

SouthWest Transit Park-and-Ride Bike and Pedestrian Facilities



Prepared by
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A capstone project completed in partial fulfillment of the requirements for the
Master of Landscape Architecture Degree
College of Design

Prepared on Behalf of
SouthWest Transit

Spring 2016



Resilient Communities Project

UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

This project was supported by the Resilient Communities Project (RCP), a program at the University of Minnesota that convenes the wide-ranging expertise of U of M faculty and students to address strategic local projects that advance community resilience and sustainability. RCP is a program of the Center for Urban and Regional Affairs (CURA) and the Institute on the Environment.



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MOMENTUM





MOMENTUM

PROJECT GOALS

1. Embrace New Modes of Transportation: BIKING & WALKING
2. Increase Bicycle and Pedestrian Access to Southwest Transit Stations
3. Create Public Space Centralized at Station Plazas & Event Spaces
4. Redefine Experiences of Biking and Walking in the Suburbs

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3. Existing conditions
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5. 1 mile / 15 minute walkshed

SARAH LIPKIN SULARZ
CAPSTONE 2016

Bicycle and Pedestrian improvements are critical to the success and resilience of suburban communities. If there are options in place for communities to engage in multimodal transportation systems, they can increase health, access, equity, and lower costs of living.

Small changes in thinking about transportation can make a huge impact in the future.

MOMENTUM

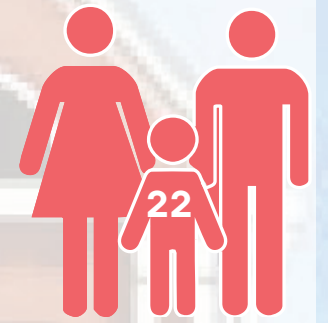
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BABY BOOMER GENERATION

IN THE 1950'S AFTER THE G.I. BILL WAS PASSED, THE AMERICAN SUBURBS AS SEEN TODAY WERE BUILT SEEMINGLY OVERNIGHT.

THE 1956 FEDERAL HIGHWAY ACT ENSURED PROGRESS AND AUTOMOBILE FRIENDLY ROADWAY DEVELOPMENT FOR THE FOLLOWING 60 YEARS.



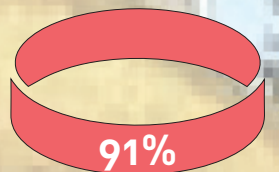
age to own 1st home



own home

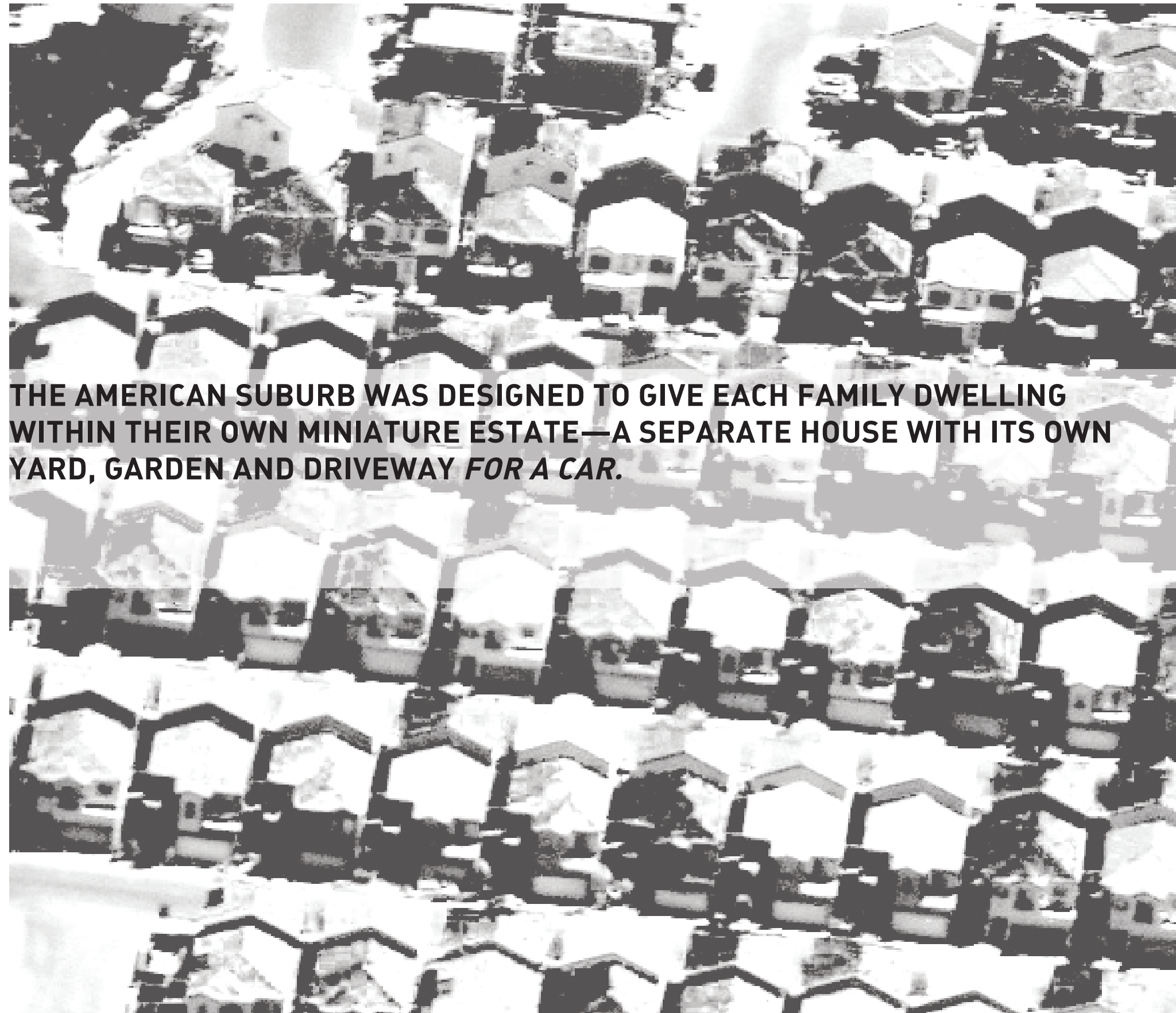


length of home ownership



have been married

The National Longitudinal Survey of Youth 1979



THE AMERICAN SUBURB WAS DESIGNED TO GIVE EACH FAMILY DWELLING WITHIN THEIR OWN MINIATURE ESTATE—A SEPARATE HOUSE WITH ITS OWN YARD, GARDEN AND DRIVEWAY *FOR A CAR.*

A SHIFT IN DEMOGRAPHICS CREATES NEW TYPES OF DEMANDS.

millenials range from 19-36.
~75.7 million people

millenials have the largest estimated purchasing power in the US.

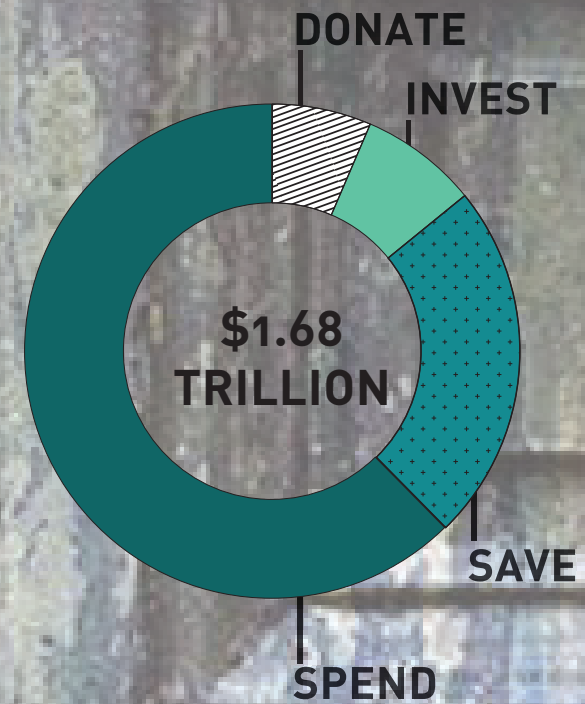
average income of 60k

Expect to keep homes for only 4.7 years

1/5 millenials own homes.

25% never marry

this bar graph shows the change in priority of baby boomer generations to millenials.



CONVENIENCE IS KEY!
convenient facilities such as access to water, seating, and safety elements can increase usership

www.co.carver.mn.us

Whole 'Hoods in which more people walk or cycle, rather than drive, are safer, nicer, places to live

intelligenthealth.co.uk

94 M riders in the Twin Cities Metro in 2011

11 different routes departing from 7 different P&R stations, serving 45+ miles

People who live in neighborhoods with sidewalks are 47% more likely to be active at least 30 mins a day.

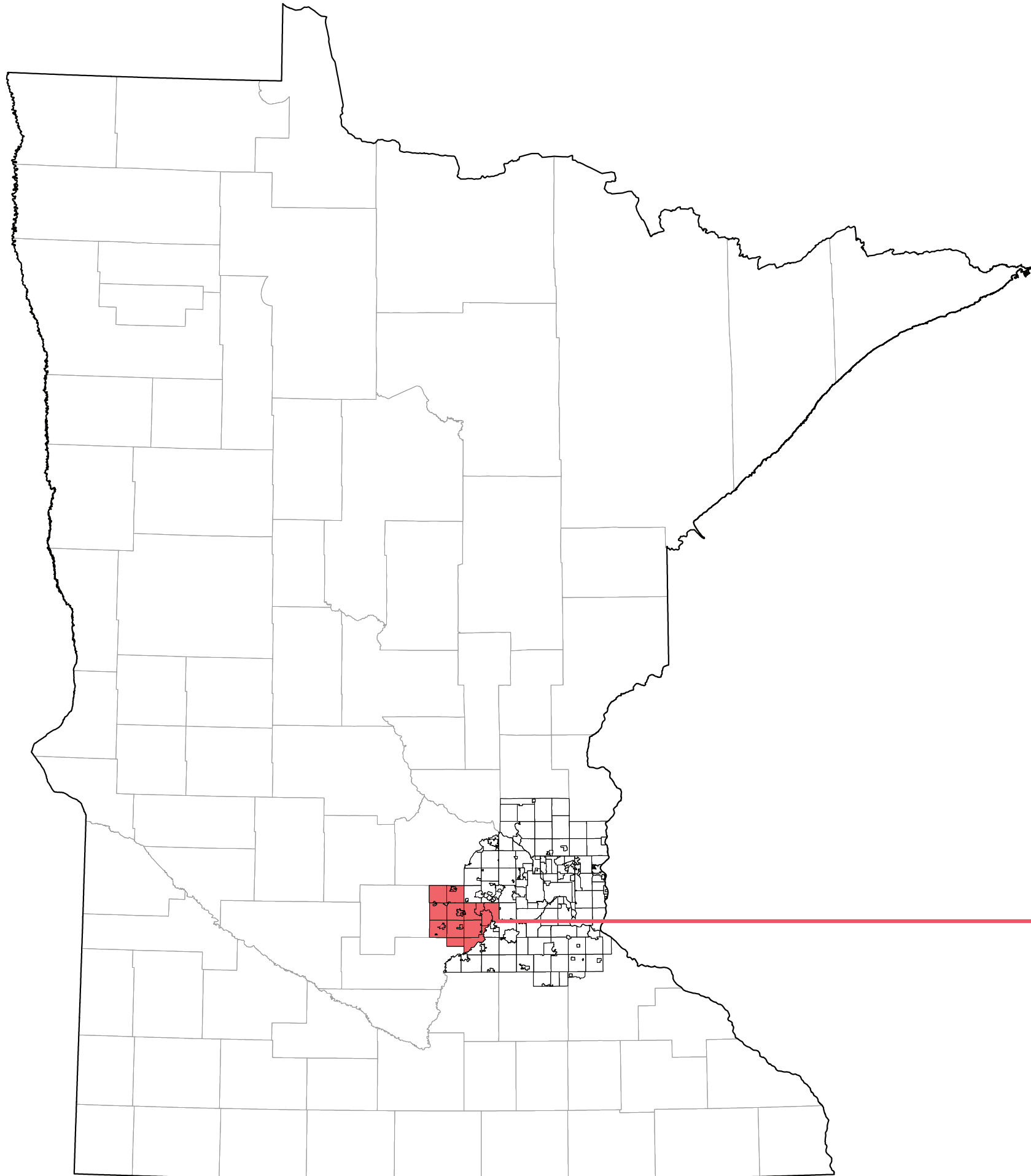
Health studies show that for every \$1 spent on trails, there are \$3 in savings in direct medical costs

<http://www.co.carver.mn.us>

Using MultiModal transportation systems, including bicycles and commuter buses can reduce roadway emissions up to 22% annually.



SOUTHWEST VILLAGE
STATION



**LOCATION MARKER
MN**

**CARVER
COUNTY**

AUTOMOBILE CONNECTION

11 BUS lines serve commuters and students through Carver and Hennepin Counties. For only \$3.00 each way this commute includes:

- WIFI
- Quiet work zones
- "Rider Rewards" - 700+ Users
- SW Prime Service

RIDER STATS

SWT serves 7 stations throughout Chaska, Chanhassen and Eden Prairie as well as Downtown MPLS, The University of Minnesota, Normandale College, and Target North Campus in Brooklyn Park.

Total of 1,032,889 rides provided in 2013.

Ridership up 2% from 2014-2015

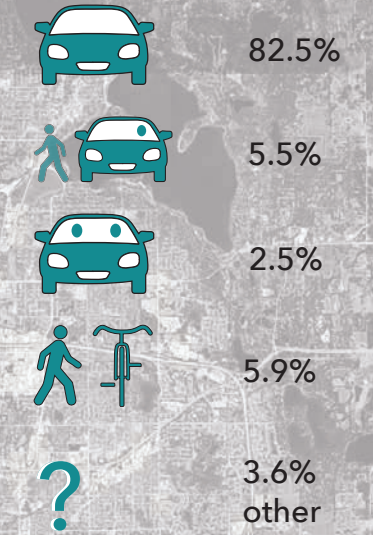
Increase of 6.4% in State Fair service (almost 90,000 rides),

Increase of 53.3% in our Vikings game service



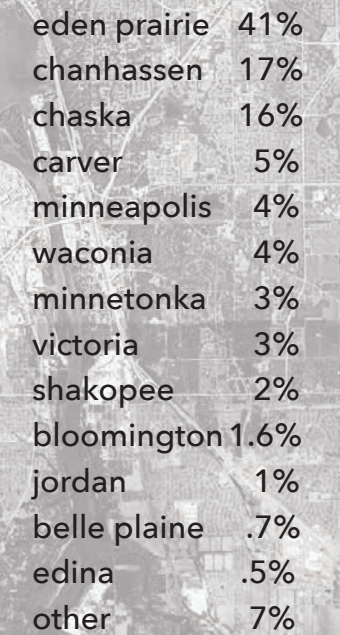
home to station transit mode.

