connectivity was that an increased link-to-node ratio is associated with a decrease in the driving for all street patterns. Street pattern research has also shown that more travel lanes are associated with a reduction in walking.

When a community's built environment consists of a diverse arrange of uses (retail, commercial business, and housing), it is more likely to exhibit higher levels of walkability. The higher mixture of uses helps to create an environment where individuals can make multiple stops within close proximity from one business to another. Having multiple destinations helps determine whether an individual will select walking or bicycling as their mode of travel.[70] An environment that consists of a variety of uses provides access to more services via foot or bicycle, reducing the need for travel by automobile. Therefore, mixed-use developments help reduce vehicle miles traveled, vehicle pollution, and time spent in cars. In turn, it contributes to more walking and bicycling, leading to lower levels of obesity, chronic disease, and stress.[71] A study on various built environments identified that of four environments, moving from a least mixed-use group to a more mixed-use group, there was a 12.2 percent reduction in the odds of being obese.[72]

Research shows that the most commonly reported place that people feel safe walking for exercise or recreation is neighborhood streets and sidewalks, followed by public parks and open space.[73] Additionally, the convenience of a safe walking place, especially public parks, directly relates to the proportion of people meeting the minimum physical activity recommendations. For example, "those able to walk to the place in less than 10 minutes are most likely to be active".[74] Further, public parks and open spaces which are large, attractive, and easily accessible are most associated with higher levels of walking.[75] Finally, public parks are an especially important resource for low-income and minority communities who lack access to other venues for physical activity due to cost or distance.[76]

While proximity to parks is the best predictor of park use, specialized programming in parks to accommodate activities for multiple users, including walkers, sports participants, and others, encourages more active use of the open space.[77] Parks with facilities for sports and other activities have higher rates of use than parks without such accommodations. Some examples of programmed activities include:

- Tracks
- Basketball, volleyball, and tennis courts
- Football and soccer fields
- Playgrounds
- Benches and picnic tables
- Walking paths

- Balls or other equipment

The walkability of a place has proven to have many other individual and community health benefits, such as opportunities for increased social interaction, an increase in the average number of friends and associates where people live, reduced crime (with more people walking and watching over neighborhoods, open space and main streets), increased sense of pride, and increased volunteerism.[78]

> *A "walkable community" is designed for people, to human scale, emphasizing people over cars, promoting safe, secure, balanced, mixed, vibrant, successful, healthful, enjoyable & comfortable walking, bicycling and human association.*
>
> *-Dan Burden-*

A bikeable community is much the same as a walkable community. It is designed in a manner that promotes cycling as a safe, comfortable, and valued mode of transportation. Currently, only about 0.4% of Glendale residents ride their bikes to work. A recent study suggested that if residents of several large Midwestern cities made 50% of their short trips by bicycle it would "yield savings of approximately $3.8 billion/year from avoided mortality and reduced health care costs." Additionally the study estimated "that the combined benefits of improved air quality and physical fitness would exceed $7 billion/year."[79]

Growing the share of bicycle commuters for work and other secondary trips could be a big benefit for the health of Glendale residents. Given Glendale's small size, urban density, mix of uses, youthful population and its location in the heart of Denver, bicycling could easily become a primary mode of transportation for its residents if the city invested in bicycle infrastructure. One study indicated that for "U.S. cities with a population more than 250,000, each additional mile of Class II bike lanes per square mile is associated with a roughly one percentage point increase in the share of workers commuting by bicycle."[80] While Glendale does not have 250,000 people, its location inside a 600,000-person city makes this study applicable. If Glendale were to add 2-3 miles of bike lanes, it could increase its share of healthy work commutes by bicycle to 4 or 5%.

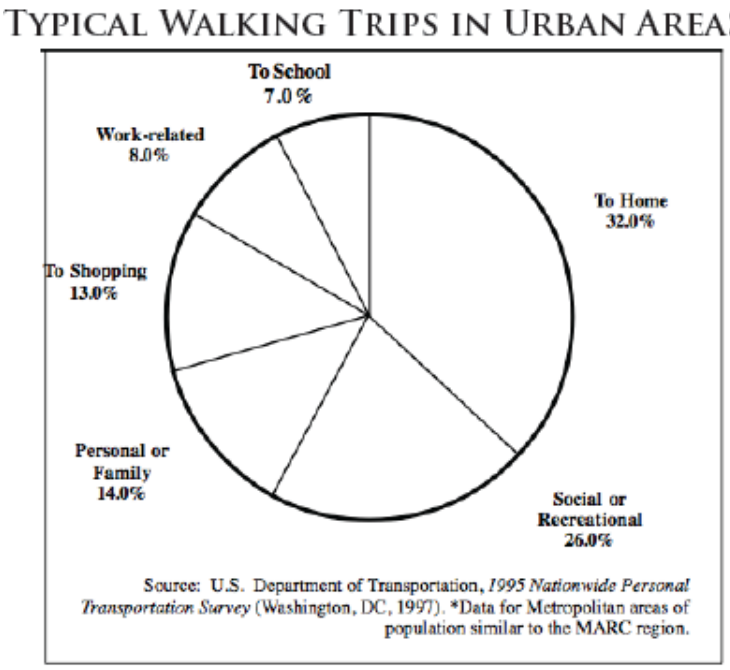
There have been several studies that show that pedestrians prefer walking on sidewalks that are safe, clean, and buffered from traffic.[81] The existence of and maintenance of sidewalks promote people to walk, improving their overall health and decreasing rates of obesity and chronic health conditions.[82] In regards to bicycling, proximity to bike facilities and/or bike lanes was more significant within 400 meters (1/4 mile) as compared to 1600 meters (1 mile).[83] In addition, evidence shows bicycle facilities are important to bicyclists as every 1 percent increase in on-street bike lanes equates to a .31 percent increase in bicycle commuters.[84] Pedestrian and bicycling facilities encourage individuals to walk and bicycle and improve their health by reducing obesity, improving chronic disease related issues, relieving stress, and improving their quality of life.[85]

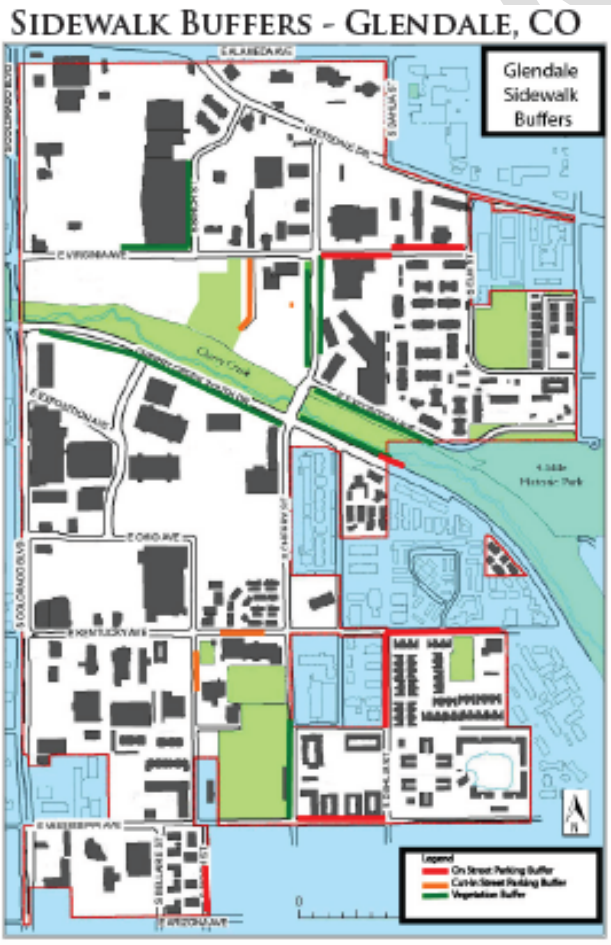
Existing Conditions

Walk Score: One tool that can provide an initial assessment of walkability is Street Smart Walk Score (www.walkscore.com). It uses an algorithm to award points based on the distance to amenities, as well as looking at some connectivity measurements. Results from Walk Score:

- Glendale's overall score 78: Very Walkable
- Scored poorly in block length
- Scored poorly in walkable intersections

- Scored low in walkability to schools and entertainment areas
- Scored high in walkable access to shopping, parks, banking and restaurants.





Walk Score is a good source for getting started, but other areas need to be explored as it does not measure every factor that affects walkability. Amenities within .25 miles receive max points and amenities further than a mile receive no points. Glendale is 0.6 square miles so most of the amenities are within walking distance, but that does not mean that the built environment encourages walking. Other factors that influence a person's decision to walk include:

- Pedestrian access (sidewalks, trails, condition and safety of trails, etc.)
- Pedestrian amenities (benches, street lights, trash cans, public art, trees, etc)
- Connectivity, direct routes
- Variety of destinations
- Aesthetics (public art, landscaping, window displays, etc.)
- Actual and perceived safety
- Parks/public recreation spaces
- Convenient transit

Active Neighborhood Checklist: The Active Neighborhood Checklist is a research tool developed by public health researchers and sponsored by the Active Living Research program funded by the Robert Wood Johnson Foundation.

"Active Living Research grantees developed an objective and practical checklist to help residents, community groups, local government officials and advocacy organizations determine whether their neighborhoods are activity friendly. The checklist rates communities on land use, presence of public recreational facilities, availability of public transportation and quality of the environment."[86]

It is especially important to note that the Active Neighborhood Checklist has been proven to be a reliable tool for assessing the built environment.[87] In addition, it was developed with the help of community members,

and therefore reflects those aspects of design which influence a person's decision to be active or not.

The Active Neighborhood Checklist was utilized within this HIA by walking and evaluating every street segment in Glendale. A street segment was defined as the length between 2 intersections. Using this definition, there are 43 street segments in Glendale. Both sides of the streets were examined, including those which are partially located in Denver. A copy of the Active Neighborhood Checklist can be found in the Appendix.

These results indicate that Glendale does not have a particularly encouraging environment for pedestrians and bicyclists, and is oriented towards automobiles. Safety features and traffic calming devices, which are intended to protect pedestrians and bicyclists and alert motorists to their presence, are absent on many street segments. Pedestrian amenities such as planters and benches are nonexistent in Glendale. In addition, the connectivity in the city is limited by the prevalence of surface parking lots and missing and disconnected sidewalks. Some of the current sidewalks are narrow with an inadequate width of approximately three feet. Further, some sidewalks in the southern section of Glendale are poorly placed, located directly behind parking spaces. This provides the pedestrian with the uncomfortable experience of walking behind parked cars and it puts the pedestrian in danger as a car can back out of a parking space and cause an injury. Finally, while some of Glendale's sidewalks are buffered from roadways via landscaping or parallel parking, the majority of sidewalks do not have such a buffer. All of this contributes to an unsafe pedestrian environment that deters people from walking.

After analyzing the completed Active Neighborhood Checklists for all 43 street segments within Glendale, the following specific results were generated:

- Mean speed limit of 30 miles per hour
- Mode number of lanes of 2
- 84% of streets have attached sidewalks. This means that the sidewalk is directly adjacent to the street with nothing to buffer the pedestrian from the moving traffic.
    - Detached sidewalks are more pleasant for pedestrians as they are further away from traffic.
    - Of detached sidewalks, all had trees for shade, providing sun protection in our high-UV Colorado climate.
- 30% of street segments had a discontinuous sidewalk on one side of the street; 7% had discontinuous sidewalks on both sides.
- More than 1/3 of street segments missing a portion of sidewalk.
- 25% of street segments contained a portion of sidewalk that was less than 3 ft. wide.
    - This makes walking side-by-side or using a stroller difficult
- 42% of Glendale street segments have both residential and non-residential uses.
    - This is good because mixed use stimulates active transit
    - 37% of street segments have commercial buildings adjacent to the sidewalk
- Only 7% of street segments have on-street parking
    - This is not good, because on-street parking provides a buffer between the pedestrian and traffic
    - This is not good as on street parking can be a benefit for commercial development and limit the number of on-site spaces that may be needed.
- Glendale is relatively clean: 6 segments, or 14%, have graffiti, boarded/broken windows, litter, or trash.
    - This is good – clean streets and lack of graffiti- broken windows = more perception of safety
- Only 50% of street segments had trees shading the walking area.
    - Shade=comfort and sun safety for pedestrians in summer.

- Trees reduce stress levels, provide oxygen and clean the air of pollutants.