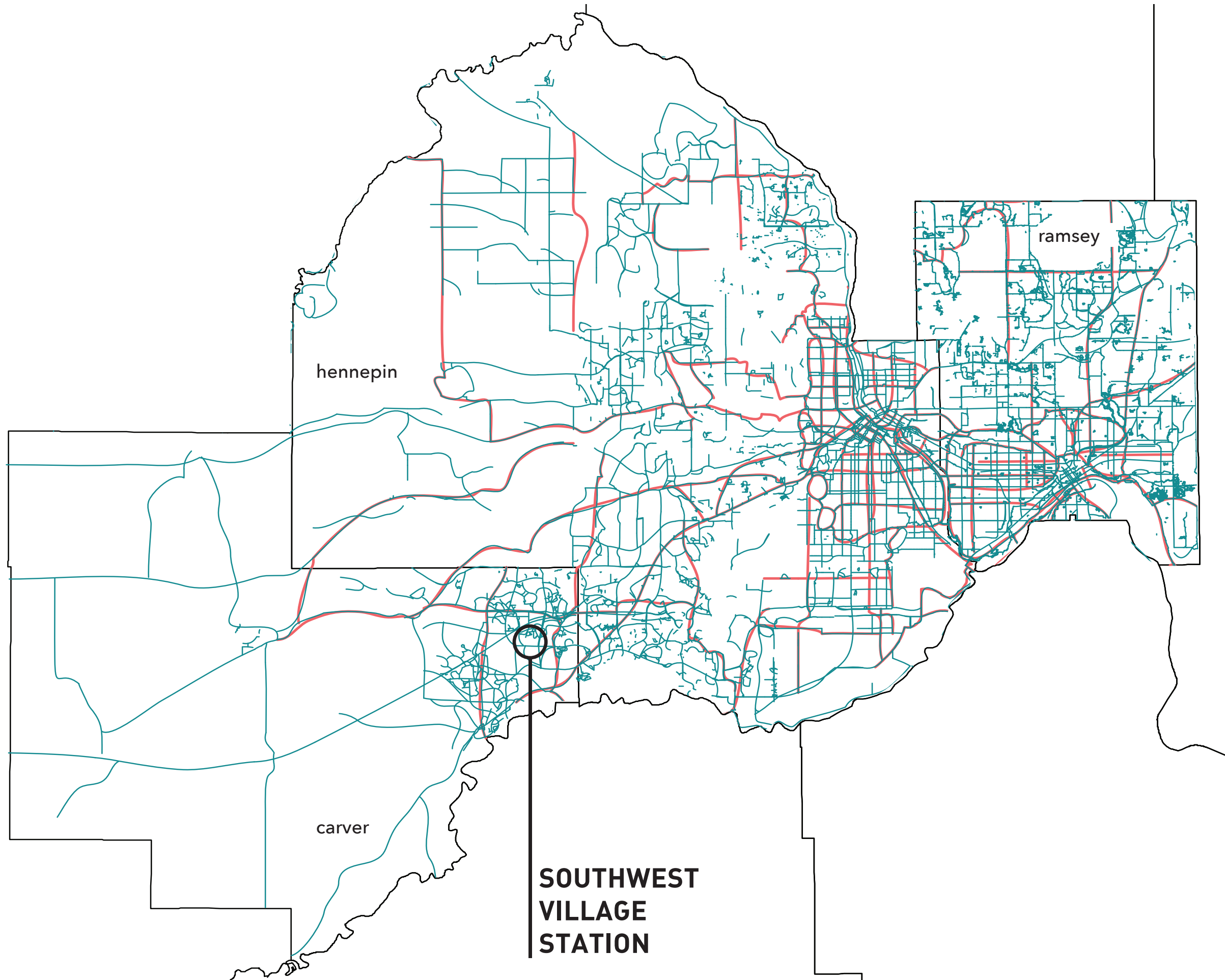
total survey: 1,356



rider home locations.

total survey: 1,356





URBAN TO SUBURBAN NETWORKS

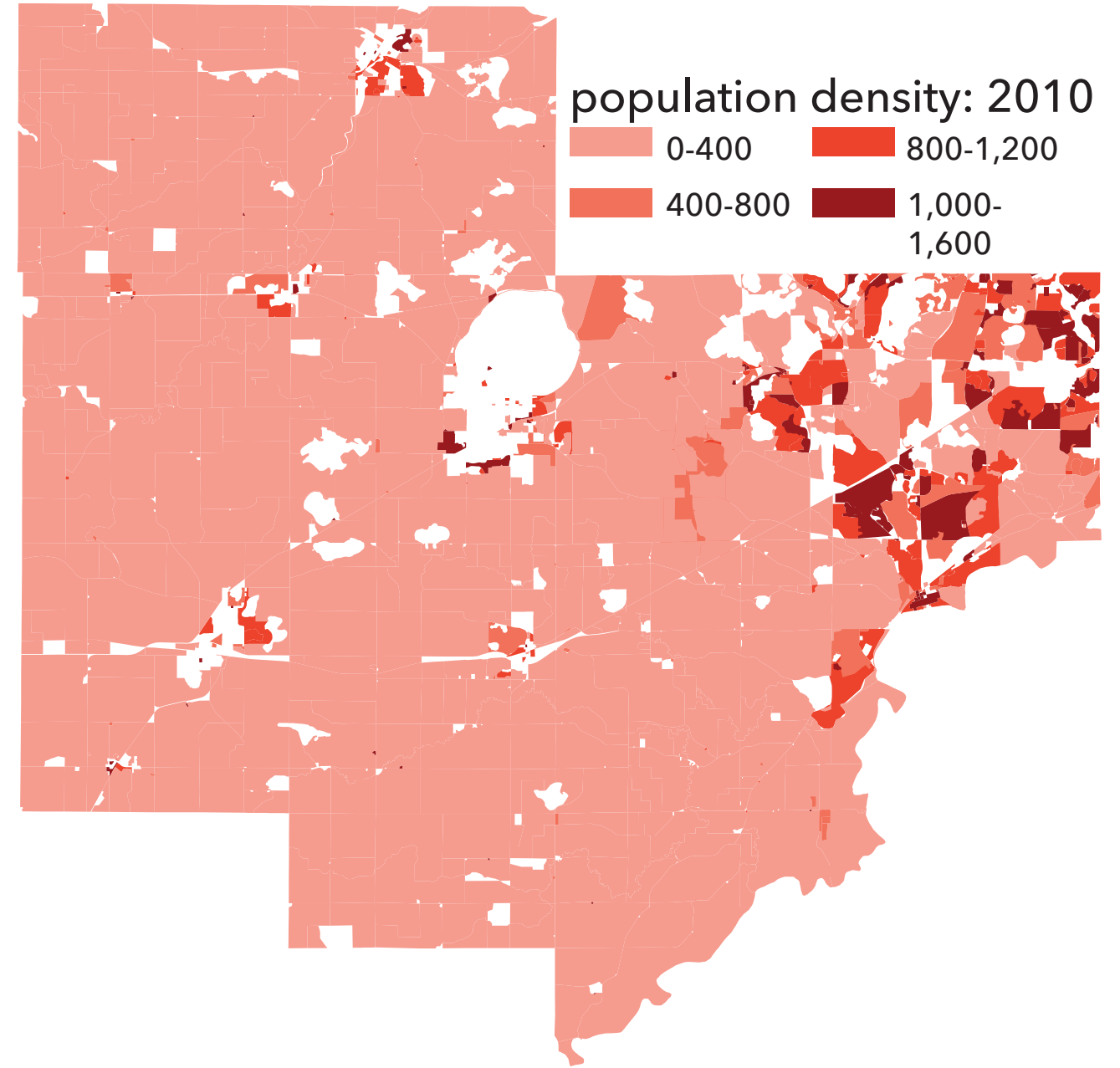
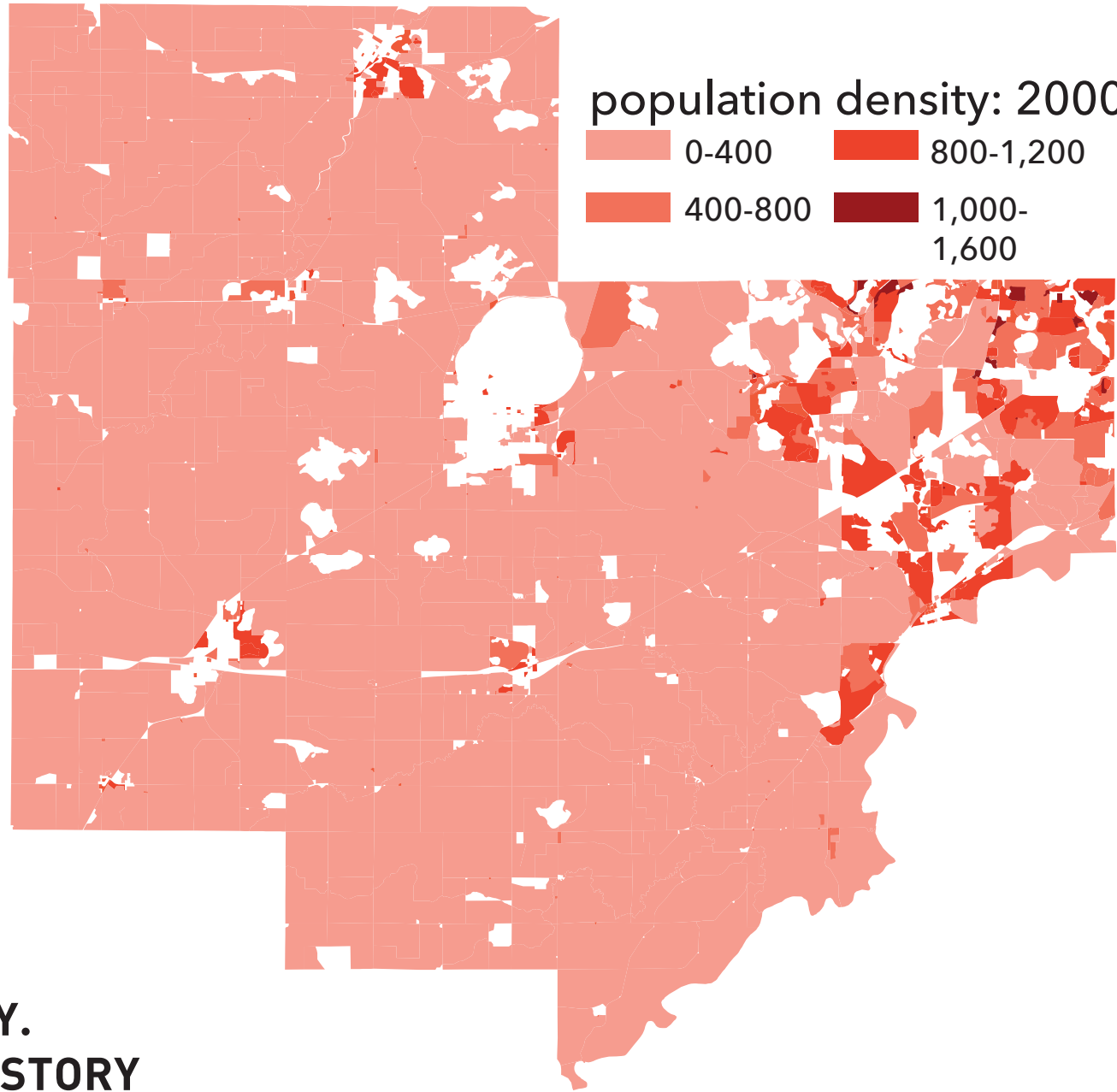
Take a look at what currently exists as far as bike paths, trails, and sidewalks all the way from Ramsey County to Carver County.

It is clear that a difference in trail connectivity and type is established when you cross county lines, from urban to suburban.

This book will address analysis and design strategies for those bike paths and walkable areas.

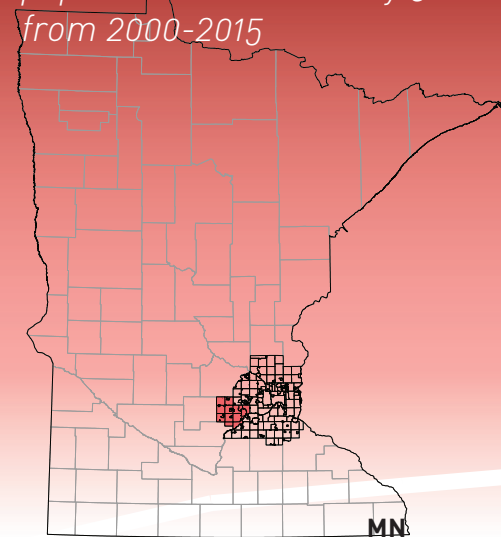
- county outlines
- bike lanes
- regional bike trail network