- 47% of street segments have transit stops
- 28% of street segments have a median or pedestrian island
- 79% of street segments have a crosswalk; 47% of street segments have a Walk/Don't Walk signal
- Only 5% of street segments have a traffic calming device, such as roundabouts, curb neckdowns, speed bumps, brick roads, or raised crosswalks
- 19% of street segments have amenities, such as drinking fountains, newspaper stands, or benches unrelated to a transit stop
- Apart from the Cherry Creek Bike Path, an on-street bike route exists on Cherry Street, but there are no bicycle lanes, sharrows, or route indicators

Residents are more likely to walk in a neighborhood with sidewalks

Bicycle & Pedestrian Counts: A pedestrian and bicycle survey was also conducted to determine how Glendale was being used for active transit. The survey assessed five different intersections over a 2-hour period. Using a calculator put out by the National Bicycle and Pedestrian Documentation Project we were able to get a glimpse at the total counts at each intersection per year. The results in Table 7:3 show the estimated annual pedestrian trips at each of the five intersections surveyed. S Cherry Street and Cherry Creek South Boulevard have the second highest volume of pedestrian crossings in all of Glendale.

Pedestrians per Intersection per Year	
Intersection	Number
Cherry St. & Cherry Creek S.	262,987
Cherry St. & Virginia Ave.	189,935
Cherry St. & Kentucky Ave.	352,737
Birch St. & Mississippi Ave.	227,505
Ash St. & Ohio Ave.	87,662
Total Pedestrians per Year	1,120,826

Bicycles per Intersection per Year	
Intersection	Number
Cherry St. & Cherry Creek S.	137,755
Cherry St. & Virginia Ave.	52,180
Cherry St. & Kentucky Ave.	60,529
Birch St. & Mississippi Ave.	58,354
Ash St. & Ohio Ave.	33,395
Total Bicyclists per Year	342,213

Around 24% of those active transit users we surveyed in a two hour period at five different intersections in Glendale were bicyclists. The table shows that the most observed bicycle trips were at the intersection immediately south of the Cherry Creek Trail. Given that the majority of residences in Glendale are located south of the Cherry Creek, this is not surprising. Numbers of bicyclists originating from the north seem to be considerably less as indicated by the number of bicyclists estimated at Cherry and Virginia, but this is difficult to say as many bicyclists may turn off on Exposition going east before getting to this intersection.

Whatever the case, the numbers show a high amount of bicycle and pedestrian traffic in the City of Glendale. Theoretically, if the estimate at Cherry and Kentucky (in front of the Glendale Recreation Center) were averaged evenly over a one-year period, 166 bicycles would pass through the intersection every day. Each one of those trips removes a car from the road and increases the physical activity and health of a local resident or employee.

Connectivity: Connectivity and street patterns in Glendale are limiting for pedestrians in part because of the long block sections (average block length of 620 feet). Glendale has a significant amount of large surface parking lots, business towers, big box stores, and commercial strips located within the city that create large blocks or "superblocks." These make it difficult and dangerous for pedestrians to access other retail stores, restaurants, and businesses. As illustrated by responses in the HIA Community Questionnaire that was administered to

Glendale employees and residents, there is an issue for pedestrians trying to access other businesses and amenities within the city because of these superblocks. In communities with smaller block sizes and grid like patterns pedestrians walk more and have access to various travel routes to reach their destination.[88] A grid pattern provides individuals with greater access to retail, restaurants, services, transit options, basic route options, and leads to increased trips via walking and bicycling. This pattern increases levels of physical activity for individuals and reduces risks surrounding obesity and chronic diseases.

> ***Superblocks*** *(over 600 feet) are much larger than normal blocks (300-400 feet) that create barriers to easily navigating a community on foot or bike.*

The City of Glendale is already taking some of the connectivity issues into consideration. The Riverwalk Development is Phase II of the City's Master Development Plan (Infinity Park was Phase I); therefore, the city has placed a strong emphasis on creating a pedestrian connection between the two locations. If a link was provided between the two developments that would greatly improve the pedestrian connectivity. However, there are still areas that create barriers to pedestrian connectivity. Connectivity is also limited by Cherry Creek, which runs through Glendale. While the Cherry Creek Trail is a great asset to Glendale, it cuts through the heart of the city with few places to access the trail from the city and few places to cross the creek. However, a new connection will be coming to the east side of the community at Kentucky Avenue to provide improved access to the Trail.

Cherry Creek Trail: The Cherry Creek trail is one of the Denver metro area's premiere bike and pedestrian routes and connects residents and visitors with Downtown Denver, the Cherry Creek neighborhood, Cherry Creek Reservoir, and various other amenities in between. The path, which is currently accessible in two locations within Glendale, at Colorado Boulevard and South Cherry Street (a Kentucky Avenue connection is also planned), provides a viable, healthy alternative for both residents and visitors to travel and recreate in and around Glendale.

The Cherry Creek Trail Bicycle and pedestrian counters placed on the path in Glendale counted 70,000 trips in August, 2011. This number is a significant amount of bicycle and pedestrian traffic that will have exposure to the Glendale Riverwalk once completed. Our conversations with employees and residents in Glendale indicated that the biggest problems along the trail are the conflicts that regularly occur between bikes and pedestrians. These conflicts occur due to the speed differential between swift moving bicyclists and slower moving pedestrians.

Designated Bike Routes & Denver Moves Bicycle Plan: As noted earlier, Glendale is completely surrounded by the City of Denver. The Glendale street grid is largely an extension of Denver's and many of the streets are shared by the two jurisdictions often with ownership split down the middle of the street. There are currently two designated bicycle routes through the City of Glendale that continue in Denver. Neither route has designated bike lanes, and signage is virtually non-existent. The first route is a north-south route on Dahlia, Leetsdale Drive and Cherry St. The second is an east-west route that runs on Mississippi Ave. turns north on Cherry St. and connects to the eastbound Cherry Creek Bike Path before heading east again south of 4-Mile Historic Park. Map 8:2 shows these designated routes. The lack of any signage or cycle facilities on these routes presents a challenge to those who wish to bike within and though Glendale, particularly visitors who are not familiar with the community.

MAP 8:2

SOURCE: DENVER BIKE PLAN

The City & County of Denver recently prepared the Denver Moves Plan to identify places to improve the city's bicycling and multi-modal infrastructure. This plan includes routes through the city of Glendale, and Map X shows the recommended improvements that the city is suggesting in the Glendale area." These include adding bicycle lanes to Cherry, improving the intersections at Leetsdale at both Cherry and Dahlia, further studying improvements to Mississippi and extending the Mississippi bike route to the Cherry Creek east of Glendale. In order to accomplish any of these improvements the City of Denver and City of Glendale will need to work in partnership to carry them out.

Mixed-Use Development: While Glendale is already a fairly dense community at about 11 residents per acre and 25 employees per acre, these numbers are not yet enough to drive significant mode shift. The Riverwalk will add to the employment density, but since no residential is planned to be included the residential density will not see a dramatic increase. Glendale, however, does have a decent mix of uses in the community. According to the Active Neighborhood Checklist analysis, 42% of Glendale streets have both residential and non-residential uses. However, many of the non-residential uses may not be pedestrian-accessible. Additionally, while Walk Score identified a good presence of many different amenities, it showed that Glendale is lacking in entertainment options and connectivity. The Riverwalk will directly address this missing piece, but improvements must then be

made to the built environment so that residents and visitors can access the new entertainment district on foot, bike, or transit.

Parks & Open Space: Glendale currently has five parks available for public use. They are Creek Side Park, Four-Mile Historic Park, Infinity Park, Mir Park, and Playa del Carmen Park. Creek Side Park "offers a pavilion with four picnic tables, restrooms, drinking fountain, walking/jogging path, and two sandpit volleyball courts".[89] Eight acre Infinity Park provides a pavilion, a field house, athletic fields, picnic areas, passive lawns, a public plaza and public gardens in addition to the rugby stadium, indoor sports center, and tennis and basketball courts located just north of the park. Mir Park also "offers a pavilion with four picnic tables, restrooms, drinking fountain, walking/jogging path" as well as an "open plaza with lights, playground equipment, and a large open space".[90] Together, Glendale has approximately 17 acres of open space, in addition to 20 acres of open space along the Cherry Creek Greenway. The Riverwalk project will replace Creekside Park, and is planned to include a 4,000 seat amphitheater, a 28,000 square foot entrance plaza, a navigable canal, and new pathways along Cherry Creek.[91]

Bicycle Safety: Community input demonstrated unfavorable perceptions of both designated bike routes through Glendale. Bicyclists did not have a favorable view of biking along Cherry St. and specifically indicated that the two intersections on Leetsdale (at Cherry and Dahlia) were dangerous and hard to navigate. While counting bikes and pedestrians at the intersection of Cherry and Virginia, most bicyclists were observed riding on the sidewalk rather than in the street where they are supposed to ride. Similar observations were made at Cherry and Kentucky indicating that while this is a designated bike route, it does not have the perception of being safe to travel.

Mississippi Ave was also not looked upon favorably. The street changes from five lanes at Colorado Blvd to four lanes and then to three lanes as it approaches Birch St. It also has multiple left and right turn only lanes. Navigating this street segment is probably confusing for auto traffic and even more so for bicyclists. East of Dahlia there is no curb on the south side of the street and the shoulder is deteriorating. This uneven surface forces bicycle traffic into close contact with cars. The overall lack of a safe space to bike in Glendale creates a risky situation for those who wish to cycle in the community.

Impacts of Riverwalk

The Glendale Riverwalk will be a major destination in Glendale and the surrounding community, and will have a significant impact on the community. All of the new amenities, as well as the hotels and office space, will attract thousands of workers and visitors every day. High numbers of jobs as well as evening and weekend entertainment events may draw additional bicyclists and pedestrians to the Riverwalk. If bicycle and pedestrian infrastructure is built into this dense pedestrian-oriented project, the number of cyclists and pedestrians will only increase. The increasing number of people coming into Glendale everyday will not only increase pedestrians and cyclists, but also lead to an increase in conflicts between vehicles, bicycles, and pedestrians. The most significant impact of the Riverwalk to walking and biking in Glendale will be increased vehicular traffic. Increased traffic may mean more opportunities for crashes and amplify the view that biking or walking in Glendale is unsafe. Colorado Blvd is notorious for its traffic congestion and any additional congestion due to the Riverwalk will likely be focused onto Cherry Street making it even less safe for bicyclists.

Increased bicycle traffic will occur along the Cherry Creek Trail during the morning and afternoon rush hours, especially given the project's location directly adjacent to the Trail. With more bicyclists on the trail, and the

emphasis on pedestrianism at the Glendale Riverwalk, there will be more bicycle pedestrian conflicts along the Cherry Creek Trail. Steps should be taken to mitigate these issues. Glendale has considered redirecting bicycle traffic to the south side of the Cherry Creek in order to reduce some of these conflicts. Considering the potential for increased conflicts due to the development this may be a good idea. Glendale would need to study whether the cost of doing so outweighs the benefits of simply separating bike and pedestrian traffic on north side of the creek where the trail currently exists.

Given Glendale's youthful demographic there may be high demand for additional bicycle infrastructure to such a major destination. Most bicycle traffic within Glendale will originate in the southeast section of the city where nearly all the housing is located. Efforts to extend bicycle infrastructure into this area will be necessary to increase ridership in Glendale.

This is also an opportunity for the city to look at the how pedestrians are currently using the city and how the pedestrian experience can be improved. The Riverwalk development is specifically geared toward pedestrians, so Glendale can use this to further encourage visitors and employees of the development to get out and explore the City of Glendale. Glendale can work towards improving connections and wayfinding to important destinations in order to capture the maximum pedestrian users.

The City of Glendale hopes to create synergy between the Glendale Riverwalk and Infinity Park's rugby stadium and conference center. While Infinity Park is within walking and biking distance of the project, there is currently no clear path between the two sites. The disconnected nature of Glendale's built environment, and its lack of pedestrian and bicycling amenities, makes navigating between the Riverwalk and Infinity Park a difficult and potentially unsafe proposition. The distance could be covered more easily and safely if opportunities and infrastructure for bicycling and walking existed between the two facilities. Providing bike sharing facilities and bike paths would encourage such use as well as provide easy access for visitors to the Cherry Creek shopping district via the Cherry Creek Trail.

Recommendations

Recommendation AT-1: Plan and implement a complete sidewalks network that improves the connectivity within the city. It is recommended that the sidewalk network resemble a grid-like pattern to further improve the community's overall connectivity.

This will require adding sidewalks where they are missing and increasing the size (assuming there is enough right-of-way available) and condition of sidewalks that are narrow or in poor condition. Sidewalks should be at least 5 feet, though wider is preferable. The grid pattern will provide pedestrians safe and various route options to access retail establishments, restaurants, workplaces, and other destinations.

Recommendation AT-2: Install additional sidewalk access points to the walking path at Infinity Park, such as at the southeast corner of the park at Mississippi Ave and Cherry St.

This will provide better access to the park for people walking, and prevent possible "cowpaths" and other landscape damage created by people cutting through the grass to enter the park.

Recommendation AT-3: Create buffers between sidewalk and street ways.

Short-term, reduce Cherry Street to one traffic lane in each direction, place a bike lane on each side of the road and allow on street parking to create a buffer between pedestrians on the sidewalk and vehicles. This will increase the perception of safety, slow down traffic and create a more pleasant walking environment.

Introduce bike lanes and on street parking on Birch Street to calm traffic and create a better walking experience for pedestrians. Place bike lanes in both directions on Kentucky from Colorado to Cherry Creek to provide a buffer between pedestrians and motor vehicle traffic.

Long-term, consider putting in more permanent infrastructure that will buffer pedestrians on the sidewalk from the vehicular traffic, i.e. tree buffers, grass buffers, planters, bollards, etc.

Recommendation AT-4: Revise city policy to allow on street parking on Glendale streets where appropriate.

On-street parking safely buffers pedestrians from moving vehicular traffic, calms automotive traffic, and encourages economic development.

Recommendation AT-5: Promote safe roadway crossing through use of small block sizes, pedestrian refuge islands, and enhanced crosswalks.

Add pedestrian crossings in the middle of long streets, specifically Cherry Street, in between E Mississippi Avenue & E Kentucky Avenue, E Kentucky Avenue & Cherry Creek South Drive and Cherry Creek South Drive & E Virginia Ave. This will encourage pedestrian flow between the Riverwalk and other key amenities, including Infinity Park, King Soopers, and the Cherry Creek Trail.

Install crosswalks specifically at Mississippi Ave and Birch St, Mississippi Ave and Cherry St, Tennessee Ave and Cherry St, Virginia Ave and Birch St, Virginia Ave and Clermont St, and Cherry Creek Dr. South and Ash St. Such crosswalks will provide opportunities for people in or near the surrounding community to walk to Infinity Park, the Riverwalk development, and other destinations in a safe and controlled manner. Incorporate safety measures at these crosswalks, especially those along Mississippi and Virginia Avenues and Cherry Creek Drive South. These include raising the crosswalks slightly above grade, using a contrasting material such as brick or colored concrete, creating “bulb-outs” on either side of the street to reduce the distance that pedestrians are exposed to traffic, and installing pedestrian signals to alert oncoming drivers of pedestrians and bicycles crossing the streets

Recommendation AT-6: Provide pedestrian countdown signals to indicate how many seconds are left in the walk phase.

Pedestrian countdown signals increase safety for pedestrians of all levels of ability.[92] Countdown signals that implement sounds allow for a greater portion of the pedestrian population to cross safely. Additional crossing time should also be considered to provide enough time for all ages and abilities to safely cross. These should be considered at all crosswalks between the Glendale Riverwalk and Infinity Park, as well as other large intersections throughout the community.

Recommendation AT-7: Provide safe and convenient pedestrian connections to public and private amenities.

Improve connections between the Riverwalk Development to important amenities in Glendale. Currently Ash Street ends at E Ohio Avenue, cutting off pedestrian access to Whole Foods, Barnes & Noble, Tokyo Joes, the

Post Office, etc. The area has a lot of surface parking, discouraging pedestrians because parking lots are difficult to navigate by foot. Pedestrian pathways should be created through surface lots to provide clear, safe passageways.

Recommendation AT-8: Create a Birch Street bicycle and pedestrian corridor between the Riverwalk and Infinity Park.

Maintaining Cherry St. as the principal north/south bicycle route would require narrowing the street to two lanes to accommodate marked bicycle lanes. Given the traffic constraints and the potential for economic development along a quieter bicycle and pedestrian oriented street, a better option may be to direct bicycle traffic onto Birch Street. This would require creating a bicycle and pedestrian route through the existing office park south of the Riverwalk. This connection would be the most direct way between the Riverwalk and Infinity Park without compromising traffic flow on Cherry St.

Recommendation AT-9: Work with the City of Denver to place bicycle lanes on S. Forrest and E. Exposition.

This is a safer and easier transition across Leetsdale Dr. to the Denver neighborhoods to the north and connects several Glendale residential complexes to the Riverwalk. Both streets are wide enough for bike lanes and are ripe for improvements. This bike infrastructure could then tie into the Birch St. Corridor to create a safe and comfortable North/South bike route through the city.

Recommendation AT-10: Place bike lanes in both directions on Kentucky from Colorado Blvd. to Cherry Creek.

This will allow east/west bicycle connections from residences to amenities such as Infinity Park, City Hall, the post office, Playa Del Carmen Park and Whole Foods. It would also connect residents to the north/south bicycle route that connects to the Riverwalk and the Cherry Creek Bike Path.

Recommendation AT-11: Install bike lanes on other key, connecting streets, such as S. Ash St., S. Cherry St., E. Virginia Ave., and S. Birch St.

Bike lanes on these roadways will provide access to key destinations throughout Glendale, including the Riverwalk, Infinity Park, CitySet, and other hotels and amenities.

Recommendation AT-12: Work with the City of Denver to make bicycle improvements to E. Mississippi Ave.

Given the high number of vulnerable populations in this part of Glendale, making improvements to this street could provide significant health benefits.

Recommendation AT-13: Install bicycle sharrows on all feasible residential roadways, such as Dexter, Dahlia, and Tennessee.

The sharrows will alert motorists that they are to share the roadway with cyclists, creating a safer, more inviting space to ride a bike.

Recommendation AT-14: Encourage way-finding with signs, maps, and landscape cues to direct pedestrians to the most direct route. Provide signage indicating Glendale bicycle routes and local destinations at the Riverwalk, Infinity Park and at other bicycle route intersections.

Wayfinding: *encompasses all of the ways in which people orient themselves in physical space and navigate from place to place.*

A way-finding program should be introduced to help residents, employees and visitors navigate their way to all of the amenities Glendale has to offer. Wayfinding is a critical tool for directing pedestrian and bicycle traffic to the fastest, easiest and safest route to their destination. Glendale could implement a wayfinding program that encourages walking and biking by making it safe and convenient. Wayfinding can be accomplished in many ways including signage, changes in sidewalk patterns or audible signals.

Visitor Kiosks stations should be put in at major destinations, including the Riverwalk Development, Infinity Park and the hotels. These stations should have a map of the City that shows the location of all businesses and public amenities and the most direct route to get there. The way-finding program should include street direction signs to let pedestrians and cyclists know they are traveling in the right direction.

Recommendation AT-15: Provide streetscape amenities such as benches, landscaping, lighting, shade structures, and public art.

Walkable, aesthetically pleasing streets encourage people to walk to their destinations and create places that people want to spend time, becoming destinations themselves. The focus should be on main pedestrian thoroughfares, such as S. Cherry St., S. Birch St., S. Ash St., Cherry Creek South Drive, E. Virginia Ave., E. Mississippi Ave., and E. Kentucky Ave.

Introduce a shade structure program on these streets to encourage walking throughout the city in the hot summer months. Shade structures can include trees, transit shelters, and anything else that casts shade on the sidewalks. Also, amenities such as benches are important to those who may not be able to walk long distances without sitting, and lighting is important for pedestrians to feel a sense of safety as far as seeing and being seen.

Recommendation AT-16: Separate bicycle and pedestrian users along the Cherry Creek trail upon entering Glendale Riverwalk.

The Riverwalk will intensify the existing pedestrian and bicycle conflict on the Cherry Creek Trail. Separating bicyclists and pedestrians on the path will help eliminate conflicts between people using the path and encourage more people to walk there without the fear of being struck by a cyclist. Two separate paths should be put in, one designated for bicycles only and the other for pedestrians only, thus eliminating the conflict. Separation could be as easy as creating a crusher fine path for runners adjacent to the existing concrete trail or as complicated as redirecting the bicycle trail to the south side of the creek. Consider putting the through-path for cyclists on the south side of the Creek to create further separation from the Riverwalk users. Whatever option is selected, signage and ground markings are needed to clearly identify where users are to travel.

Recommendation AT-17: Ensure that design plans for open space at the Riverwalk include various programmed elements that encourage physical and social activities to replace those being lost at Creek Side Park.

Examples include a looped walking path or track, designated athletic fields, sufficient flat open space for playing sports, exercise stations along a walking path, terrace seating, and picnic or cafe tables. Provide paddle boats for public use in the project's navigable channel. Allow proposed amphitheater to be open to the public when not being used for private events.

Recommendation AT-18: Incorporate retail establishments within close proximity of its residences.

Evidence shows that this type of development pattern increases active transportation rates, decreases automobile use, and is directly correlated to reduced levels of obesity, chronic disease and stress.

Recommendation AT-19: Encourage the development of street-level shopping and restaurants along pedestrian and bicycle routes.

Shopping areas that are scaled to the pedestrian environment encourage pedestrian activity while also furthering economic development in the community. The businesses and pedestrians feed off each other, creating a safer environment for pedestrians.

Recommendation AT-20: Provide secure bicycle parking and changing facilities at the Glendale Riverwalk and major employment centers.

A key to increasing bicycle traffic is providing places to securely park bicycles, shower and change clothes. Since all the buildings at the Riverwalk have yet to be built these facilities should be included during design. The provision of bicycle changing rooms and storage facilities have been shown to encourage active transportation as a substitute for automobile use for commuting trips. The increased use of active transportation will lead to improved health outcomes while reduced automobile use will lead to improvements in regional and local air quality.

To encourage the provision of bicycle and pedestrian improvements, financial incentives could be provided to local businesses. Possible options could include reduced inspection fees, density bonuses, streamlined permitting, and partially subsidized improvement costs.

Recommendation AT-21: Encourage bicycle parking at shopping and entertainment destinations throughout Glendale.

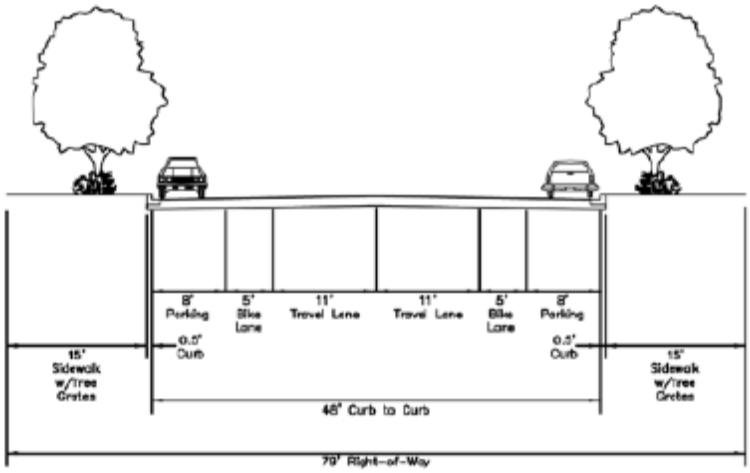
Walking surveys of Glendale indicated few places for bicycle parking. Encouraging highly visible bicycle racks for parking at businesses would help encourage ridership. As noted in the Recommendation AT-20, financial incentives could be used with local businesses.

Recommendation AT-22: Provide B-Cycle stations at the Riverwalk and Infinity Park stadium to encourage ridership between the two destinations.

Since the Glendale Riverwalk contains two hotels, having a bike sharing system would provide visitors an opportunity to utilize Glendale's bicycle amenities. It would connect them to destinations in Glendale as well as the Cherry Creek Mall and Downtown Denver via bicycle.

Recommendation AT-23: Maintain or increase residential density throughout the city.

It has been shown that density rates of 13 persons per acre can reduce automotive usage and increase active transportation rates which can lead to reduced levels of obesity, chronic disease, and stress, improving the health of the overall community.



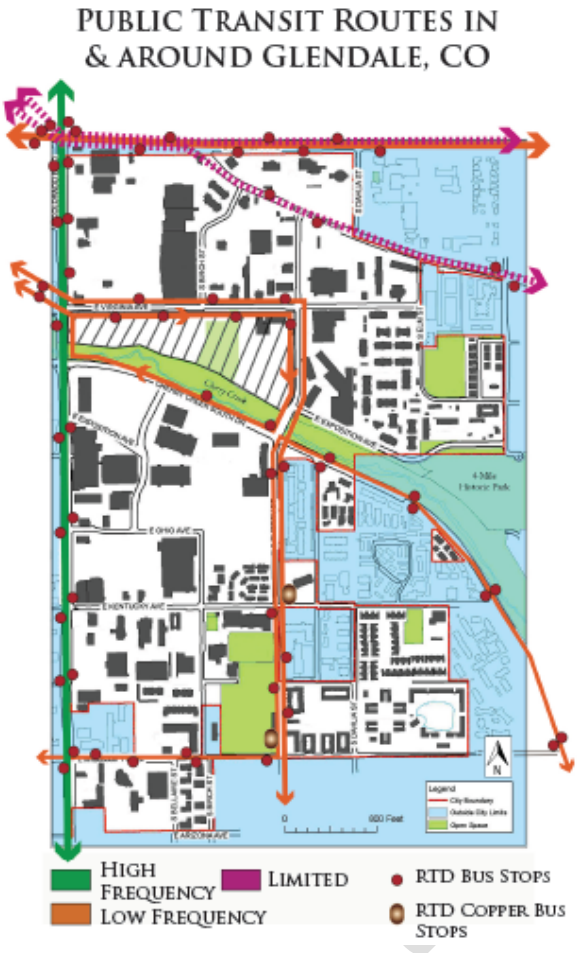
SOURCE: CITY OF LOS ANGELES DEPARTMENT OF CITY PLANNING
WALKABILITY CHECKLIST GUIDANCE FOR ENTITLEMENT REVIEW

SOURCE: CITY OF LOS ANGELES DEPARTMENT OF CITY PLANNING;WALKABILITY CHECKLIST GUIDANCE FOR ENTITLEMENT REVIEW

Public Transit

Public transit can play an important role in living a physically active lifestyle. Any time someone rides a bus or train, they walk or bike to and from the transit stop, becoming a pedestrian or cyclist.[93, 94] This is particularly true in Glendale since there are no park-n-rides in the community. For those who cannot afford a car or cannot drive due to age or disability public transit is a lifeline that gives them the ability to reach their place of work, run errands and access social and recreational opportunities. Public transit, however, should not be seen as a service only for those who cannot drive. Good transit provides a service that is appealing to all types of users and is a key component in creating a vibrant and healthy community.