STATE OF CARVER COUNTY



**CARVER COUNTY.
POPULATION HISTORY**

Carver County's total population increased by 36% from 2000-2015



**TOTAL POPULATION 2000:
70,205**

The population density was 197 people per square mile

**TOTAL POPULATION: 2010
91,042**

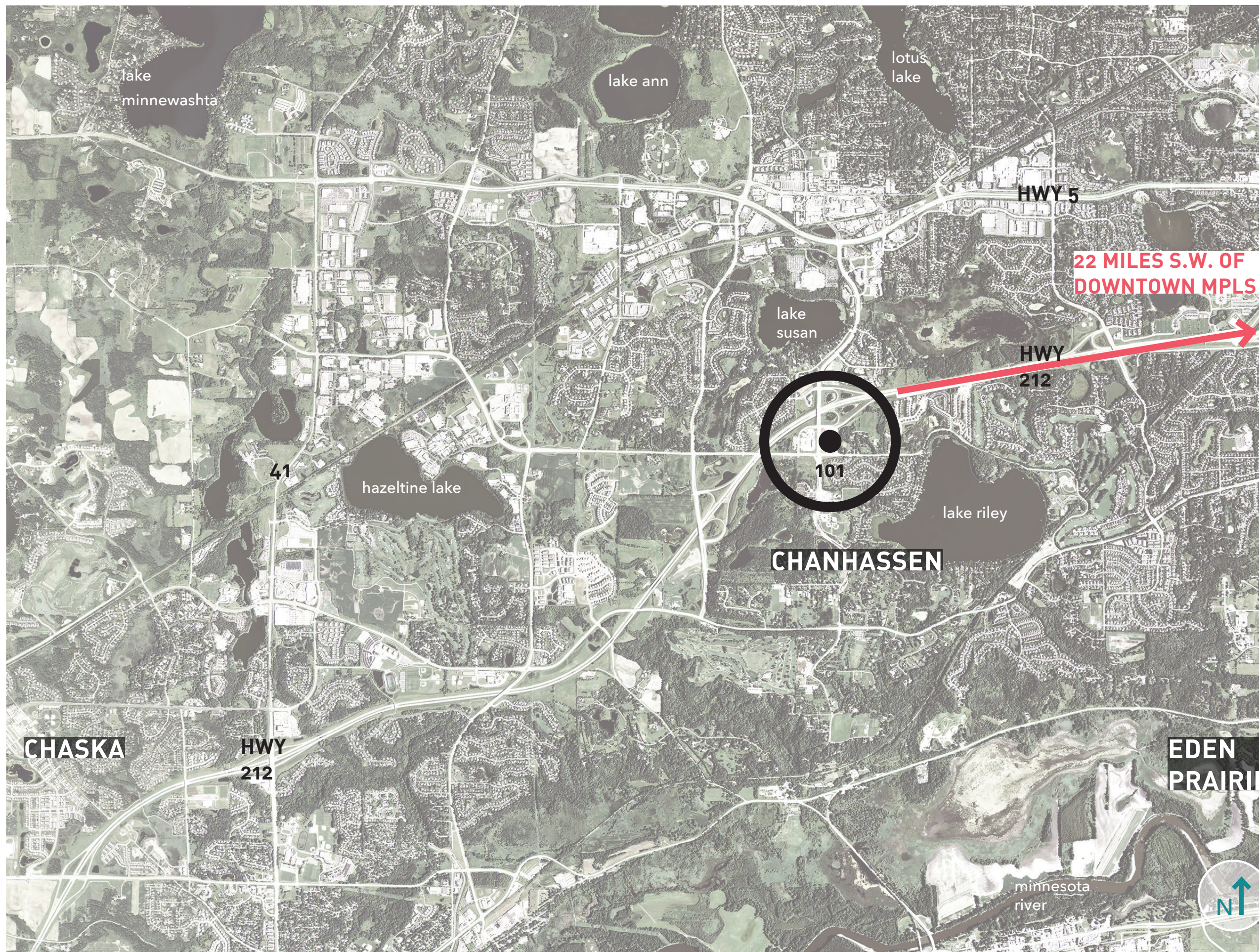
The population density was 242 people per square mile

**TOTAL POPULATION 2015:
est. 98,741**

The population density is 257 people per square mile

Census.gov

www.carvercountyhistoricalsociety.org - data graph created from historical census information.



WHERE TO START?

A multimodal enhancement project in Chanhassen is a great way to start addressing the shifting needs and wants of new suburban residents. These new residents, predominantly from the Millennial generation have drastically different perceptions of suburban living and make different life style choices than those of the Baby Boomer generation. The area in Carver County being examined in this project is known as Chanhassen.

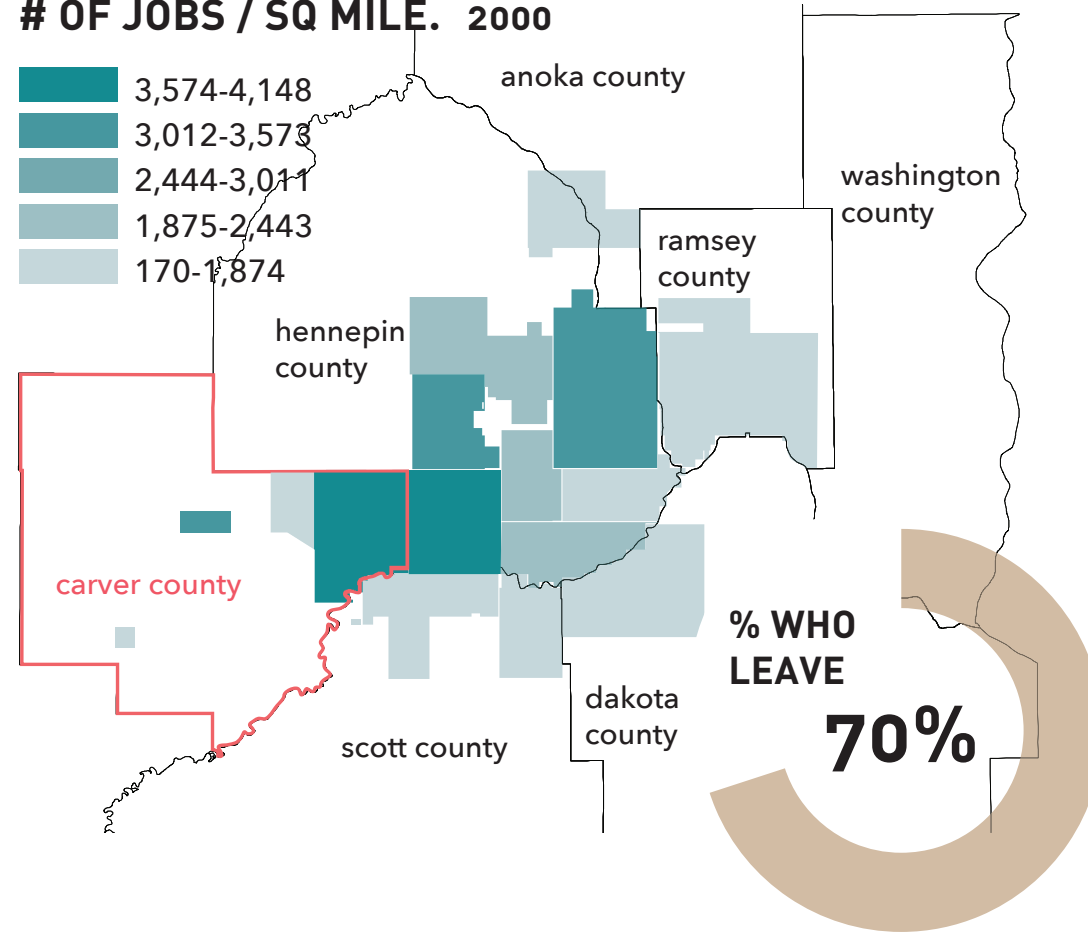
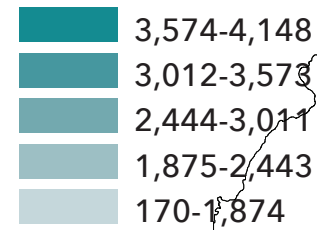
This area is already growing at a high rate with young families. With access to amenities and community spaces and better transit options being a highlight for new residents.

Momentum is a project that delves into the best practices of streetscape, community space, and bike trail design so that moving forward there is a shift in how to best plan and design for a new type of suburban resident.

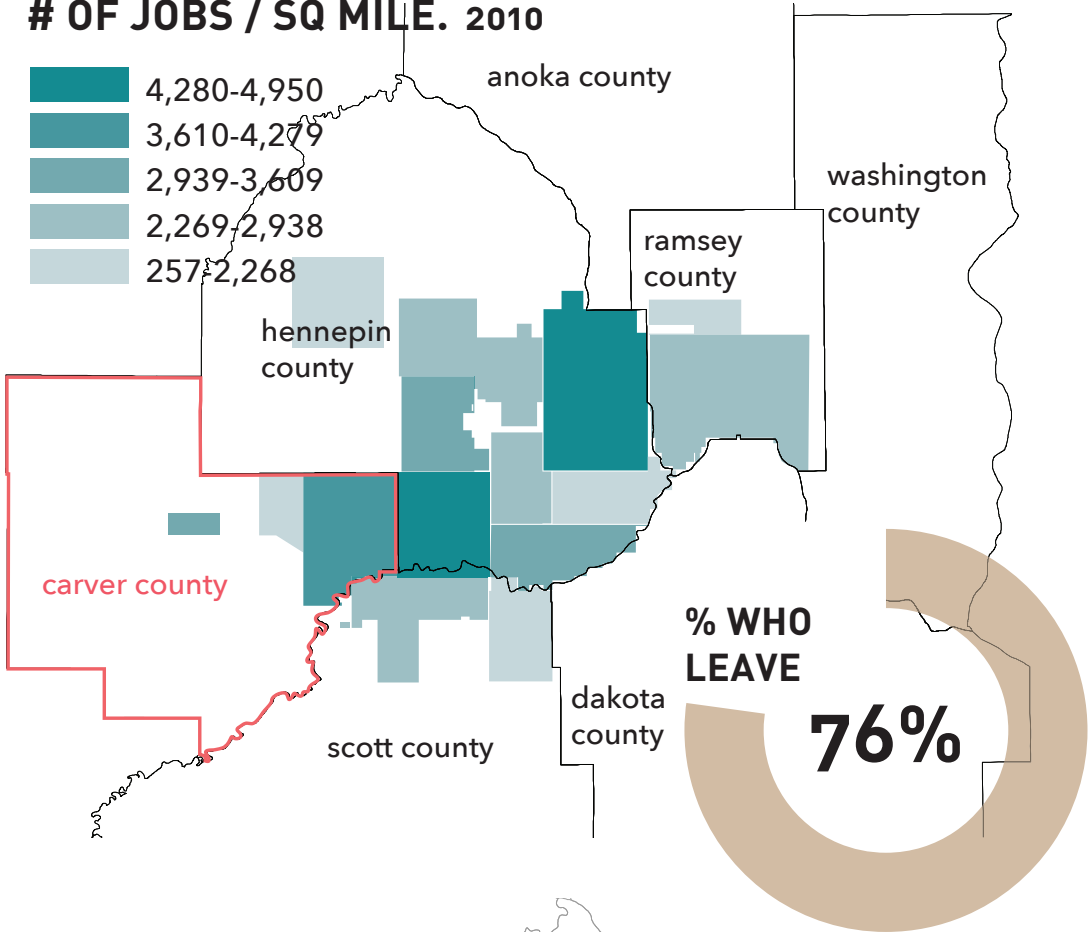
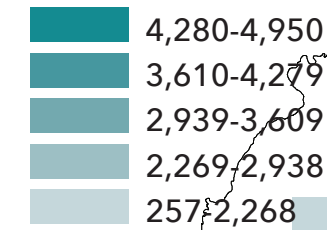
WHERE WE WORK.

In just 10 years, there has been a 6% increase in commuters who leave Carver County for work. That is 25% more than the state's average. For so many people to be commuting every day by car can have huge environmental and physical impacts on the cities and towns they traverse.

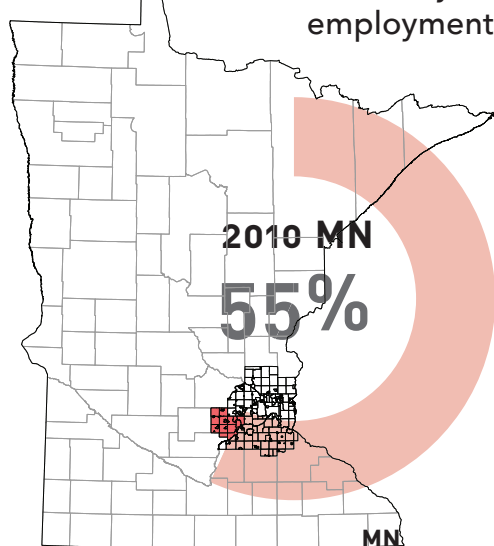
OF JOBS / SQ MILE. 2000



OF JOBS / SQ MILE. 2010



Comparatively fewer workers in MN leave their home county for employment.



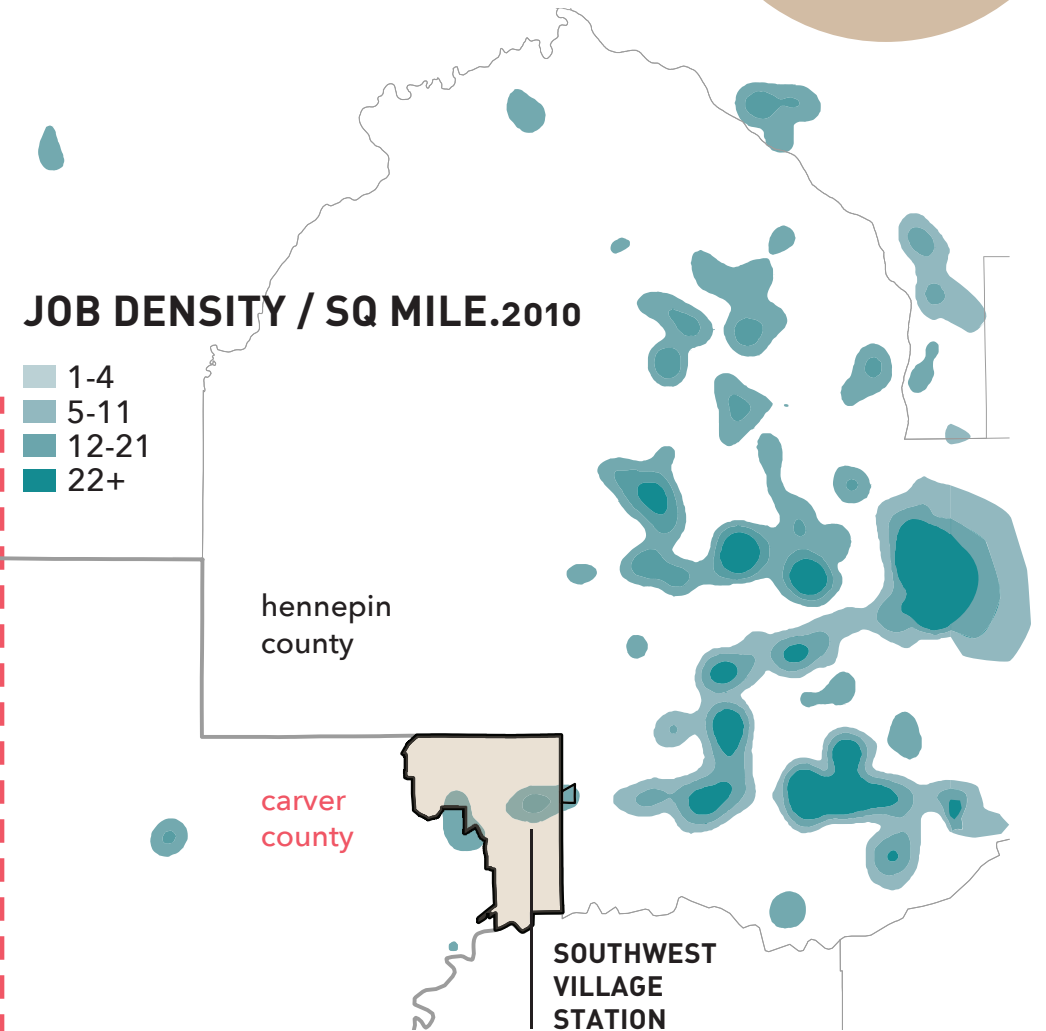
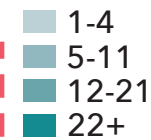
“THE GOAL IS BASICALLY ELIMINATING THE CAR FROM THE PICTURE.”