Public transit has been noted to have significant health and economic benefits. Many studies have indicated that using public transportation promotes physical activity. One study found that people who use public transit are three times more likely to be physically active than motorists.[95] Transit riders tend to walk more because they have to travel on foot to get to and from the transit stop, as well as their origins and destinations. Another study showed that Public transit users are less likely to be overweight than people who drive. Using U.S. National Household Travel Survey data, researchers found that 29% of public transit users walked over 30 minutes per day just getting to and from the station, thereby meeting the government's recommended levels of daily physical activity.[96] A study of Charlotte light rail riders found that the average person lost 6.45 pounds after switching from driving to transit for a year.[97]



Economically, people who ride public transportation in lieu of owning and maintaining a motor vehicle are able to save a significant amount of money. In the Denver region, these savings add up $860 per month or $10,325 per year for the average household in 2011.[98] While saving money might not have direct impacts on physical health, freeing up family income may allow households to afford better health care, healthier foods, a gym membership or the cost of joining a local sports league.

Existing Conditions

Currently there are eight bus routes serving Glendale (see Table X). Three of these routes only provide service to downtown during the morning rush hours and service from downtown in the afternoon rush hours. Four routes provide service every 1/2 hour throughout the day and one route (the 40 on Colorado Blvd.) provides high frequency service with stops every 15 minutes.

Bus stops along these routes are located throughout the city and no resident is more than 1/4 mile away from their nearest bus stop. As residents are less likely to walk more than 1/4 mile to reach bus service, this means that the city is currently well served and there are no major gaps in coverage. Glendale recently constructed two signature bus shelters along Cherry Street near the new Infinity Park complex. These shelters provide a great deal of comfort at the bus stops, with ample seating, shelter from the wind, trash receptacles, current bus schedules and information boards regarding Glendale events. These stops are a positive addition to the transit experience and also provide a high level of visibility for the transit route. Other stops within Glendale are not as comfortable or aesthetically pleasing.

GLENDALE BUS ROUTES*

#	Frequency	Final Destination 1	Final Destination 2	Other Major Stops/Streets
1	30 min.	Glendale	Belmar	Cherry Creek, Downtown, Broadway, Santa Fe Art District, Mile High, Pepsi Center,
3	30 min.	Federal Center Park-n-Ride	Aurora Town Center	Alameda LR Station, Cherry Creek, Belmar, South Lowry
3L	**	Alameda & Airport Blvd.	Civic Center Station	Cherry Creek, Speer Blvd.
11	30 min.	Belmar	Aurora Town Center	Lousiana/Pearl LR Station, Broadway LR Station, Anschutz Campus
40	15 min.	Southmoore LR Station	60th & Dahlia (Commerce City)	Colorado Blvd. Colorado LR Station, Stapleton P&R, Rose Medical Center
46	30 min.	Denver Tech Center	Cherry Creek	Belleview LR Station, Univ Hills Shopping Center, Evans LR Station
79L	**	Civic Center LR Station	Nine Mile LR Station	Cherry Creek, Speer Blvd.
83L	**	Civic Center LR Station	Nine Mile LR Station	Cherry Creek, Speer Blvd.

* All routes are subject to change

** This bus only runs westbound in the morning rush hour; It only runs eastbound in the evening rush hour

In addition, 3 lines (E, F, H) of RTD's light rail service are located at the South Colorado Boulevard and Interstate 25 station, approximately 2 miles south of Glendale. The light rail can be accessed by the #40 RTD bus route, car, and bicycle from Glendale, and provides an additional mobility opportunity for Glendale residents and visitors (Regional Transportation District, 2011).[99] The lines provide quick and easy access to various cities, employment centers, and amenities along Interstates 25 and 225, including downtown Denver and the Denver Tech Center.

The U.S. Census 2006-2010 American Community Survey estimates that 10.8% of workers residing in Glendale take public transit to work (8% for Denver County, 4% for Arapahoe County).[100] Steps taken to increase this transit share would help improve local traffic congestion levels and improve the health of Glendale residents. Lower traffic congestion in turn will help encourage more people to walk and bike, creating an even better pedestrian and bicycling environment.

Impacts of Riverwalk

According to the U.S. Census Bureau there were nearly 9,000 employees working within the city limits of Glendale in 2009.[101] The Glendale Riverwalk Economic Analysis predicts a total of 3,400 jobs on site once the

project is completely built out and operating. Current rates of commutes by public transit are about 3% across the Denver/Aurora Metropolitan Statistical Area; in the city of Denver this increases to around 6%, and in Glendale it is nearly 11%. Assuming these rates hold steady, transit ridership into Glendale would only increase between 102 and 374 person trips per day [3,400 x 0.03 = 102; 3,400 x 0.11 = 374]. This in and of itself will not impact existing transit service very much. Depending on the level of increased traffic congestion in the area, the number of parking spaces provided, the cost of parking, and the level of improvements made to transit infrastructure, however, these numbers have significant potential to increase. Any significant increase in ridership due to the development will likely be dealt with by RTD through routine service adjustments.

The bigger concern will be increased traffic congestion in the vicinity of the Glendale Riverwalk if the remaining 94-97% of new employees drive to and from work (and work related errands) every day. Given the Riverwalk's relatively central location within the Denver Metro Area and its current access to bus service, all attempts should be made to increase ridership to and from the Glendale Riverwalk via transit. Doing so would help increase physical activity among employees and have the added benefit of allowing easier access to the development for low-income workers (especially in the retail/service sector) who cannot afford to own and maintain a car.

Increases of transit service due to the construction of the Riverwalk will also be extremely beneficial for the residents of Glendale by allowing them greater access to jobs outside of town. According to the U.S. Census' Local Employment & Housing Dynamics (LEHD) database only 4.3% of the employed citizens of Glendale work in Glendale. While there is some chance the Riverwalk could improve those numbers, the reality is that most workers will still continue to work outside of Glendale. The LEHD database also notes that the two principle destinations for Glendale workers are Downtown Denver and the Denver Tech Center.[102] Increases of service in these two directions would have the greatest impact. Additionally, a new Trolley system may be developed as part of the Riverwalk development. The trolley will circulate between Infinity Park, the Riverwalk, the Cherry Creek shopping district, and Four Mile Historic Park, providing an additional mobility option for residents and visitors to access amenities within and outside of Glendale.[103]

Recommendations

Recommendation PT-1: Prioritize infrastructure improvements near transit stops and public transportation stations.

Safe and convenient access to public transit will encourage more people to ride.

Recommendation PT-2: Provide signage/kiosks with bus related information (schedules, route maps, etc.) within the Glendale Riverwalk and near other key Glendale destinations such as Infinity Park and CitySet.

This will raise the profile of bus service and provide easy access to information for workers and visitors who might choose to use public transportation.

Recommendation PT-3: Ensure that all bus stops adjacent to the Riverwalk are highly visible and provide adequate signage, shelter, lighting and seating for safety and comfort.

Providing safe and secure bus stops increases the likelihood that people will use public transit services, especially during rush hours and evenings.

Recommendation PT-4: Improve the safety and attractiveness of bus stops throughout Glendale with amenities such as covered shelters, benches, trash cans and improved lighting.

Many of the area's bus stops contain little more than a sign designating the site as a bus stop. In order to make taking the bus an attractive option, as well as increase the safety and comfort of those waiting for a bus, each bus stop needs certain amenities such as shelters, benches and lighting. This is especially important in areas where safety is a real or perceived concern. It is also important to have good amenities at stops near senior housing facilities.

Recommendation PT-5: Incentivize employers to subsidize employees who commute to work via mass transit, bicycle or foot.

Incentives are sometimes necessary to encourage active transit for those who are very comfortable driving to work. Reduced costs for bus passes or rewards programs for utilizing active transit would help get more local workers out of their car and on to healthier alternatives. In particular, RTD's EcoPass program should be targeted.

Recommendation PT-6: Work with RTD to extend the Route 1 bus south to Mississippi Avenue.

MAP 9:3 - THE MAP BELOW SHOWS THE AREAS OF DENVER THAT A PERSON, STARTING AT THE CHERRY ST./MISSISSIPPI AVE. INTERSECTION COULD REACH IN 30 MINUTES OR LESS BY WALKING OR USING PUBLIC TRANSIT.

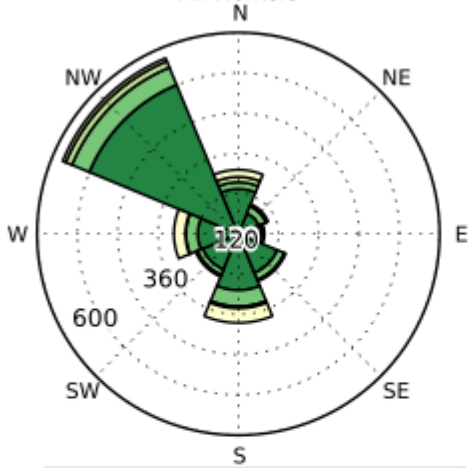
Extending this route would provide direct access to Downtown for low-income residents in the southeast corner of Glendale by eliminating the need for a long walk to reach the 1 bus or a transfer from either the 11 or 46 to the 1 bus (or any other bus) that heads downtown. As can be seen in Map 9:3, a person travelling from Cherry St. and Mississippi Ave. cannot reach Downtown Denver in less than 30 minutes. Doing so would also improve access to Infinity Park from Downtown and Cherry Creek and make for multiple connections between the 1, 11 and 46 routes.

Recommendation PT-7: Work with RTD to increase Bus service from the Glendale Riverwalk to Downtown Denver and the Denver Tech Center.

As can be seen in Graphic 9:3, most Glendale residents travel towards Downtown or the Denver Tech Center for work. To do so, however, requires a 30 minute commute. Increasing public transit service to 20 minute intervals would help encourage increased ridership.

Additionally, increasing late evening service would benefit service employees with late shifts and help prevent drunk driving by patrons of the entertainment district.

Job Counts by Distance/Direction in 2009
All Workers



Jobs by Distance - Home Census Block to Work Census Block

	2009 Count	Share
Total All Jobs	1,680	100.0%
Less than 10 miles	1,278	76.1%
10 to 24 miles	224	13.3%
25 to 50 miles	46	2.7%
Greater than 50 miles	132	7.9%

Automobile Traffic

Managing traffic in Glendale should be seen as a way to improve pedestrian, bicyclist and automobile safety. Currently the City of Glendale caters to motor vehicle usage by providing an abundance of surface parking lots and wide streets. These types of automobile incentives reward personal vehicle use and discourage walking, biking, and transit use. By encouraging automobile use for even short trips people end up spending more money on transportation and lead more sedentary lives than they would if walking, biking, and transit were encouraged.[104] One of most important benefits of walkability is the decrease of the automobile footprint in the community. Traffic congestion leads to an increase in carbon emissions and traffic collisions. This can lead to chronic disease such as asthma and other respiratory diseases, increased stress and the amount of time being physically active. Traffic volume can be reduced if more people choose to walk rather than drive.

Traffic calming is an increasingly common and effective means to manage high traffic volumes and speeds. According to the Victoria Transport Policy Institute, traffic calming measures have a very beneficial impact on walking and cycling rates, and increased public transit use. As can be seen in the chart below, the results are mixed for reducing total traffic counts and improving overall access.[105]

Reducing or managing the speeds on roadways, separating the pedestrian and/or bicyclist from vehicle conflicts via specific infrastructure, and increasing the visibility of pedestrians and bicyclists can result in significant safety improvements within a community. For example:

- By converting traffic signals to multi-way stop sign control of 199 U.S. intersections, the amount of pedestrian vehicle crashes was reduced by 25%[106]
- By installing exclusive pedestrian signal phases at 1297 intersections in 15 U.S. cities, the risk of pedestrian vehicle crashes was reduced by half[107]
- On U.S. roads with more than 2 lanes and 15,000 vehicles per day, the roads with marked crossings and raised medians with refuge islands, had half the pedestrian crash rate as those without raised medians[108]
- By converting conventional intersections to roundabouts within European cities, the rate of pedestrian crashes was reduced by 75%[109]
- By increasing the intensity of roadway lighting, Australia experienced a 59% decrease in nighttime pedestrian crashes[110]
- Traffic calming infrastructure can result in 11-15% reduction in automobile crashes with injuries[111]

As highlighted by such statistics, traffic-calming infrastructure elements have proven to be highly effective methods of reducing crashes and improving the overall safety of the transportation environment within a community.