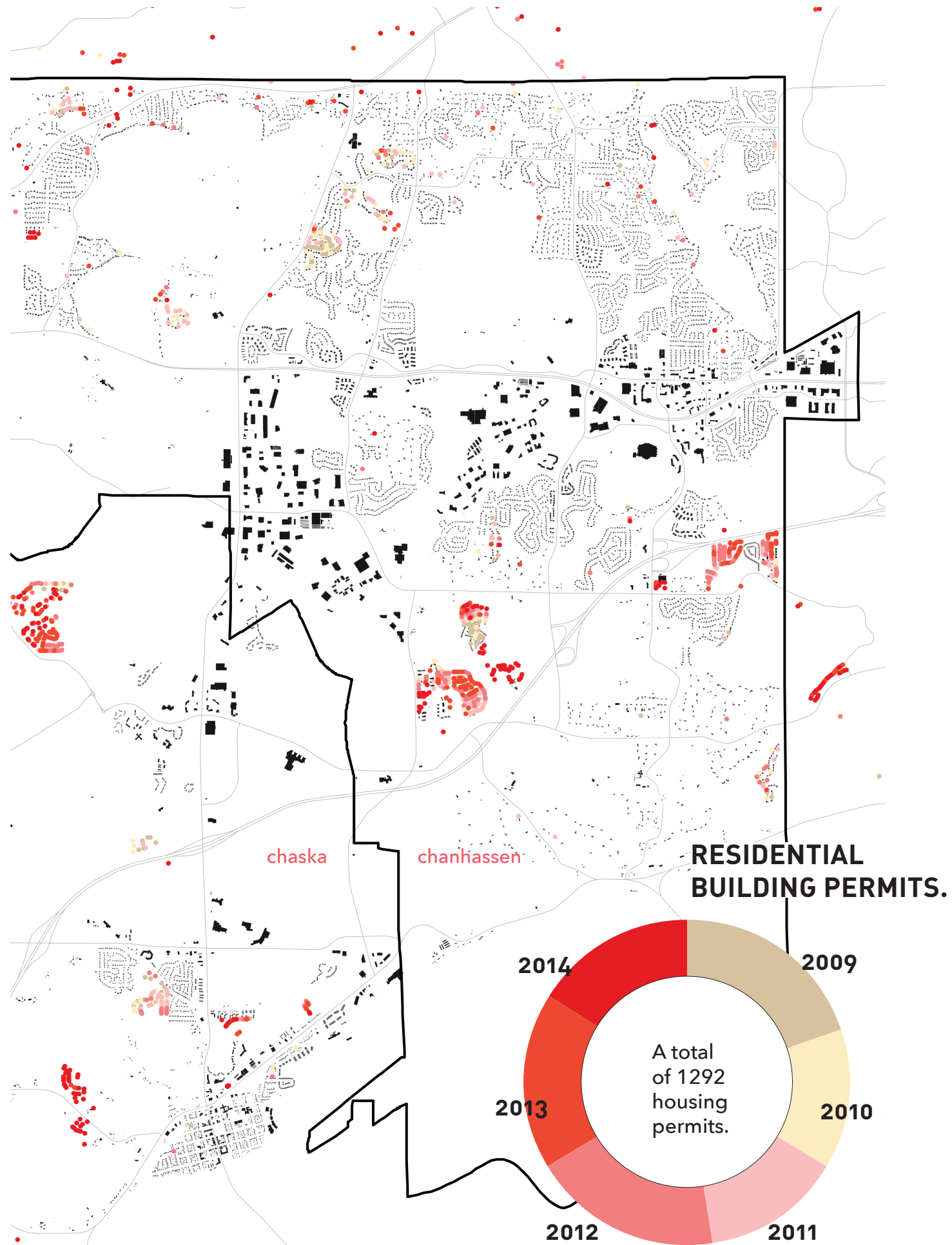
and we have a long way to go...

18.1% HENN CO. HOUSEHOLDS DO NOT OWN CARS.

< 2.5% CARVER COUNTY HOUSEHOLDS DO NOT OWN CARS.

JOB DENSITY / SQ MILE. 2010





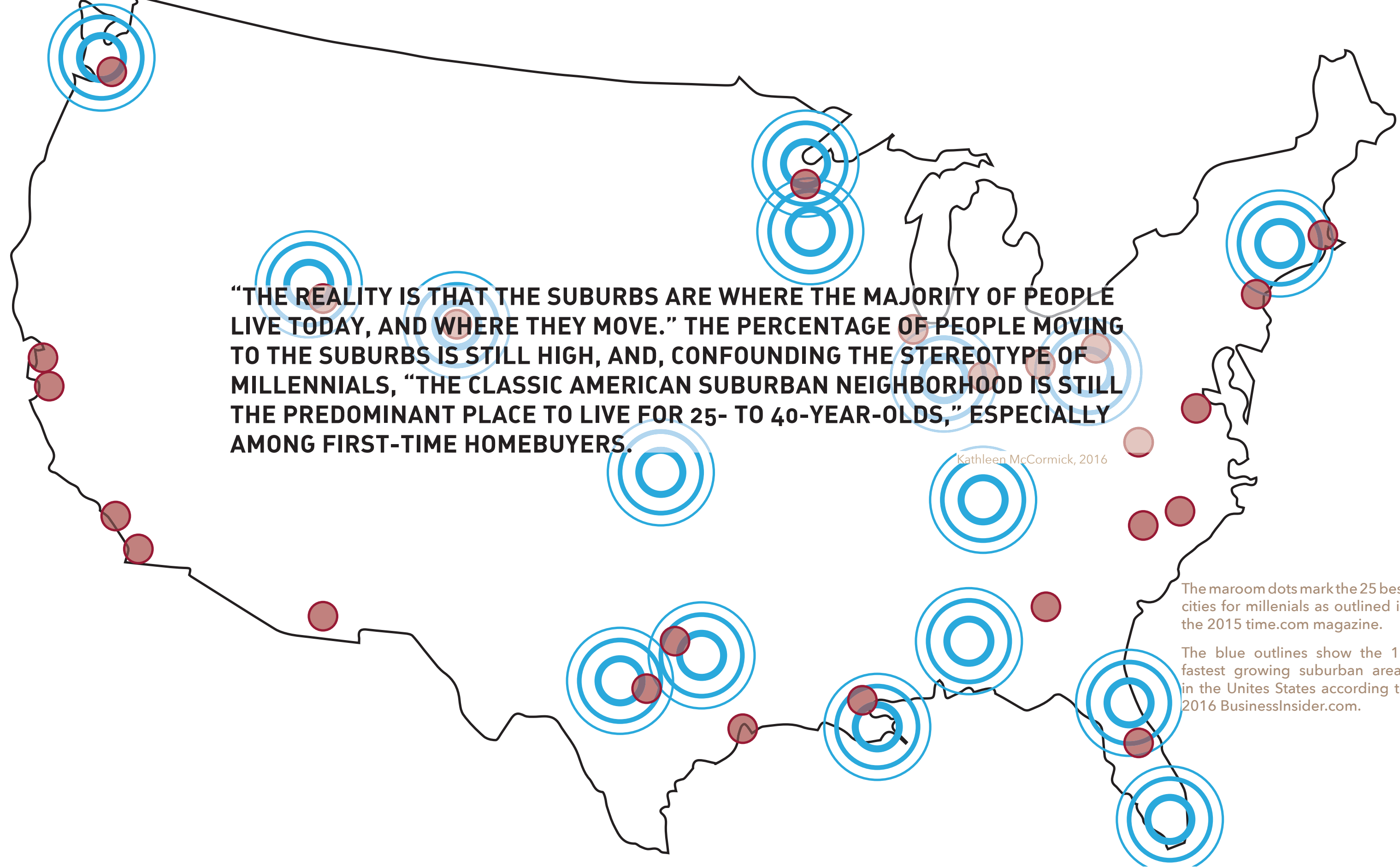
SOCIAL DEVELOPMENT.

This project delves into social perception of biking and walking as transportation in suburban life.

Knowing the changes in demographics of target populations is important when planning new types of transit paths in the suburbs.

In Chanhassen we are seeing a rise in medium and high density housing units. Single family home are no longer the future trajectory for this town.

HOUSING PERMITS pulled per year for a 6 year span has changed the suburban fabric. This map and chart to the left show how communities are growing in areas already previously densified. These smaller cities and towns are growing due to reducing suburban sprawl trends and higher density housing styles being in demand.



“THE REALITY IS THAT THE SUBURBS ARE WHERE THE MAJORITY OF PEOPLE LIVE TODAY, AND WHERE THEY MOVE.” THE PERCENTAGE OF PEOPLE MOVING TO THE SUBURBS IS STILL HIGH, AND, CONFOUNDING THE STEREOTYPE OF MILLENNIALS, “THE CLASSIC AMERICAN SUBURBAN NEIGHBORHOOD IS STILL THE PREDOMINANT PLACE TO LIVE FOR 25- TO 40-YEAR-OLDS,” ESPECIALLY AMONG FIRST-TIME HOMEBUYERS.

Kathleen McCormick, 2016

The maroon dots mark the 25 best cities for millennials as outlined in the 2015 time.com magazine.

The blue outlines show the 15 fastest growing suburban areas in the United States according to 2016 BusinessInsider.com.



POTENTIAL REACH.

Pedestrians:

People will choose to walk up to **1 mile** to get goods and services. In many cities this is easily 8-12 blocks away. In Carver County, the suburban layout means that walking up to **1 mile** barely gets you to exit a housing development.

Bikers:

According to a survey by Southwest Transit Authority, bike commuters will ride up to **3 miles** for a bike to bus transfer. The diagrams on the following page show how far, using current street layouts in the suburbs, that **3 miles** takes riders.

By creating more direct channels for walking and riding trails, ridership can increase and comfortably accommodate more bike and pedestrian to bus commuters.

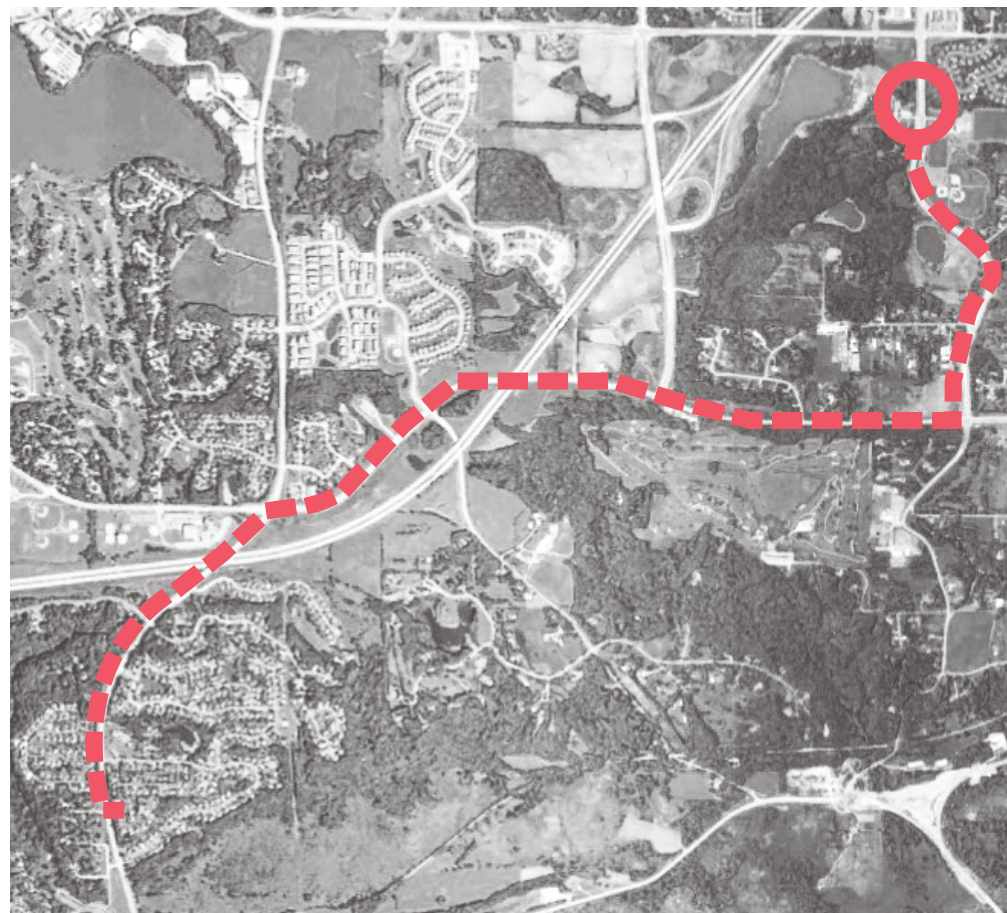
There is standing transit/modal philosophy that people are willing and able to walk up to 1 mile, and bike up to 3 miles to get goods and services, I will be conducting the analysis, design and recommendations at both the 3 mile and 1 mile scales. This will benefit the experiences of riders at the furthest extent of the bikeable area as well as pedestrians and bikers as they arrive into the transit station and public plaza area. By creating more direct channels for walking and riding trails, ridership can increase and comfortably accommodate more bike and pedestrian to bus commuters.



urban 3 mile radius

EXPERIENCE IS KEY!

Know what you are getting into and what to expect along the way. It can also be helpful to infill open areas that are undeveloped in the suburban context. This changes ones perception of travel distance and time passed.



suburban 3 mile radius



urban 1 mile radius

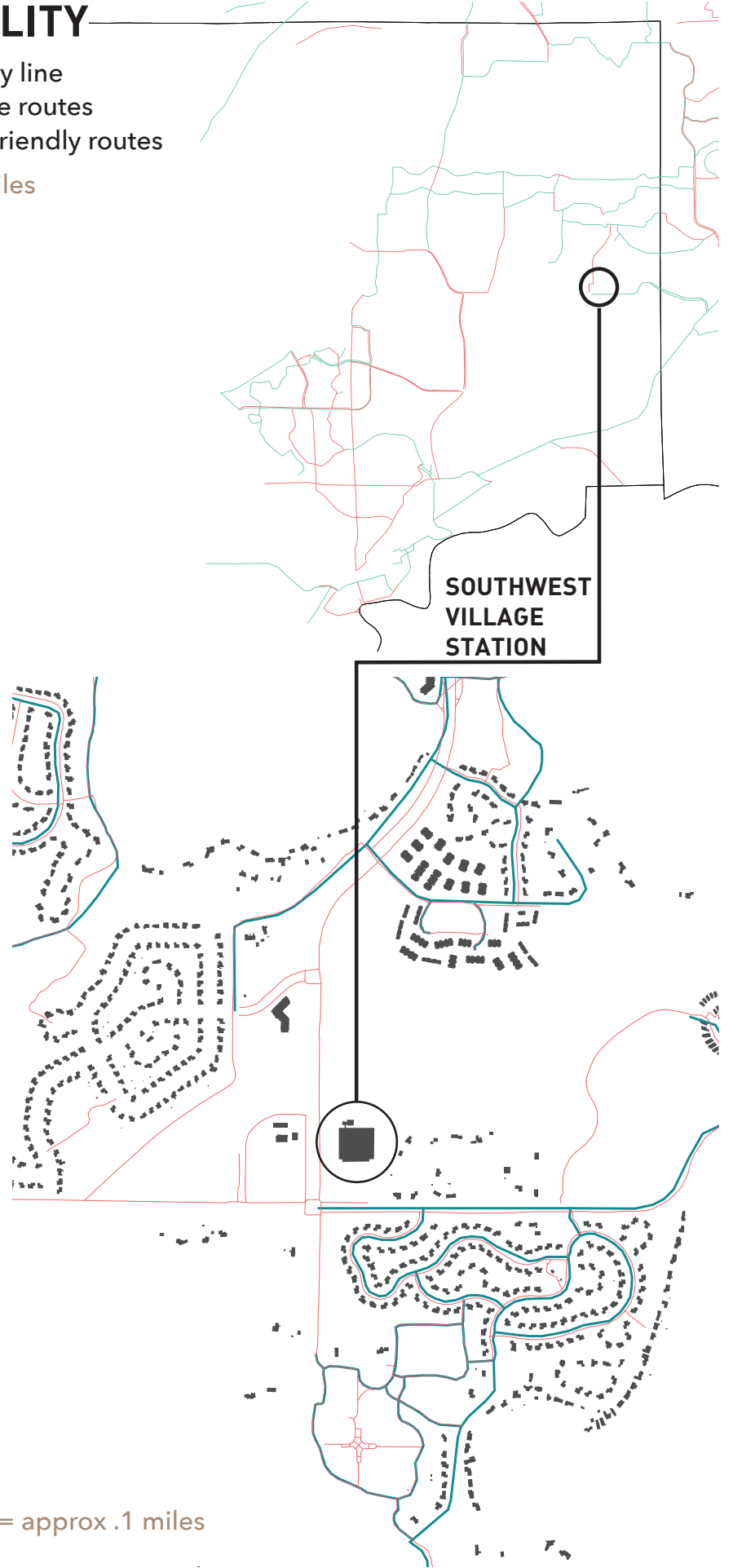


suburban 1 mile radius

ROUTE QUALITY

- county line
- unsafe routes
- - - bike friendly routes

1" = approx .375 miles

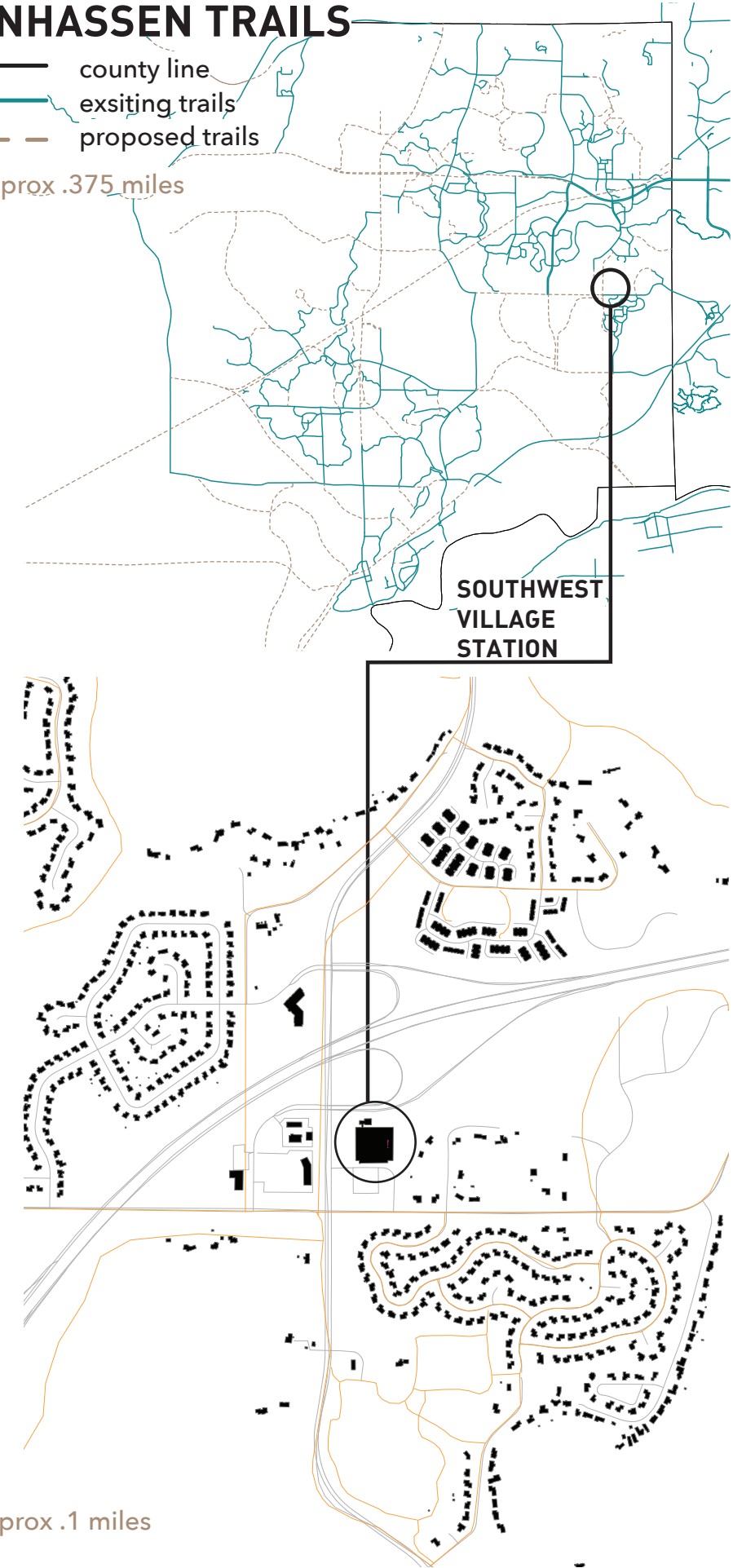


1" = approx .1 miles

CHANHASSEN TRAILS

- county line
- existing trails
- - - proposed trails

1" = approx .375 miles



1" = approx .1 miles

30 MIN BIKE / 15 MIN WALK

ROUTES IN CHANHASSEN.

It is important to understand the current conditions existing in Chanhassen. There are numerous trails, with more planned, for increasing recreation, and safe and commuter opportunities. These new planned routes will better connect existing trails and paths that lead people from residential areas into commercial, communal, and transit nodes. Southwest Village Station serviced by Southwest Transit Commuter Bus Lines, is a perfect place to engage additional bike and pedestrian users, a new community space all around existing transit and new residential zones.

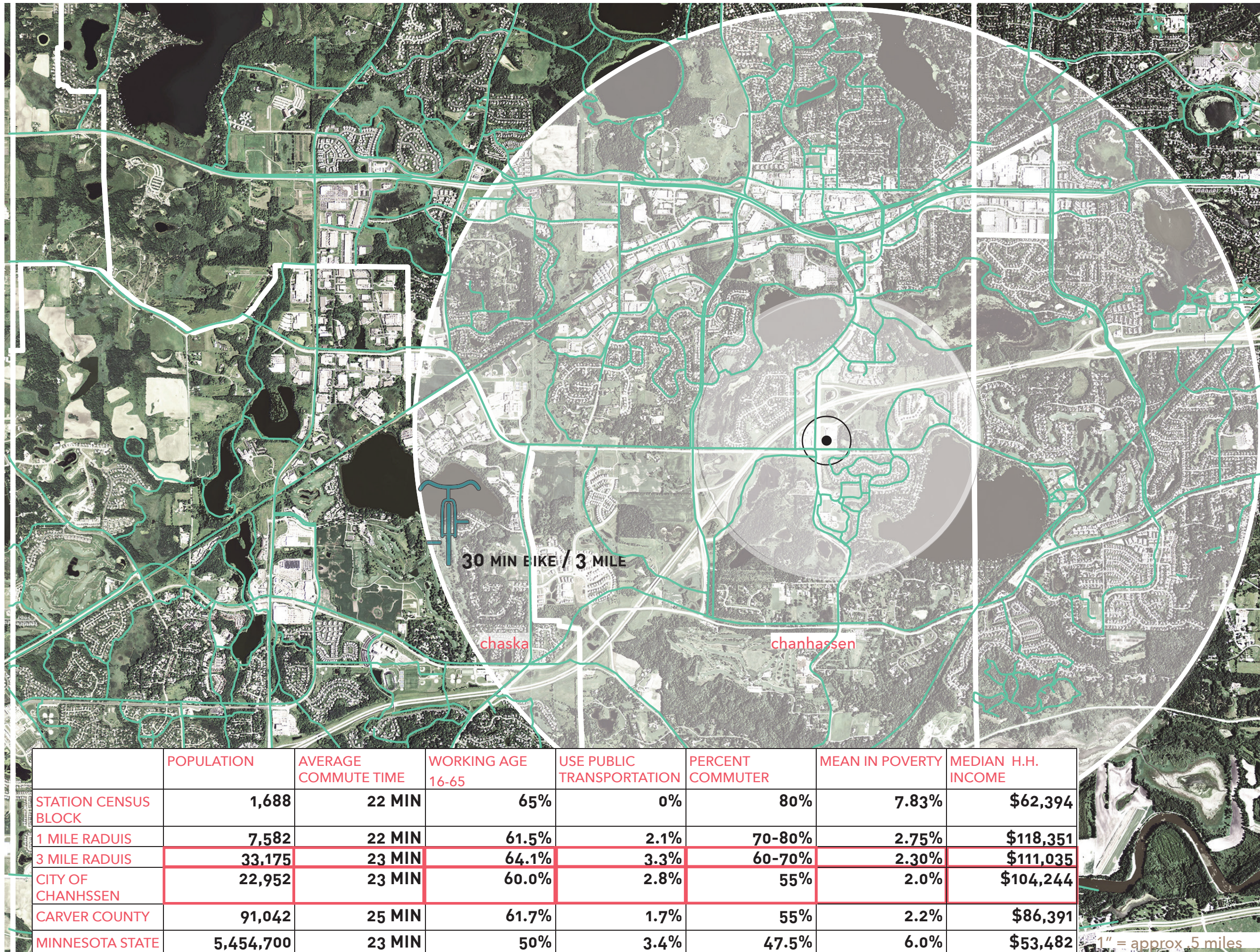
It is invaluable to have these connections both for biker and pedestrian use. However, what is even more important is the **experiential qualities** and **safety implementations** of these routes.

CONSIDERATION OF TRAILS AT THREE MILE RADIUS

Biker's view for the 3 mile / 30 minute ride

THE MAJORITY OF AMERICAN COMMUNITIES, DEVELOPED AFTER 1950, ARE DESIGNED FOR PRIVATE AUTOMOBILE RATHER THAN PUBLIC TRANSPORTATION. THIS SUSTAINED EMPHASIS ON DESIGN, PUBLIC POLICY, AND INVESTMENT FAVORING PRIVATE AUTO TRAVEL HAS MADE *IT DIFFICULT FOR TRANSIT TO SERVE THESE COMMUNITIES.*

-Goodwill & Hendricks, 2002.



CYCLING TO WORK: POTENTIAL.

Over 33,000 people live in a 3 mile / bikeable range to Southwest Village Station.

The higher levels of income mean that these users have the means to use automobile transit if they choose. Our challenge is to excite and engage this large population in order to peak interests in commuter cycling.

THE 4 TYPES OF TRANSPORTATION CYCLISTS



	POPULATION	AVERAGE COMMUTE TIME	WORKING AGE 16-65	USE PUBLIC TRANSPORTATION	PERCENT COMMUTER	MEAN IN POVERTY	MEDIAN H.H. INCOME
STATION CENSUS BLOCK	1,688	22 MIN	65%	0%	80%	7.83%	\$62,394
1 MILE RADUIS	7,582	22 MIN	61.5%	2.1%	70-80%	2.75%	\$118,351
3 MILE RADUIS	33,175	23 MIN	64.1%	3.3%	60-70%	2.30%	\$111,035
CITY OF CHANHSSEN	22,952	23 MIN	60.0%	2.8%	55%	2.0%	\$104,244
CARVER COUNTY	91,042	25 MIN	61.7%	1.7%	55%	2.2%	\$86,391
MINNESOTA STATE	5,454,700	23 MIN	50%	3.4%	47.5%	6.0%	\$53,482

1" = approx. 5 miles

30 MIN BIKE / 3 MILE

BIKE STREET TYPES.

RESIDENTIAL TRAFFIC

ON or OFF street bike lanes with low speed limits, 0-999 ADT, paved route.

LOCAL TRAFFIC

ON or OFF street bike lanes with medium speed limits, 1000-5,999 ADT, paved route.

COMMUTER TRAFFIC

ON or OFF street bike lanes with high speed limits, 6000+ ADT, paved route.

SITE ○





ROUTE TYPOLOGIES.

In this section there are 4 typologies that will be discussed within the proposed bike shed of a 3 mile radius / 30 minute commute.