TABLE 6:2

CHANCES OF PEDESTRIAN SURVIVING A TRAFFIC COLLISION	
SPEED	SURVIVAL RATE
20MPH	95%
30MPH	55%
40MPH	15%
SOURCE: US DEPARTMENT OF TRANSPORTATION	

Traffic collisions are a significant concern for cyclists and pedestrians, both for the actual harm they cause and for possibly deterring people from more walking and biking. According to the National Highway Traffic Safety Administration (NHTSA) there were 4,784 pedestrians killed in automobile collisions in 2008. On average this amounts to one pedestrian killed every 107 minutes.

Reported pedestrian injuries due to a motor vehicle collision amounted to 59,000 in 2009, roughly one every nine minutes. Since many pedestrian injuries go unreported, the actual injury rate is likely much higher.[112]

According to NHTSA most pedestrian/vehicle collisions occur in urban areas (71%), in normal weather conditions (88%), and between 6pm and 6am (66%). Most pedestrian deaths are white males, although children and the elderly face the greatest risk for serious injury. Pedestrian deaths and injuries are most often due to driver inattention. 50% percent of all crashes are while a pedestrian is crossing at an intersection.[113] Motor vehicles exceeding the safe speed, often driving at the designed speed (rather than the posted speed limit), are most likely to cause a pedestrian fatality. As seen in Table 6:2 the faster a vehicle is travelling the more likely a severe pedestrian injury or death will occur.[114] Regarding pedestrian-vehicle collisions, studies show that:

- Both main-streets and cross-streets with medians were negatively associated with pedestrian crashes. Medians offer a refuge for pedestrians to concentrate on crossing one direction of traffic at a time.
- The number of right-turn-only lanes at intersections has a positive association with pedestrian crashes.
- The number of non-residential driveways within 50 feet of each intersection is positively associated with pedestrian crashes.
- The number of commercial retail properties within 0.1 miles of the intersection is positively associated with pedestrian crashes. Commercial corridors have particularly risky interactions between vehicles and pedestrians.
- The percentage of neighborhood residents living within a .25 mile of the intersection who are younger than the age of 18 years was positively associated with pedestrian crashes.

Additional evidence on the impact of automobile traffic includes:

- People reporting heavy traffic was not a problem were more likely to engage in physical activity compared to those reporting heavy traffic was a problem.[115]
- Introduction of traffic calming schemes are associated with 20% increase in walking/pedestrian activity, improvements in local traffic-related nuisances, and improvements in physical health.[116]

Existing Conditions

As in most U.S. cities, the majority of Glendale residents (71.2%) drive to work alone. Glendale's average travel time to work is 29.6 minutes, and data from the U.S census indicates that only around 4% of Glendale residents work in Glendale.[117] While there is a lack of data on the means of transportation for the nearly 9000 workers employed in Glendale, it can be assumed (from the vast amount of parking, local traffic volumes and metro-wide commuting statistics) that the vast majority of them drive to Glendale by themselves. This causes a great deal of traffic in the morning and evening commute hours. Traffic volume remains high even during non-rush hours due to the large number of auto-oriented retail establishments located in and around Glendale.

Traffic Volume: Predominantly an automotive-oriented community, the centrally located City of Glendale can be accessed via a hierarchy of roadways. For example, large, multi-lane roadways such as Colorado Boulevard and Alameda Avenue and Leetsdale Drive reside in the western and northern boundaries of Glendale. Medium sized arterials such as Cherry Creek Drive South, East Mississippi Avenue, East Kentucky Avenue, East Virginia Avenue, and South Cherry Street provide valuable east, west, north, and south connections throughout the city. In addition, a series of local roadways such as South Birch Street, South Dahlia Street, and South Ash Street, further connect Glendale's citizens and visitors to areas and amenities both within and outside of the city. Due to the

large amount of roadways serving Glendale, and it being an automotive-oriented community, large volumes of automotive traffic regularly travel along roadways throughout Glendale. In 2010, the average amount of daily vehicle trips in and out of Glendale was 44,100.[118]

Table 6:4 shows traffic volumes at locations in and around Glendale. The highest trafficked streets are along the North and West edges of the city, while traffic volumes on streets within Glendale tend to be more moderate.

Traffic Volume Counts In & Around Glendale		
Location	Average Count	Source
Colorado Blvd: N/o 1st Ave.	66,236	CDOT
Alameda Ave: E/o Colorado Blvd.	40,149	CDOT
Leetsdale Dr: NW/o Cherry St.	33,115	CDOT
Mississippi Ave: E/o Colorado Blvd.	16,693	CDOT
Cherry Creek Dr. S: E/o Colorado Blvd.	13,883	RTD/ City of Glendale
Cherry Creek Dr. S: N/o Mississippi Ave.	13,507	Consultant
E Kentucky W/o Cherry Creek Dr. S	3,598	City of Glendale

Parking: Map 6:1 shows the surface parking lots within the city of Glendale. As can be seen from the map, these surface parking lots constitute a considerable presence in the city and lead to the perception that Glendale is designed more for the car than for people. Convenient parking and the increased distances between buildings due to surface parking lots only serve to increase traffic volume within the City.

Street Widths: Many streets in Glendale are much wider than necessary for the traffic volume they carry. Wide streets tend to encourage drivers to drive at speeds higher than the posted speed limit. These higher speeds are often referred to as the design speed. Research shows that drivers, in the absence of law enforcement, tend to drive at the design speed rather than at the legal posted speed resulting in an unsafe environment for pedestrians, bicyclists, and other drivers.[119] Safety increases when traffic-calming measures are put in place such as narrow lanes, street trees along the roadway and on street parking. These less forgiving designs are effective because they provide more visual information and driving cues than do conventional streets, thus requiring drivers to proceed with safe and appropriate driving speeds.[120]

THE MAJORITY OF PEDESTRIAN DEATHS BY MOTORVEHICLE OCCUR IN STREETS WHOSE DESIGN SPEED IS HIGHER THAN THE LEGAL SPEED LIMIT AND ARE OFTEN CAUSED BY PEOPLE SEEKING A SHORTCUT THROUGH A COMMUNITY.

In order to manage automobile traffic in Glendale, streets with excessive width should be addressed. Map 6:3 shows the street widths of streets in Glendale. The average street width is 55 feet and the range is 28 feet to 138 feet on Colorado Blvd. The State of Oregon's Guide for Reducing Street Widths, defines a "narrow street" as one that is no wider than 28 feet. By that measurement there are no narrow streets in Glendale.

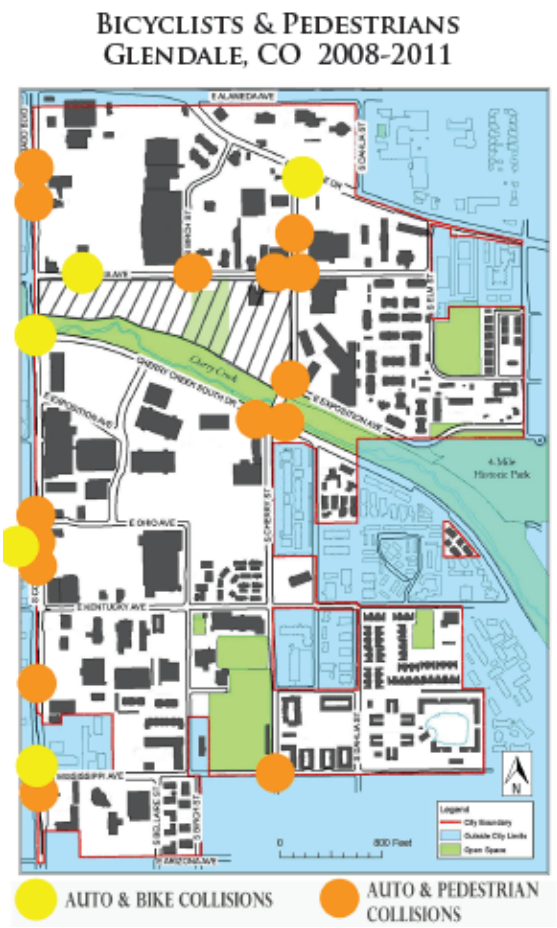
Traffic Safety: Traffic collision data, made available by the Glendale Police Department, shows that between January 2008 and June 2011 there have been 861 traffic collisions within Glendale city limits. The crash data did not account for any unreported crashes but did include reported hit and run incidents. The reports were reviewed to determine the following:

- Where the crash took place
- What time the crash took place
- If certain roadways, intersections, and parking lots had a higher volume of crashes
- If a DUI citation was involved with the crash
- If the crash involved automobiles, pedestrians, and/or bicyclists
- If the crash resulted in an injury or fatality

All crashes not involving a pedestrian or bicyclist were mapped separately, and total crashes were fixed to the intersection or address of the occurrence of the crash. Map 6:5 shows the 613 traffic collisions that are located in clusters. The clusters are mapped and each circle has a number corresponding to the number of collisions that have occurred at that location over the past three years. Only clusters of four or more collisions are mapped. This resulted in 35 locations throughout Glendale. Out of the 613 mapped collisions, 459 (74.8%) occur at intersections.[121]

Rank	Location of Crash	Total # of Crashes	# of Crashes w/Peds	# of Crashes w/bikes
1	S. Colorado Blvd & E. Virginia Ave.	61	0	0
2	S. Colorado Blvd & Cherry Creek Dr. S.	43	0	1
3	S. Colorado Blvd & E. Exposition Ave.	38	1	0
4	S. Colorado Blvd & E. Mississippi Ave.	33	0	1
5	4301 E. Virginia Ave.	31	1	1
6	S. Colorado Blvd & E. Ohio Ave.	29	1	0
7	400 S. Colorado Blvd	24	2	0
8	S. Cherry St & E. Virginia Ave.	24	2	0
9	Leetsdale Dr. & S. Cherry St.	22	0	1
10	S. Colorado Blvd & E. Kentucky Ave.	21	0	0
15	S. Cherry St. & Cherry Creek Dr. S.	14	2	0

Borders Riverwalk development site



In addition, the data highlighted the top 10 crash points within Glendale, 3 of which border the Riverwalk development (Colorado Blvd & Virginia Ave, Cherry St & Virginia Ave, and Colorado Blvd and Cherry Creek Dr South). Further, another critical intersection bordering the development, Cherry Creek Dr South and Cherry St, was number 15 on the list of crash points. This data is shown in the Top 10 Crash Reports chart.

Vehicular collisions with bicyclists and pedestrians were also mapped in Glendale. As seen in Map 7:2 the majority of collisions between pedestrian and vehicle occur on S Colorado Boulevard and S Cherry Street, while collisions with cyclists were scattered throughout the community. The city would like to

make S Cherry Street an important multimodal connections, so particular attention should be paid to the conflicts there.

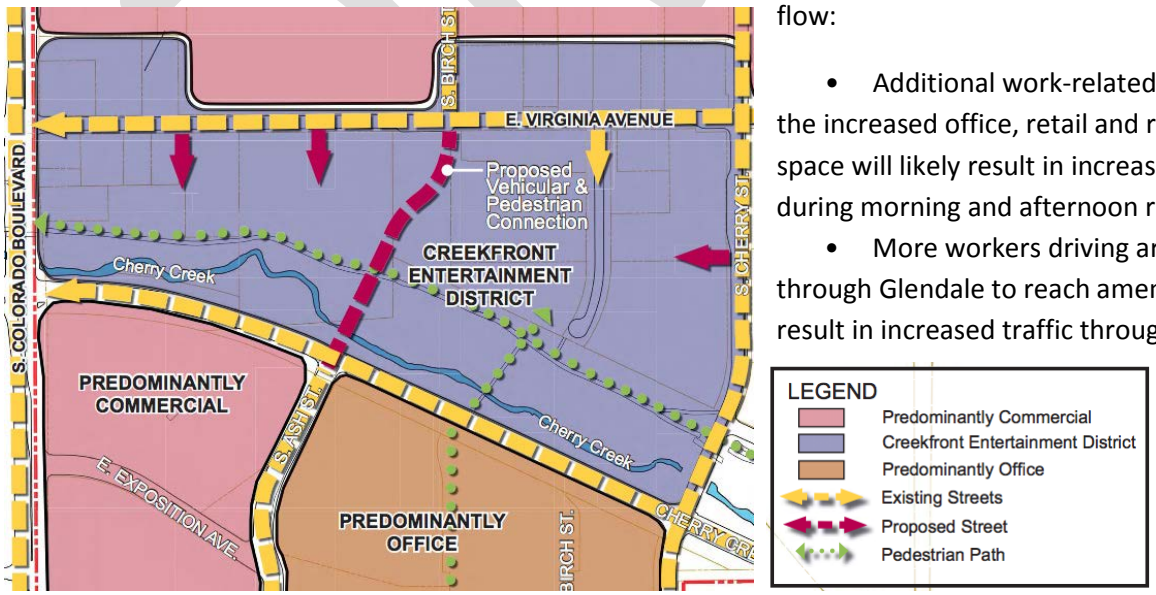
The streets in Glendale are conducive to pedestrian and vehicle conflicts. This is because the streets in Glendale are very wide, which means it will take pedestrians longer to cross, therefore increasing the chance for a conflict. On average, Colorado is 110 feet wide and Cherry Street is 60 feet wide. S Cherry Street does not provide any medians for pedestrians to take refuge. Focusing on the intersection of S Cherry Street and Cherry Creek South Drive, where two pedestrian-vehicle collisions occurred, the street is about 91 feet wide. There is a right-turn-only lane present and there is no median. All of these factors make crossing this intersection less safe for pedestrians.