By classifying these typologies of path experiences, we can better assess user needs and strategies to plan for the safe and increasing use in the future.

Issues with sight lines, access, congestion, crossing lengths, crossing ability, and way finding can all be influential in the user's desire and ability to bike.

First, we will look at safety strategies from the Community Design Group, a Minneapolis based consultation firm. Second, we show how new technologies can increase and excite more people in the millennial generation to use trails. Third, we will run through design interventions and propose changes in experiential qualities for all 4 typologies through a series of sections and perspective renderings.

30 MIN BIKE / 3 MILE

SAFETY STRATEGIES

These 3 safety measure classifications are based on average daily traffic (ADT) numbers, concurrent with increasing mph speed limits on these roads.

According to the Community Design Group (c-d-g.org) of Minneapolis, there are different safety structures needed depending on the route quality.

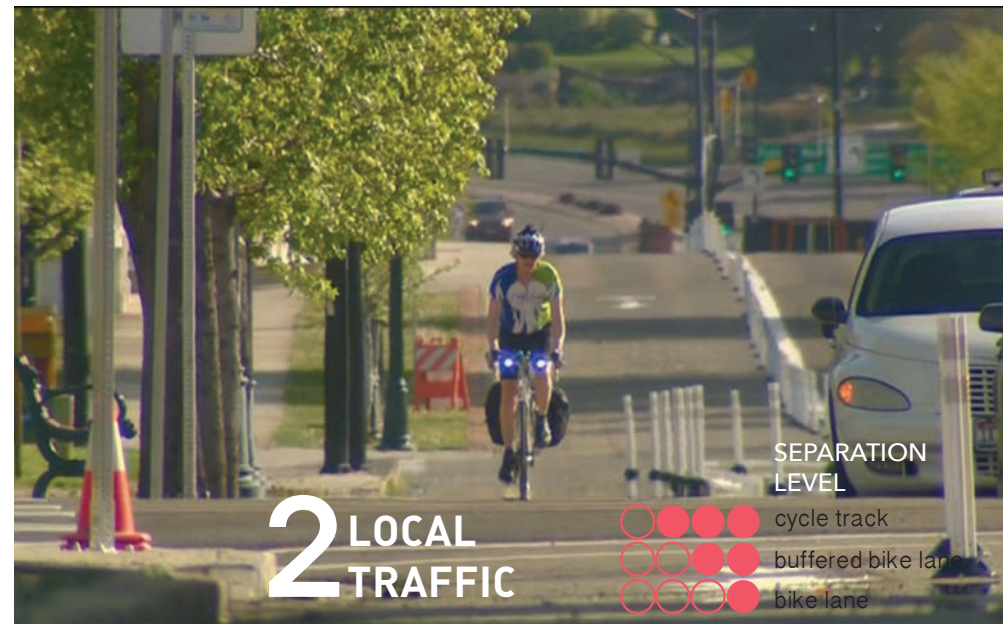
Because this graph typically applies to urbanized areas, we do not always find the need to analyze and re-design the exact same ways. This project for instance chooses to focus on local traffic and commuter traffic streets rather than residential trafficked streets. We also have included two additional typologies of design interventions: "Unique Elements", such as park trails, and where "Trails Converge", two distinct types meeting or change.



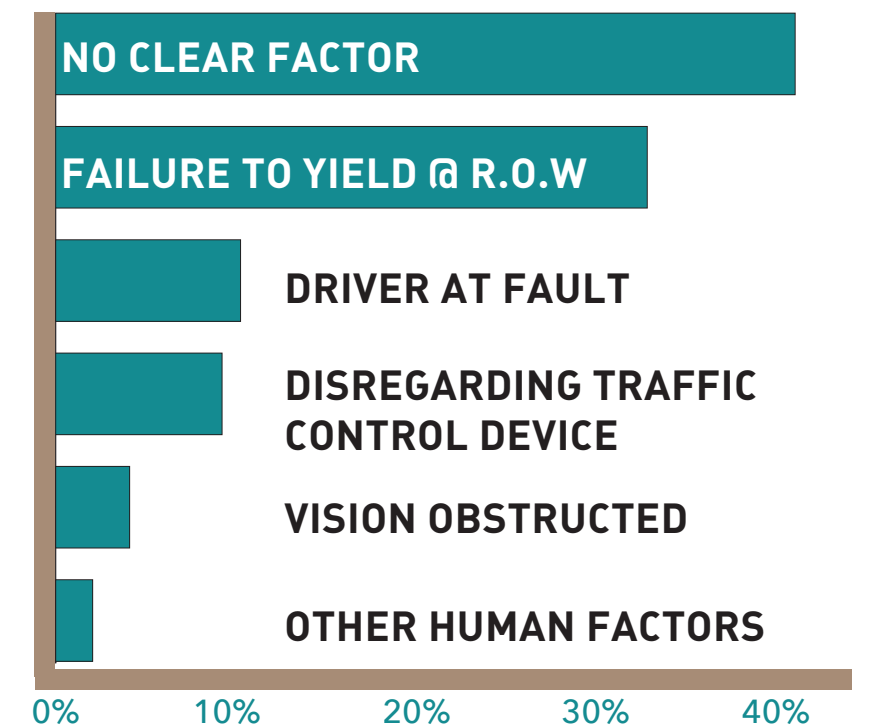
LOW

MED

HIGH



TOP CRASH CONTRIBUTING FACTORS WITH MOTORISTS



UNIQUE ELEMENT: *Wayfinding & information in park trails and rest areas through tech apps.*

SOME HAVE CALLED THE SMART CITY TREND THE MOST TRANSFORMATIVE THING TO HAPPEN TO CITIES SINCE THE URBAN RENEWAL MOVEMENT OF THE 1960S. IT'S HAPPENING IN LARGE PART BECAUSE OF DEMOGRAPHIC, ECONOMIC AND FISCAL CHANGES AFFECTING CITIES IN AMERICA AND AROUND THE GLOBE.

govtech.com 2016



30 MIN BIKE / 3 MILE

PARK TRAIL CONNECTIONS

This schematic map shows all 7 stations served by Southwest Transit and interstitial distances. By using Smart City technology users can track progress, and location for an easy and safe ride from home to station.

Clover Ridge P&R

2.7 MILES

1.8 MILES

Walnut Creek P&R

Eagle P&R

4.4 MILES

Chanhassen Station

1.5 MILES

Southwest Village Station

5.0 MILES

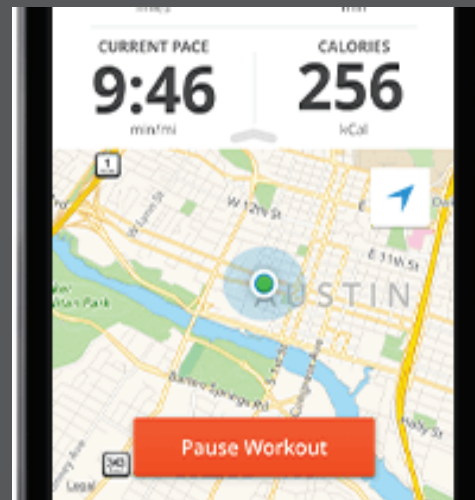
Southwest Station

3.6 MILES

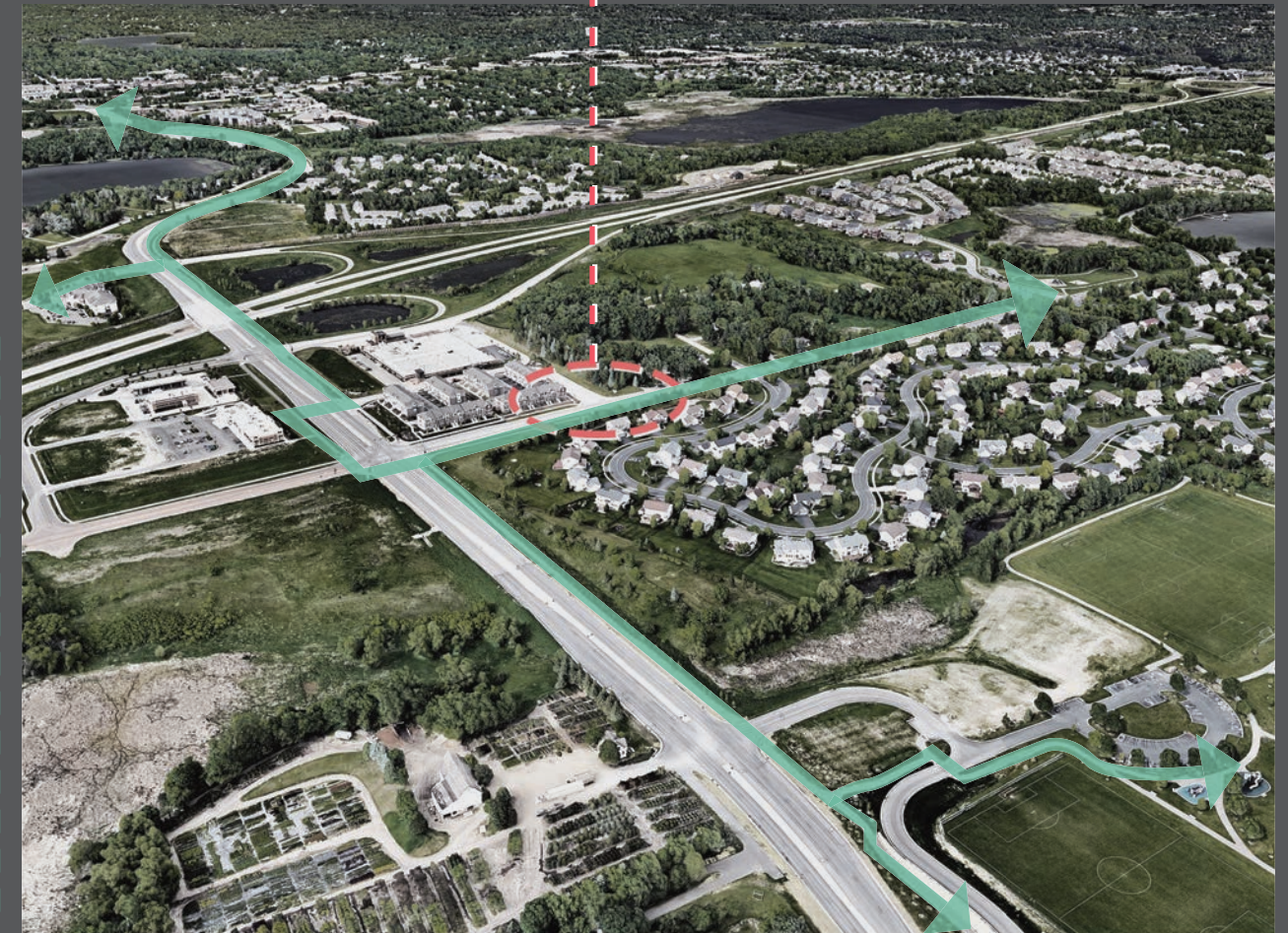
Preserve Mall

YOU ARE HERE

TRACK



CONNECT





1. TRAILS CONVERGE

Lyman Blvd. & SW Village Ct.

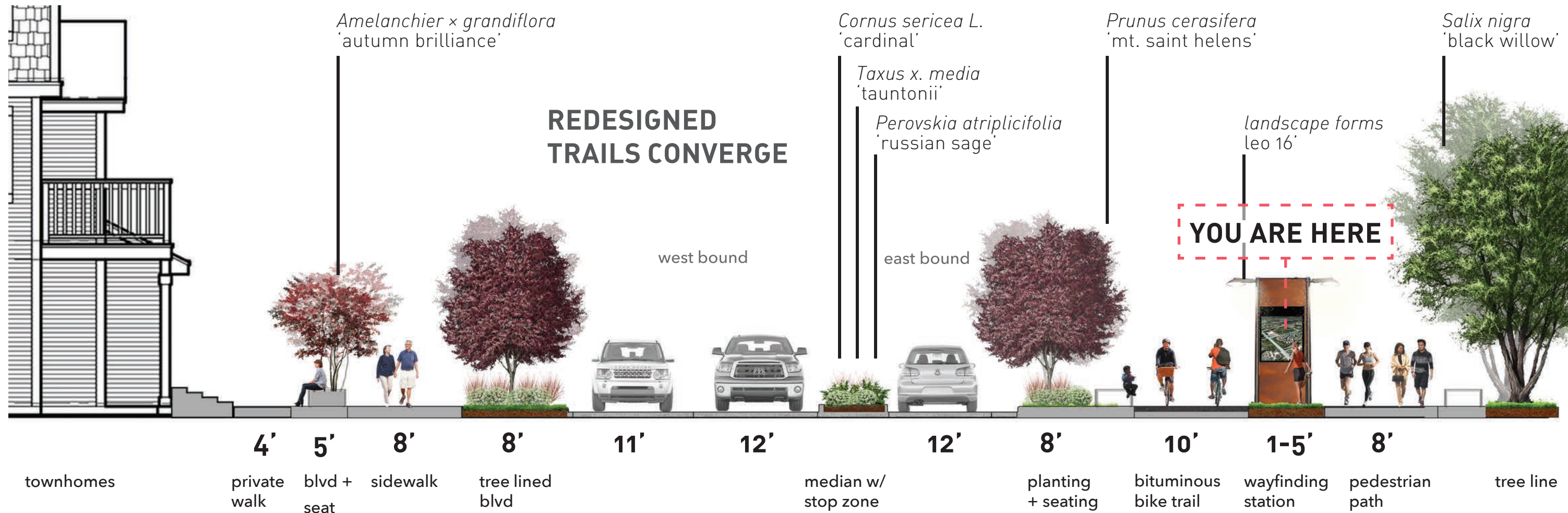
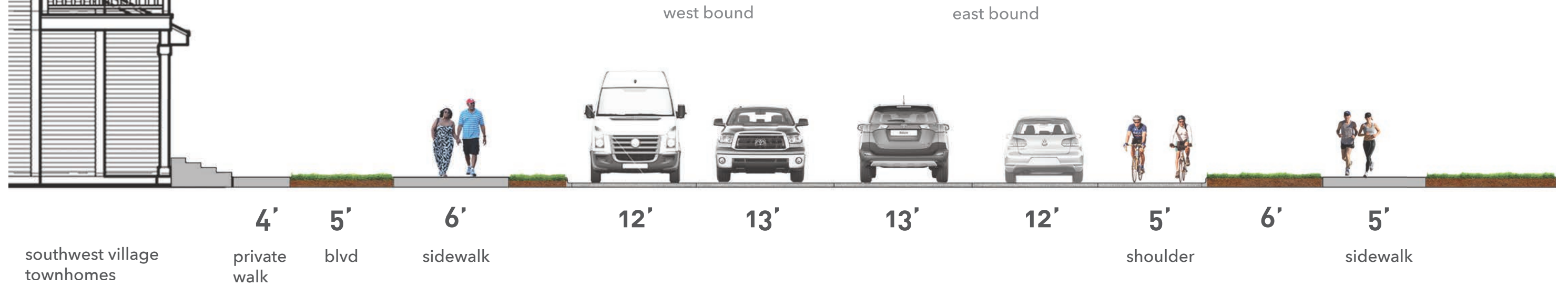
Lyman Blvd is a commuter traffic route. It has a 5' Shoulder pathway classified for bikers. A solid white painted line is all there is to designate space from vehicular to bike traffic. Here you see the north facing entrance to Southwest Village Court, just a half block from the north entry of the station.

Here we see a Park Trail and a Local Traffic route, above-grade path converge into one unmarked crosswalk.

On the following pages we see how simple safety and aesthetic enhancements can greatly reduce risk of a crash, and increase use for all types of pedestrian and bike users.

30 MIN BIKE / 3 MILE

EXISTING TRAILS CONVERGE



YOU ARE HERE

1. REDESIGNED TRAILS CONVERGE

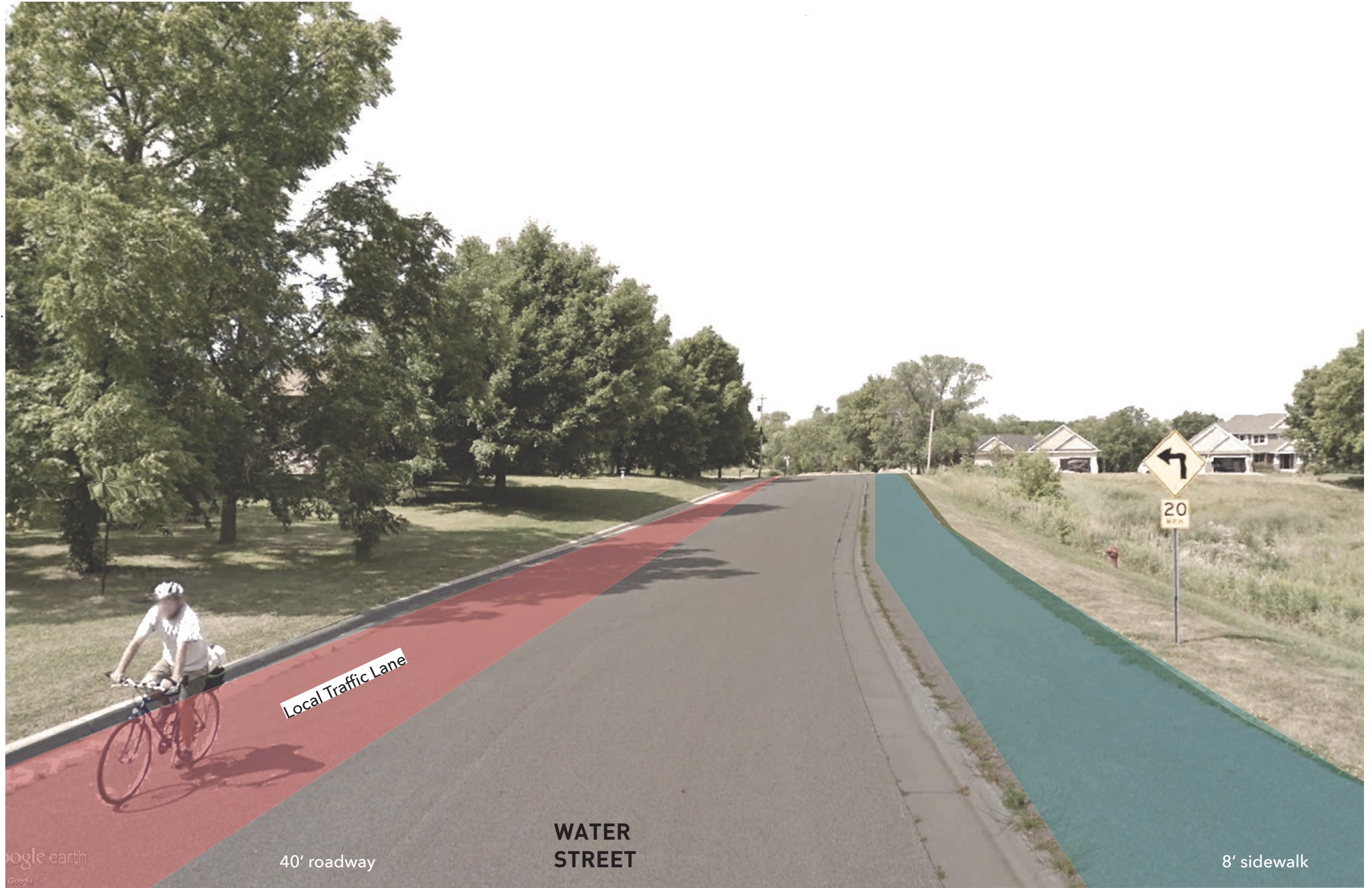
LYMAN BLVD

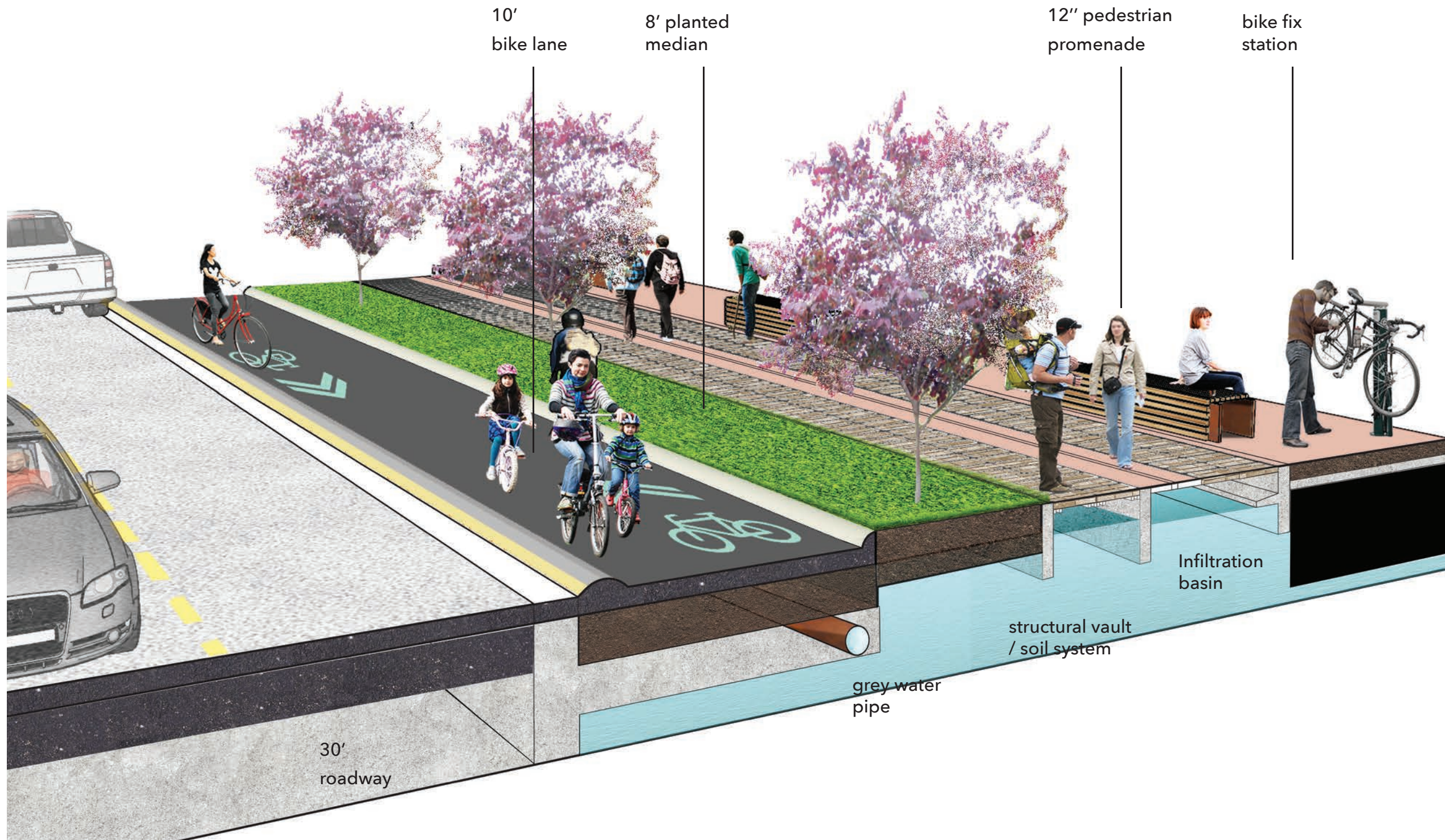


2. EXISTING LOCAL TRAFFIC

water street @ great plains blvd.

This street can easily be used as an example of expansive roadways with little care for multimodal movement. No infrastructure or space is considered for enhancing pedestrian or biker experience. On the next page you can see how re-distributing space can change everything about a street.





2. REDESIGNED LOCAL TRAFFIC

water street @ great plains blvd.

This is an on-street bike route option for local roadways. The user is protected by elevation and visual cues from vehicular traffic in this scenario. Safety and convenience for users is fundamental to increase use and function in multimodal traffic. The use of protected intersections, illuminated paths, way finding and a bike fix station are appropriate safety measures to implement on the Local Traffic Route, as outlined by the CDG and NACTO bikeguide.