DUI Arrests: Map 6:6, shows the locations in Glendale that have had two or more DUI arrests since 2008. It is clear that the majority of DUI accidents are clustered at 490 S Colorado Blvd, which makes up 12.16% of total DUI's since 2008. Nearly 32% of DUI arrests since 2008 resulted in a collision and 64.86% of DUI's occurred between 9:00pm and 5:00am. DUI hotspots can create especially hazardous areas for cyclists and pedestrians to navigate at night.

Connectivity: As discussed previously under Active Transportation, Glendale suffers from a lack of street connectivity. The street grid that is common throughout Denver breaks down in Glendale in favor of large "super blocks" that can often be navigated through a series of interconnected private parking lots and private drives. This network of non-public streets can make Glendale confusing for drivers as well as pedestrians and may lead to additional traffic collisions. One example of this is the high number of comments received regarding the high risk of pedestrian/automobile collisions in the Whole Foods parking lot. The lack of connectivity for vehicle traffic also increases vehicle miles travelled within the community, which adds to air pollution and traffic congestion and increases the amount of time drivers spend in their car.

Impacts of Riverwalk

There are many important impacts that the Glendale Riverwalk will have on motor vehicle traffic and traffic flow:



- Additional work-related traffic due to the increased office, retail and restaurant space will likely result in increased congestion during morning and afternoon rush hours.
- More workers driving around or through Glendale to reach amenities would result in increased traffic throughout the day.

- Riverwalk Development would increase congestion along adjacent streets, especially along Colorado Blvd., Virginia Ave., Cherry St. and Cherry Creek Drive South.
- Investments made to improve areas surrounding Riverwalk could increase overall connectivity.
- Increased motor vehicle traffic due to the addition of 3,000 proposed new parking spaces and the draw of an entertainment district in the Riverwalk.
- The Riverwalk will increase connectivity in Glendale, by connecting Birch St. to Ash St., as can be seen in Map 6:7. This provides an additional connection across the Cherry Creek and breaks up an existing super block.

Recommendations

Recommendation T-1: Adopt and implement a "Complete Streets" policy.

Complete Streets are streets that support all modes of transportation and serve all people making use of a street, including cyclists, pedestrians, transit users, and motorists. Complete streets particularly emphasize age friendly strategies, economic vitality, and a vibrant public realm along the street and in the corridor.

Creating a complete streets policy would help integrate the needs of all road users into everyday planning practices rather than simply automobile traffic. The policy should require all new developments to contribute to the creation of complete streets by providing improved sidewalk infrastructure and pedestrian and bicycle amenities.

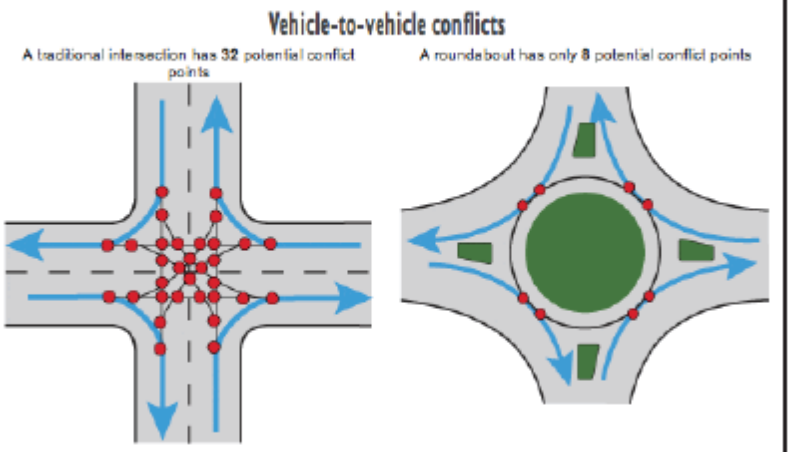
Recommendation T-2: Install roundabouts at key intersections linking Infinity Park to the Riverwalk and elsewhere throughout Glendale.

BELOW IS AN CONCEPTUAL RENDERING OF A ROUND-ABOUT AT THE CHERRY STREET, KENTUCKY AVE. INTERSECTION, CREATED BY DAN BURDEN OF WALKABLE COMMUNITIES, INC.

SOURCE: DAN BURDEN'S CITY OF GLENDALE, S. CHERRY ST. WORKSHOP, SEPT. 1, 2011

Roundabouts should be where feasible as research shows that they are safer for automobile and pedestrian traffic. Roundabouts are able to handle roughly 30% more traffic and require much less maintenance than a traditional traffic light intersection because there is no signal.[122, 123] The placement of roundabouts at these intersections would improve traffic flow and allow for reduced street width. Recommended intersections for roundabouts include E. Kentucky Ave. and S. Birch St., E Kentucky Ave. and S. Cherry St., Cherry Creek South Dr. and either S. Birch St. or S. Ash St. (depending upon the final Riverwalk street configuration), Cherry Creek South Dr. and S. Cherry St., and S. Ash St. and E. Ohio Ave.

GRAPHIC 6:8



SOURCE: U.S. DEPARTMENT OF TRANSPORTATION

As can be seen in Graphic 6:8, roundabouts limit the nodes-of-impact that are created by normal intersections. Roundabouts improve navigation by providing an easy, safe location for U-turns, an action that is increased when seeking parking or an event location.

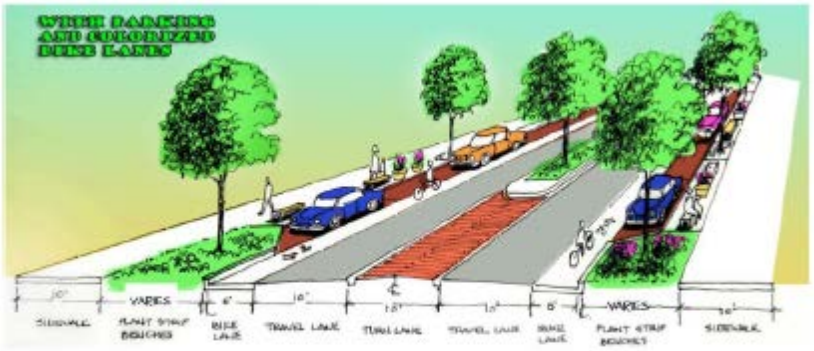
Recommendation T-3: Institute traffic calming measures along Cherry, Virginia, Kentucky, Mississippi, and Cherry Creek Drive.

Traffic-calming treatments help ensure that motor vehicles are operated at or below safe speeds. Traffic calming measures are an element of the streetscape that the City of Glendale should address. The cost of traffic calming measures cover a wide range, allowing the city to implement some traffic calming devices quickly for little to no cost. Safety, aesthetics, and effectiveness should not be sacrificed due to cost as Glendale moves toward becoming a true tourist destination.

Traffic calming measures can come in many forms. The few listed below may be a good fit for certain street sections of Glendale:

- Road diets (reducing the size of the roadways, eliminating automotive lanes, and providing additional room for pedestrians and bicyclists)
- Installation or improvement of sidewalks
- Medians
- Pedestrian refuge islands (areas where pedestrians can stand safely in the middle of an intersection)
- Speed bumps/humps
- Converting traffic signals to multi-way stop signs at low-volume intersections
- Exclusive traffic signal phasing for cyclists and pedestrians
- Raised crosswalks
- Textured pavements
- Traffic signs and pavement markings, including repositioning stop lines further back from crosswalks
- Neckdowns/bumpouts (curb extensions to reduce crossing distance at intersections)
- Bike lanes

Recommendation T-4: Increase on-street parking on streets with excess right-of-way, including (but not limited to) S. Ash St., S. Cherry St., E. Exposition Ave., E. Ohio Ave., E. Virginia alongside the Glendale Riverwalk.

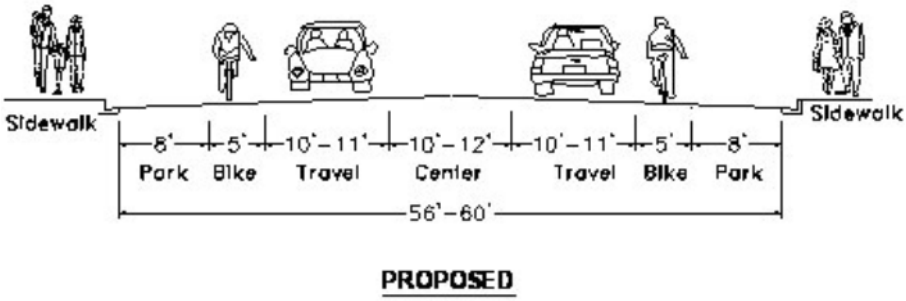


SOURCE: DAN BURDEN'S CITY OF GLENDALE, S. CHERRY ST. WORKSHOP, SEPT. 1, 2011

On-street parking creates an additional buffer between pedestrians on the sidewalks and moving vehicles on the adjacent street. They also serve to slow down the passing traffic, helping to balance the overall use of the street. On-street parking could be limited to one side of a street to allow for bike lanes and sufficient traffic lanes.

Recommendation T-5: Use bike lanes to narrow driving lane widths along S. Cherry St., S. Ash St., S. Birch St., E. Mississippi Ave., E. Exposition Ave., E. Kentucky Ave. and S. Forest St.

Bike lanes are a significant traffic-calming tool, inexpensive and efficient at heightening motorist awareness. Motorists drive more slowly and with greater alertness, increasing motor vehicle, pedestrian, and bicyclist safety.



PROPOSED

Recommendation T-6: Implement traffic wayfinding system to create smooth traffic flow throughout the community.

There should be appropriate use of signs and signals for motorists to more easily navigate throughout Glendale by offering clear directions and keeping distractions at a minimum. Proper wayfinding systems allow automobile drivers to be more focused and alert because little effort is spent navigating a community. Also, wayfinding decreases unnecessary miles travelled through a community by allowing drivers to navigate to a destination in the shortest, safest and easiest manner.

Recommendation T-7: Provide incentives to avoid driving while under the influence.

Research shows that providing incentives to patrons of an entertainment district decreases driving under the influence in the community.[124] A proposed incentive might be to have the City of Glendale/Riverwalk establishments provide partial reimbursement for taxi fare and transit fare to be used at the restaurant or bar. This could be paid for by an additional tax on establishments to fund fare payments.

Recommendation T-8: Connect E. Ohio Ave. to S. Cherry St. to improve automobile and pedestrian connectivity.

Providing this new street connection would reduce the size of the existing super block in this area and improve connectivity. This connection would increase access points to S. Cherry Street and provide an additional crossing for pedestrians.

Personal Safety

Crime and perceived safety are very important to the health of residents within an area. Fear of crime can lead to restrictions in outdoor activities, including walking and cycling, and ultimately to increased car use.[125] Those who fear crime may therefore be less physically active, lead a lifestyle that increases the risk of cardiovascular disease, poor mental health, and poorer physical and cognitive functioning.

A significant portion of walking, cycling, and physical exercise takes place in the public realm. If these spaces are crime-ridden or perceived as unsafe, however, people are less likely to go there.[126] Therefore, an emphasis on increasing perceived safety and lowering opportunities for crime is important in promoting active transportation. It should be noted that certain populations are more sensitive to the issue of personal safety in the built environment than others. Research to date shows that crime or fear of crime is linked to lower physical activity levels in women (especially minority women), young people, and seniors, and is a barrier to recreational walking for low-income individuals.[127]

In order to improve the health of the community, steps must be taken to eliminate the risks associated with increased criminal activity and any perceived lack of safety. Changes in environmental design are often more effective than simply providing additional police power and many communities are embracing “Crime Prevention through Environmental Design” (CPTED). CPTED includes efforts to increase surveillance of public spaces and provide visibility for pedestrians and other users of the environment.

Increasing surveillance is often referred to as “putting eyes on the street.” When there is a perception that people are watching, crime is often less likely to occur and people tend to feel safer.[128] Studies have shown that anonymous and deserted parks, forests, recreational areas, and transit stops are particularly frightening spaces for many people and are avoided at all costs.[129]

Eyes on the street are created by situating buildings directly adjacent to the street and providing windows, balconies, patios and other public spaces that can allow people in those buildings to watch what is going on in the street. Thus the presence of physical features that increase the visibility of a site (such as open storefronts, unobstructed windows, and well-lit areas) and the absence of features that can block views (for example, blank walls, thick vegetation) can significantly reduce crime rates in a neighborhood. Mixing businesses and residences tends to provide the best 24 hour surveillance as residents tend to be around when businesses are closed and vice versa.

Security lighting does not necessarily prevent or stop crime, but it can help owners protect people and property. Good pedestrian lighting offers the natural surveillance people need to feel comfortable walking across a

parking lot to their cars. Lighting can prevent surprises from "jump-out" criminals, or give pedestrians the opportunity to request assistance, to turn and go another way, or to retreat.[130]

Existing Conditions

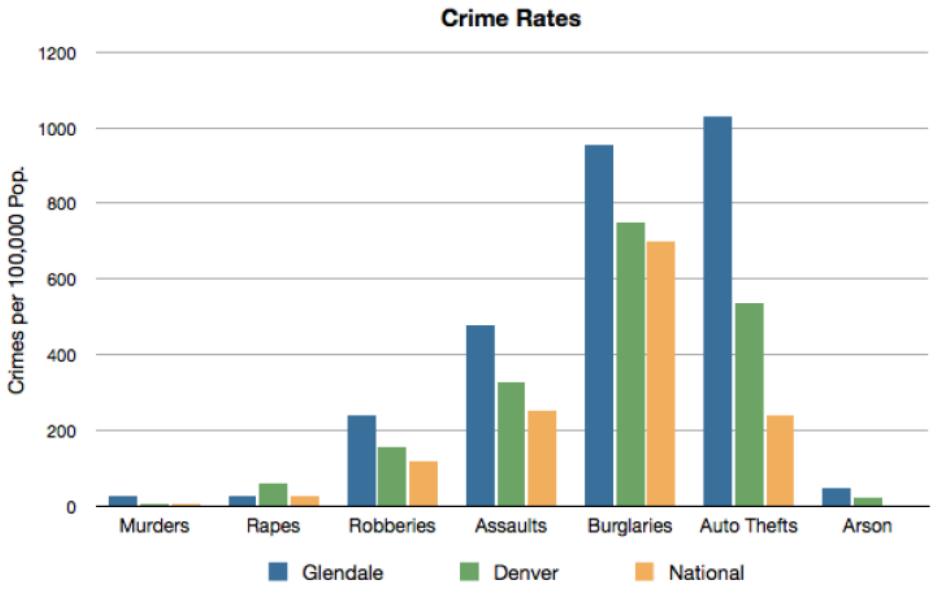
Table 5:1 compares crime rates in Glendale to those in Denver and the nation as a whole. Glendale's crime rate in most categories is higher than both other geographies indicating that crime in Glendale is potentially a significant deterrent to active transit.

TABLE 5:1

GLENDALE MAJOR CRIME STATISTICS:

THE STATISTICS IN THIS GRAPH COMPARE GLENDALE, DENVER AND NATIONAL CRIME STATISTICS. IN ORDER TO COMPARE GLENDALE STATISTICS TO THE NATIONAL RATE GLENDALE STATISTICS HAVE BEEN CONVERTED TO A PER 100,000 POPULATION RATE.

SOURCE: GLENDALE POLICE DEPARTMENT, 2011



Roughly 10% of respondents in the community questionnaire indicated that crime was a deterrent to walking or biking more. Conversations with active transit users in Glendale uncovered a few specific safety concerns. One participant noted that she felt uneasy jogging at night along the north sidewalk of Cherry Creek Drive South. She indicated that the tall grasses and shrubs planted between the sidewalk and the street (while beautiful during the day) make it difficult for an individual to be seen by passing vehicles and pedestrians on the opposite side of the street at night. Another person indicated that there was a need for better lighting under the Colorado Blvd. where it crosses the Cherry Creek Trail. A small group of women commented that there was a lack of lighting along the trail in general.

Glendale has a great number of bus stops as part of the RTD network. To encourage the use of transit facilities, individuals must feel safe waiting for busses and walking to and from bus stops. Individuals are less likely to use available transportation if they perceive a lack of safety in waiting areas for public transportation. Studies have shown that bus stops that allow opportunities for escape by criminals via dark alleys, empty parking lots and other passages tend to have more crime. Bus stops that not visible to other pedestrians and vehicular traffic are also particularly troubling for transit users. It is therefore important to make sure all bus stops are adequately lit and highly visible.

The Glendale Police Department does have a number of programs to raise community awareness about safety and crime prevention. Citizens can enroll in the Citizen Alert System provided by Arapahoe County E 9-1-1, an alert system that notifies citizens of emergency situations. Police Incident Notification Cards (PIN) are a tool for

owners of rental properties so residents can easily alert police of safety concerns. Also, properties can enforce their own policies to eliminate disturbances and criminal activities near the rental property.[131]

Glendale's Business Crime Watch Program was created in 2001 and membership exceeds 100 members as last reported. Business owners are informed of local crime trends that may affect them and their customers. Owners are also taught how to properly secure their property and reduce loss from burglary, robbery, shoplifting, fraud and internal theft. An important concept of these programs is the increased communication between Glendale citizens and business owners and the police department so individuals feel more comfortable contacting the department and prepared to protect themselves from potential harm.[132]

Impacts of Riverwalk

The Riverwalk Project and its associated nightlife will certainly add to the number of people walking around Glendale in the evening hours. Appropriate lighting and visibility must be taken into account in areas where individuals frequent at night, such as entertainment venues, parking lots (structured and unstructured), restaurants, retail shops, and paths along the creek. Efforts should be made to ensure the personal safety of users along the creek by providing appropriate lighting and creating unobstructed views of the trails and amenities along the creek, and limiting hiding places for criminal activity.

Another significant component of pedestrian traffic will be between Infinity Park and the Riverwalk on game days. It will be important to ensure that these routes are clearly marked and well lit. Most of the existing development along this pathway does not include residential housing or retail businesses that would encourage eyes on the street after dark and these routes may be perceived as unsafe without additional safety provisions or further development.

Recommendations

Recommendation PS-1: Promote crime prevention through environmental design (CPTED) within the Riverwalk area.

The final design for the Riverwalk area should ensure that there are adequate eyes on the streets and plazas by providing ample fenestration on ground level businesses. It should also make sure that entrances and exits to buildings are highly visible, and that private spaces are clearly defined. Doing so will help create a safer environment for those who work and visit the area.

Recommendation PS-2: Provide security call boxes within the public spaces and parking garages of the Riverwalk.

Well lit and well-marked call boxes should be placed within the development so that visitors can easily reach security and or the police in the case of an emergency or other unsafe situation. This is especially important in parking garages and areas of low visibility near the development.

Recommendation PS-3: Provide adequate way-finding signage to destinations and parking areas within the Glendale Riverwalk and important destinations outside the development.

People often feel safer when they are clear about where they are going. Providing such signage may also encourage safety by directing visitors to the safest routes between destinations.

Recommendation PS-4: Ensure there is uniform and consistent lighting on pedestrian routes throughout the city.

Uniform lighting will enhance pedestrian safety at night. This will be especially important as the Riverwalk will be a hub of night life. Encouraging pedestrianism after dark would provide a safer alternative than driving for those residents and hotel guests who have had one too many drinks at the local entertainment venues. Lighting should be at a pedestrian scale and non-intrusive in residential settings. Special attention should be made along the Cherry Creek Trail so that residents and visitors will be able to safely stroll along this natural amenity in the evening hours.

Recommendation PS-5: Promote eyes on the street in future developments around the Glendale Riverwalk.

It is very likely that the Riverwalk will spark new development around it. It is highly encouraged that new development includes residences that overlook the street in order to provide eyes on the streets in the evenings and nighttime hours when office workers are not around. Porches and balconies should be included on residential units that overlook the street to encourage more street life. Efforts should be made to ensure unobstructed views from commercial structures to streets, sidewalks and parking lots, eliminate hiding spots where criminals can easily escape and increase overall visibility within sites.

Recommendation PS-6: Encourage the elimination of litter, graffiti, and deteriorated property conditions (weeds, broken windows, etc.)

Blight is often a magnet for criminal activity. While Glendale is already a relatively clean city, efforts should be undertaken to ensure that it stays that way. The city should especially work on redeveloping the abandoned parcel immediately across from the Glendale Recreation Center in order to create a safer and more attractive corner.

Recommendation PS-7: Continue to support and promote community awareness programs and citizen alert systems.

Glendale has a good number of existing programs to assist in crime reduction. The City and Police Department should work on further promotion of these programs and development of new initiatives to deal with local crime issues.

Economic Benefits

HIAs and similar documents endeavor to make a case for actions to mitigate negative health impacts or to reinforce and support positive health impacts within the community as they relate to project proposals. This document has developed an evidence-based argument for intervening to address potential health impacts that result in changes to the community that affect active transportation. It is worth noting, however, that these same recommendations can result in improved economic development for the City of Glendale.

Economic development refers to progress toward a community's economic goals, including increases in economic productivity, employment, personal earnings, business activity and investment. Retail and employment centers are affected by the quality of their pedestrian environment, particularly in urban areas and resort communities. The popularity of walkable neighborhoods, historic Main Streets, and pedestrian-oriented resort communities are indications of the high values that consumers place on pedestrian environmental quality. Indeed, walkability has been found to have many economic benefits, including accessibility, cost savings both to individuals and to the public, increased efficiency of land use, increased livability, economic benefits from improved public health, and economic development, among others.[133]

On an individual level, economists have demonstrated how wealth creation and allocation may influence health and well-being. People who earn more money have more to spend on health care, recreation and healthier foods. Promoting active transit provides a financial opportunity for low-income households by expanding the range of available job opportunities and reducing the need to spend money on car ownership and maintenance.[134]

From this evidence, it is clear that active transit is a critical component of the transportation system, and can provide significant benefits to society. Improved active transit increases accessibility, provides consumer and public cost savings, increases community livability, improves public health and supports strategic economic development, land use and equity objectives. Unfortunately, active transit tends to receive less than its appropriate share of transportation resources, especially since the improvements can provide a high economic return on investment.

Business & Retail Activity: Evidence suggests that traffic calming can actually improve business conditions and raise revenues for small businesses. A number of studies reflected increases in commercial rents and reductions in vacancies as the success of a commercial corridor is often when it's comfortable for pedestrians. Walkability has also been shown to be an attractive benefit to tourists.[135] One study concluded that the addition of bicycle lanes will not negatively impact commercial activity, and in fact, re-allocating parking spaces for bike lanes will likely increase commercial activity. In addition, it concluded that efforts to attract more pedestrians and cyclists will have a more positive impact on businesses than maintaining existing parking.[136]

Retail areas often subsidize vehicle parking on the assumption that customers need to drive to make large purchases. This may sometimes be true, but not always. A shopping center or office complex may become more economically competitive if walking conditions improve. In fact, a study of consumer expenditures in British towns found that customers who walk actually spend more than those who drive.[137] This may be because vehicles travel faster, so stores go unnoticed. Plus, if there is not parking available close enough to the store vehicles simply may not stop at all. For the pedestrian this is not an issue, they are welcome to stop and browse

at as many stores as they'd like. Therefore, making an existing commercial district more pedestrian friendly can be vitally important for urban revitalization.

Property Values & Neighborhood Design: Research shows that increasing the mix of land uses in a given area increases both economic development and walkability.[138] In order for the mixed-use development to be effective, amenities need to be within walking or biking distance. This includes public transit, parks, trails, restaurants, retail and other amenities. It also includes providing amenities, incentivizing active transit, and providing places that are a destination, which results in purposeful walking rather than merely recreational walking or no walking.

Premiums for residential property have been correlated with new urbanist features in neighborhoods. These features include smaller blocks and better pedestrian accessibility to commercial uses.[139] Much of this premium comes from internal connectivity, and in fact, design matters in the characteristics of the neighborhood. Consumer trends in neighborhood preferences are shifting toward denser, walkable neighborhoods. The growth of the café culture, as evidenced by Starbucks and imitators, are among the most prominent new social institutions, and half of housing consumers prefer a decreased auto orientation in their ideal neighborhood, including narrower streets to encourage walking. This trend is supported by immigrant populations who tend to support transit systems and pedestrian-oriented commercial and residential districts. Looking toward the future, demand curve for walkable neighborhoods is predicted to continue growing, and that such preferences are expanding in advance of supply. This suggests that infrastructure investments in the short term may support a rising demand for new development of walkable neighborhoods.[140] In particular, studies have shown that sit-down restaurants are among the most common destinations for walkers, bicyclists and active transit users and as such should be encouraged within Glendale over more car dependent fast-food establishments.

The presence of places to recreate is also important. Not only does living close to parks correlate to higher physical activity levels for adults and youths, but proximity to parks and open space correlate strongly to residential property values. Generally, urban parks, natural areas, and preserved open spaces show positive effects on property values.[141]

Walkability has also been associated with higher values for office, retail, and industrial properties. 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.[142]

Impacts of Riverwalk

The Glendale Riverwalk is a huge investment in economic development by the City of Glendale. A large amount of capital is being invested in this project, much of which is expected to be returned to the community through economic output created by the development though new jobs and sales and hotel tax revenues. The project will generate money for the city and its residents for many years to come. Making this development more amenable to active transit will only help increase the desirability of the project and increase its revenues. Connecting this project to other amenities in the city, such as the Glendale Recreation Center, Infinity Park, office towers and hotels with active transit routes can spread the economic development throughout the community, making Glendale a more healthy, vibrant and economically sustainable city.

Currently, Glendale has great amenities to offer visitors, employees and residents such as Infinity Park, Whole Foods, Target, King Soopers and so on. With the construction of the Riverwalk, Glendale will have a whole new array of nightlife, restaurant and retail options. However, the access to these amenities, goods and services is critical to their success and the economic development of the city. People choose vacation places that they believe will be easy to navigate in relatively stress free manner. Improving Glendale's connectivity by active transit will also help the city create a strong brand and will improve the day-to-day economy by promoting easier access to goods and services. Therefore, improving connectivity through active transit will have a mutual benefit for Glendale's health, economy, and brand.

> *The popularity of retail malls, historic Main Streets, and pedestrian-oriented resort communities are indications of the high values that consumers place on pedestrian environmental quality.*

Recommendations

Recommendation E-1: Assure access to daily goods and service needs within the Glendale Riverwalk.

Inclusion of additional basic services such as banks, salons, bike repair shops, eating establishments, retail food markets, etc. within the development would help those who live and work near the development to fulfill daily needs within the Glendale Riverwalk rather than drive elsewhere. This will be especially beneficial for those local residents who do not have access to a car as they will be able to easily access these amenities via walking or biking. An additional service need that should be considered for local low-income residents in the area is an affordable childcare center.

Recommendation E-2: Create a safe and aesthetically pleasant active transit link between the Glendale Riverwalk, Infinity Park and the Lowe's Hotel using the Birch St. Corridor.

The Plan for the Riverwalk encourages pedestrian activity on site, but greater economic development could occur if the pedestrian experience was extended off site to connect with these other major destinations in Glendale. If extended through the Cherry Creek Corporate Center, Birch Street would connect Infinity Park, the Lowes Hotel, and Glendale's civic buildings (city hall and post office) directly to the heart of the Glendale Riverwalk Development. This would offer a more pleasant pedestrian experience than the heavily trafficked Cherry St (which will see increased traffic volumes due to the Glendale Riverwalk). Encouraging mixed use development and structured parking with ground level retail along this corridor would enhance the pedestrian experience and bring more revenue to the city. Sidewalks along this route should be detached and or separated from traffic by parking and shaded with street trees.

Recommendation E-3: Brand the Riverwalk and the City of Glendale as a place that is safe and easy for pedestrian and bicycle users.

Emphasizing these key qualities that Glendale can offer will make Glendale more desirable to visitors and tourists. This will increase demand for restaurants, hotels, nightlife destinations, and retail establishments. It would also make Glendale a more attractive place to hold conferences and business meetings. Further into the future, it may bring additional investment by companies who prefer locations that are walkable, bikeable and offer transit options.

Recommendation E-4: Create a special recognition program for businesses and properties that encourage walking, bicycling, and transit usage.

This will encourage businesses to take part in the larger effort of creating and branding the Riverwalk as bicycle and pedestrian friendly destination. It also boosts their profile and provides free positive publicity.

Monitoring & Evaluation

If the Glendale Riverwalk HIA Report is adopted and Glendale City Council decides to move forward with some or all of the recommendations contained in said report, it is paramount that management, monitoring, and evaluating mechanisms be established. Such mechanisms need to be established in order to properly manage, monitor, and measure the implementation of the HIA recommendations and their impact upon active transportation and health within Glendale. To do so, this HIA recommends the following:

- Establish an Active Transportation HIA Advisory Committee within Glendale. The committee could consist of Glendale public officials, Glendale private business owners, Glendale residents and employees, and officials from the Tri-County Health Department and the Colorado Department of Public Health and Environment.
- Set up and hold public meetings with and distribute materials to residents and business and property owners describing the HIA, detailing what the Advisory Committee and the city plan to implement and when, requesting feedback, and highlighting benefits for Glendale.
- Based off of Advisory Committee work and public meetings, develop an implementation plan and timeframe.
- Set up a stand-alone website or section on existing Glendale website which contains all information surrounding the HIA and its implementation.
- As recommendations are implemented, conduct regular surveys with Glendale residents, employees, business and property owners, and visitors to gather feedback surrounding implemented measures and obtain detail surrounding active transportation usage within Glendale.
- Conduct another questionnaire similar in size and scope to the one conducted for the health impact assessment, using the same questions to ensure comparability between the results.
- Place the CDOT Cherry Creek trail bicycle and pedestrian counters at the same locations each year, to monitor changes in traffic along the path. Conduct bicycle and pedestrian counts at the same locations as new destinations open within the Riverwalk to monitor changes there as well.
- Via Glendale Public Works, Riverwalk Development property owners, B-Cycle, and others, track active transportation usage throughout Glendale by conducting traffic counts, analyzing electronic health and environmental data, and sharing such data with the public via electronic and traditional methods.
- With the assistance of the Tri-County Health Department and Colorado Department of Public Health and Environment, gather annual health metrics for Glendale after implementation of HIA recommendations. Compare such metrics against past numbers, and share such data with the public via electronic and traditional methods.

Through the establishment of a dedicated HIA committee and the employment of critical monitoring and evaluating mechanisms, Glendale will be able to obtain essential data that highlights if modifications to their built environment have led to higher levels of active transportation and improved health metrics within its boundaries. In addition, the data gathered via such mechanisms may highlight what modifications worked better than others and if additional interventions need to be developed and employed in order to maximize active transportation usage and improve public health. Further, the data gathered may serve as valuable HIA information that could not only be shared with Glendale citizens and representatives, but also with other cities, counties, and planning and public health officials who are interested in researching, developing, and implementing HIAs.

Conclusion

Our built environment plays a significant role in our lifestyles and individual transportation decisions. Environmental factors that influence these decisions can also greatly impact our individual health. This report examined the relationships between Glendale's built environment and the health of those who live, work and visit the city as it relates to active transit. This report analyzed and discussed the existing conditions and determined the health impacts of the existing environment and the future Riverwalk. Finally it identified recommendations to mitigate these impacts.

The recommendations made throughout the document can be categorized as "Short-term", "Long-term" and "Riverwalk-Specific." Short term recommendations will be simple and relatively cost effective to implement, while long term recommendations might require large infrastructure improvements that will take additional planning and financing. The Riverwalk-specific recommendations are directly related to the proposed development and should be implemented during design and construction. The recommendations for Glendale listed here have been paraphrased and re-organized to fit these categories. For the specific recommendations please refer back to the previous sections of the document.

Short Term

AT-2: Install additional sidewalk access points to the walking path at Infinity Park, such as at the southeast corner of the park at Mississippi Ave and Cherry St.

AT-4: Revise city policy to allow on street parking on Glendale streets where appropriate.

AT-6: Provide pedestrian countdown signals to indicate how many seconds are left in the walk phase.

AT-10: Place bike lanes in both directions on Kentucky from Colorado Blvd. to Cherry Creek.

AT-11: Install bike lanes on other key, connecting streets, such as S. Ash St., S. Cherry St., E. Virginia Ave., and S. Birch St.

AT-13: Install bicycle sharrows on all feasible residential roadways, such as Dexter, Dahlia, and Tennessee.

AT-14: Encourage way-finding with signs, maps, and landscape cues to direct pedestrians to the most direct route. Provide signage indicating Glendale bicycle routes and local destinations at the Riverwalk, Infinity Park and at other bicycle route intersections.

AT-15: Provide streetscape amenities such as benches, landscaping, lighting, shade structures, and public art.

AT-21: Encourage bicycle parking at shopping and entertainment destinations throughout Glendale.

T-3: Institute traffic calming measures along Cherry, Virginia, Kentucky, Mississippi, and Cherry Creek Drive.

T-4: Increase on-street parking on streets with excess right-of-way, including (but not limited to) S. Ash St., S. Cherry St., E. Exposition Ave., E. Ohio Ave., E. Virginia alongside the Riverwalk.

T-5: Use bike lanes to narrow driving lane widths along S. Cherry St., S. Ash St., S. Birch St., E. Mississippi Ave., E. Exposition Ave., E. Kentucky Ave. and S. Forest St.

T-6: Implement traffic wayfinding system to create smooth traffic flow throughout the community.

PT-1: Prioritize infrastructure improvements near transit stops and public transportation stations.

PT-4: Improve the safety and attractiveness of bus stops throughout Glendale with amenities such as covered shelters, benches, trash cans and improved lighting.

PT-5: Incentivize employers to subsidize employees who commute to work via mass transit, bicycle or foot.

PS-4: Ensure there is uniform and consistent lighting on pedestrian routes throughout the city.

PS-6: Encourage the elimination of litter, graffiti, and deteriorated property conditions (weeds, broken windows, etc.)

PS-7: Continue to support and promote community awareness programs and citizen alert systems.

E-4: Create a special recognition program for businesses and properties that encourage walking, bicycling, and transit usage.

Long Term

AT-1: Plan and implement a complete sidewalks network that improves the connectivity within the city. It is recommended that the sidewalk network resemble a grid-like pattern to further improve the community's overall connectivity.

AT-3: Create buffers between sidewalk and street ways.

AT-5: Promote safe roadway crossing through use of small block sizes, pedestrian refuge islands, and enhanced crosswalks.

AT-7: Provide safe and convenient pedestrian connections to public and private amenities.

AT-8: Create a Birch Street bicycle and pedestrian corridor between the Riverwalk and Infinity Park.

AT-9: Work with the City of Denver to place bicycle lanes on S. Forrest and E. Exposition.

AT-12: Work with the City of Denver to make bicycle improvements to E. Mississippi Ave.

AT-18: Incorporate retail establishments within close proximity of its residences.

AT-19: Encourage the development of street-level shopping and restaurants along pedestrian and bicycle routes.

AT-23: Maintain or increase residential density throughout the city.

T-1: Implement a "Complete Streets" policy.

T-2: Install roundabouts at key intersections linking Infinity Park to the Riverwalk and elsewhere throughout Glendale.

T-8: Connect E. Ohio Ave. to S. Cherry St. to improve automobile and pedestrian connectivity.

PT-6: Work with RTD to extend the Route 1 bus south to Mississippi Avenue.

PT-7: Work with RTD to increase Bus service from the Riverwalk to Downtown Denver and the Denver Tech Center.

Riverwalk Specific

AT-16: Separate bicycle and pedestrian users along the Cherry Creek trail upon entering the Riverwalk.

AT-17: Ensure that design plans for open space at the Riverwalk include various programmed elements that encourage physical and social activities to replace those being lost at Creek Side Park.

AT-20: Provide secure bicycle parking and changing facilities at the Riverwalk and major employment centers.

AT-22: Provide B-Cycle stations at the Riverwalk and Infinity Park stadium to encourage ridership between the two destinations.

T-7: Provide incentives to avoid driving while under the influence.

PT-2: Provide signage/kiosks with bus related information (schedules, route maps, etc.) within the Riverwalk and near other key Glendale destinations such as Infinity Park and CitySet.

PT-3: Ensure that all bus stops adjacent to the Riverwalk are highly visible and provide adequate signage, shelter, lighting and seating for safety and comfort.

PS-1: Promote crime prevention through environmental design (CPTED) within the Riverwalk area.

PS-2: Provide security call boxes within the public spaces and parking garages of the Riverwalk.

PS-3: Provide adequate way-finding signage to destinations and parking areas within the Glendale Riverwalk and important destinations outside the development.

PS-5: Promote eyes on the street in future developments around the Riverwalk.

E-1: Assure access to daily goods and service needs within the Riverwalk.

E-2: Create a safe and aesthetically pleasant active transit link between the Riverwalk, Infinity Park and the Lowe's Hotel using the Birch St. Corridor.

E-3: Brand the Riverwalk and the City of Glendale as a place that is safe and easy for pedestrian and bicycle users.

Appendices

Copy of Active Neighborhood Checklist and Community Questionnaire (and results)

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