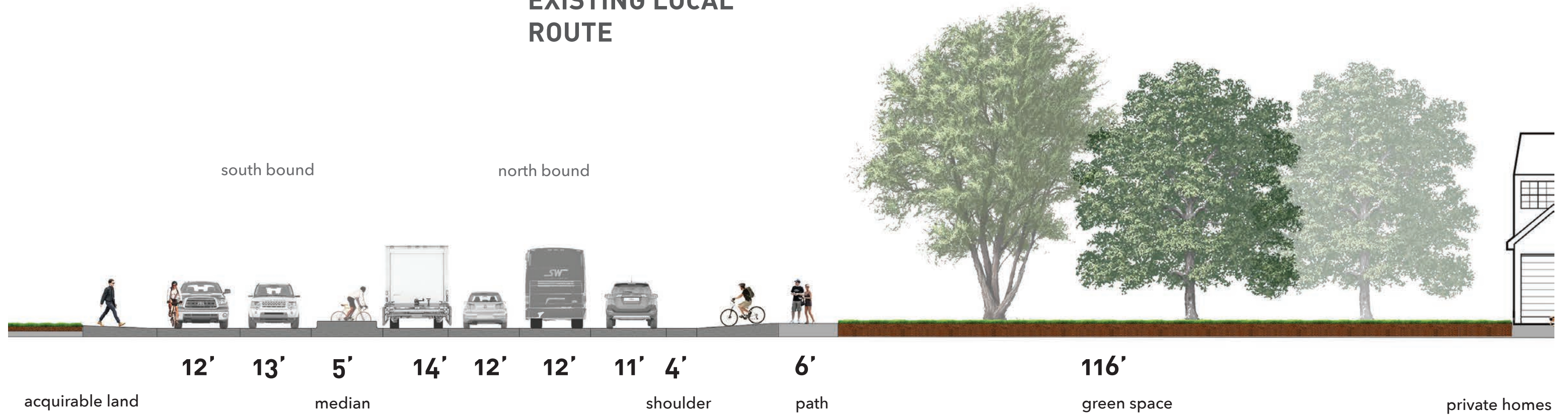
30 MIN BIKE / 3 MILE

2. EXISTING LOCAL ROUTE

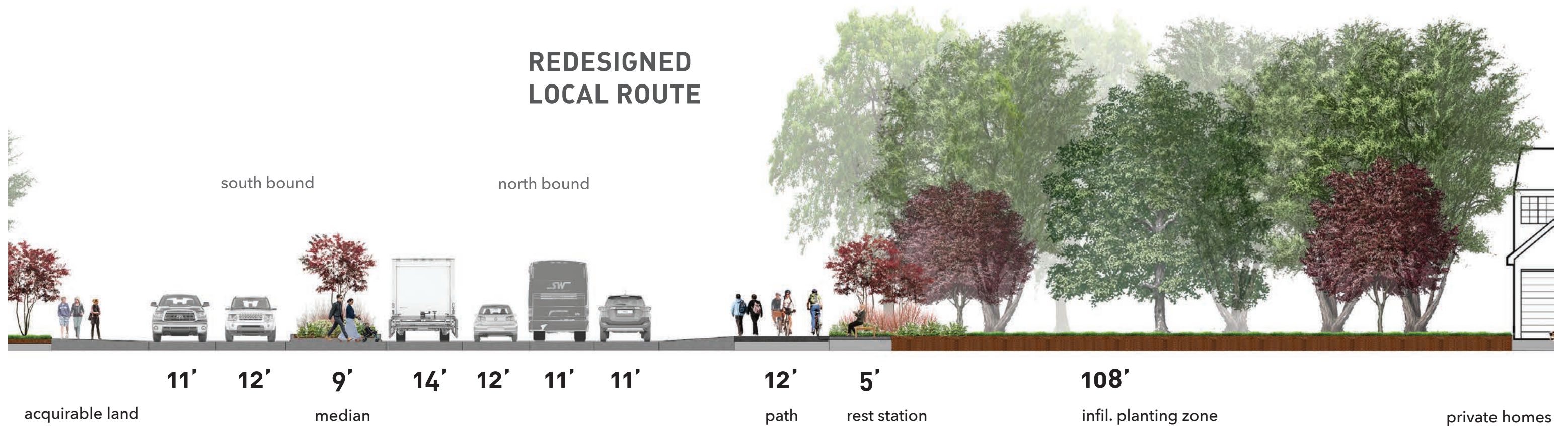
*Great Plains Blvd. &
Brendemere Park*



EXISTING LOCAL ROUTE



REDESIGNED LOCAL ROUTE



CONSIDERATIONS OF TRAILS AT STATION APPROACH WITHIN ONE MILE

Pedestrian experience for the 1 mile / 15 minute walk

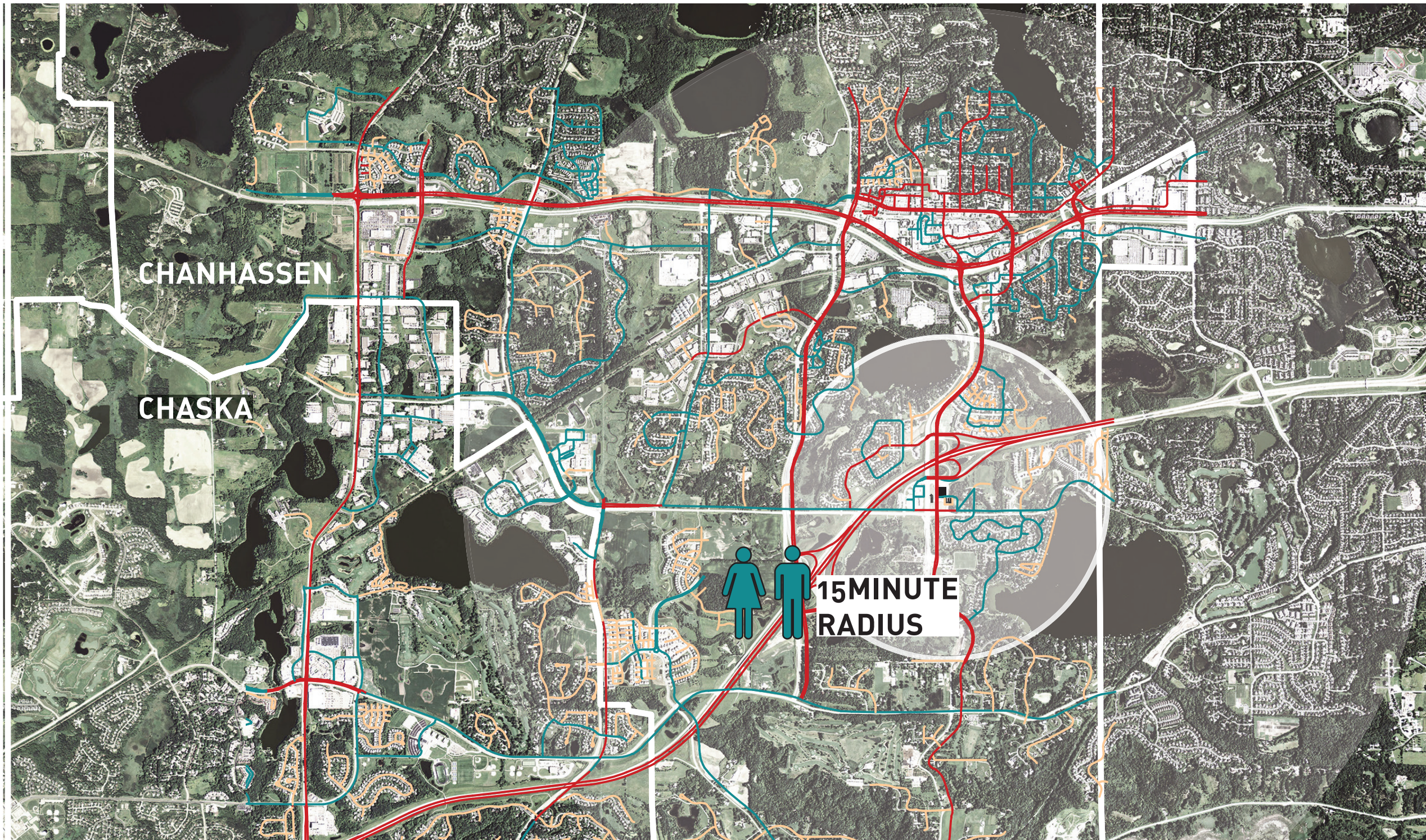
SW SOUTHWEST TRANSIT
SOUTHWEST TRANSIT

650

“ALL TRULY GREAT THOUGHTS ARE CONCEIVED WHILE WALKING.”

Friedrich Nietzsche

15 MINUTE WALK / 1 MILE



POTENTIAL REACH @ 1 MILE.

	POPULATION	AVERAGE COMMUTE TIME	WORKING AGE 16-65	USE PUBLIC TRANSPORTATION	PERCENT COMMUTER	MEAN IN POVERTY	MEDIAN H.H. INCOME
STATION CENSUS BLOCK	1,688	22 MIN	65%	0%	80%	7.83%	\$62,394
1 MILE RADUIS	7,582	22 MIN	61.5%	2.1%	70-80%	2.75%	\$118,351
3 MILE RADUIS	33,175	23 MIN	64.1%	3.3%	60-70%	2.30%	\$111,035
CITY OF CHANHSSSEN	22,952	23 MIN	60.0%	2.8%	55%	2.0%	\$104,244
CARVER COUNTY	91,042	25 MIN	61.7%	1.7%	55%	2.2%	\$86,391
MINNESOTA STATE	5,454,700	23 MIN	50%	3.4%	47.5%	6.0%	\$53,482



1" = approx. 5 miles

15 MINUTE WALK / 1 MILE

EXISTING STATION CONTEXT.

BIKE TRAILS

RESIDENTIAL AREAS

RETAIL AREAS

In order to fully explain the need for new development and it is necessary to show the existing conditions of this transit site. Currently, there is a commercial development with limited services across the street to the west. Multiple housing developments surround the transit node. With the amount of people around the station, there is a great chance that rider numbers and site use will rise.

With rising populations, there will soon be greater demand for goods and services nearby areas of transit and housing.



15 MINUTE WALK / 1 MILE



BIKE STREET TYPES. WITHIN STATION CONTEXT

RESIDENTIAL TRAFFIC

ON or OFF street bike lanes with low speed limits, 0-999 ADT, paved route.

LOCAL TRAFFIC

ON or OFF street bike lanes with medium speed limits, 1000 -5,999 ADT, paved route.

COMMUTER TRAFFIC

ON or OFF street bike lanes with high speed limits, 6000+ ADT, paved route.

SITE ○

1" = approx 210'

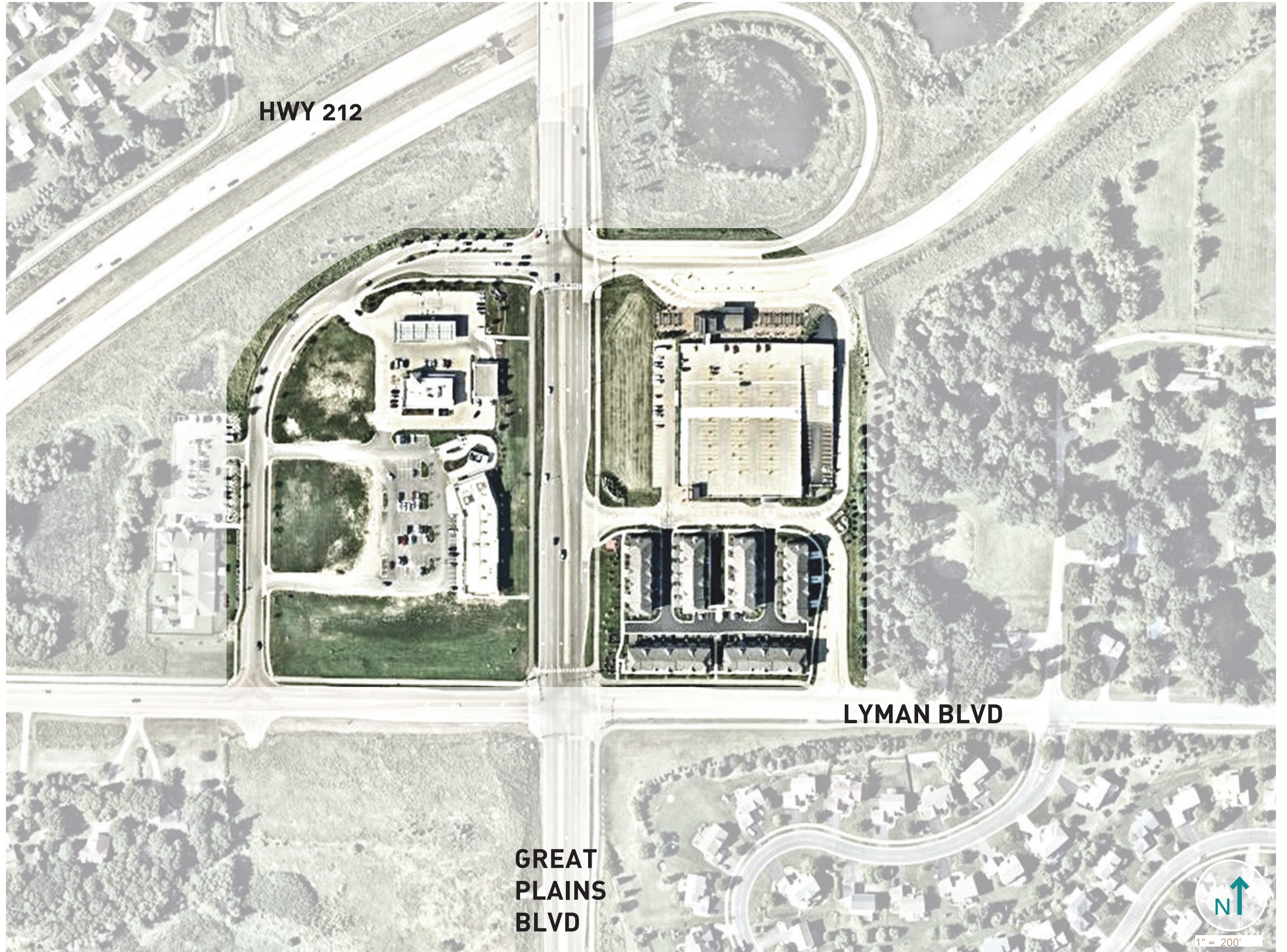
CENTRAL STATION: DEFINED

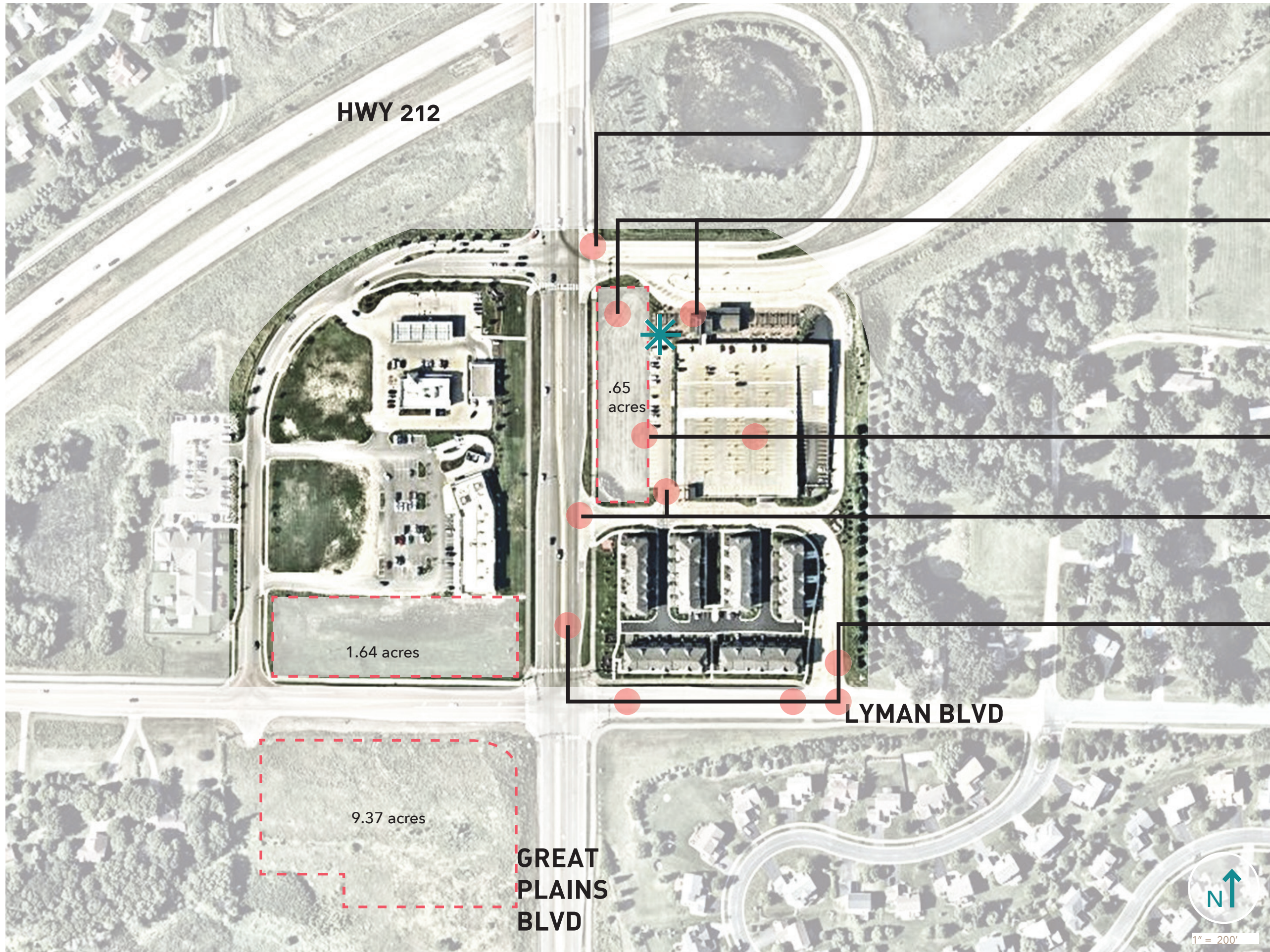
Inventory:

4.30 acres at station block
regional commercial
establishments
hosts 400+ cars; interior and
exterior lot
Indoor 5am - 9 pm

By providing a community center
gathering area, the transit node
can have dual functionality as
a place for people and modal
transport. Like a town square
for the suburban area, it needs
to have certain amenities and
access. The new area should
have respite from built and
environmental factors, such as
pollution, noise, odors, sun, heat,
cold and wind.

This site is perfect for events
and gatherings, cyclist routes
for tourism and recreation,
pre-sporting events which are
served already by SWT, and
social activity for emerging
communities.





TRANSIT STATION / PUBLIC NODE

ISSUES IDENTIFIED

- discontinuous sidewalks
- entrance points hidden
- parking structure under utilized
- uncontrolled intersections
- crossing excessive roadways

standing water and runoff on site

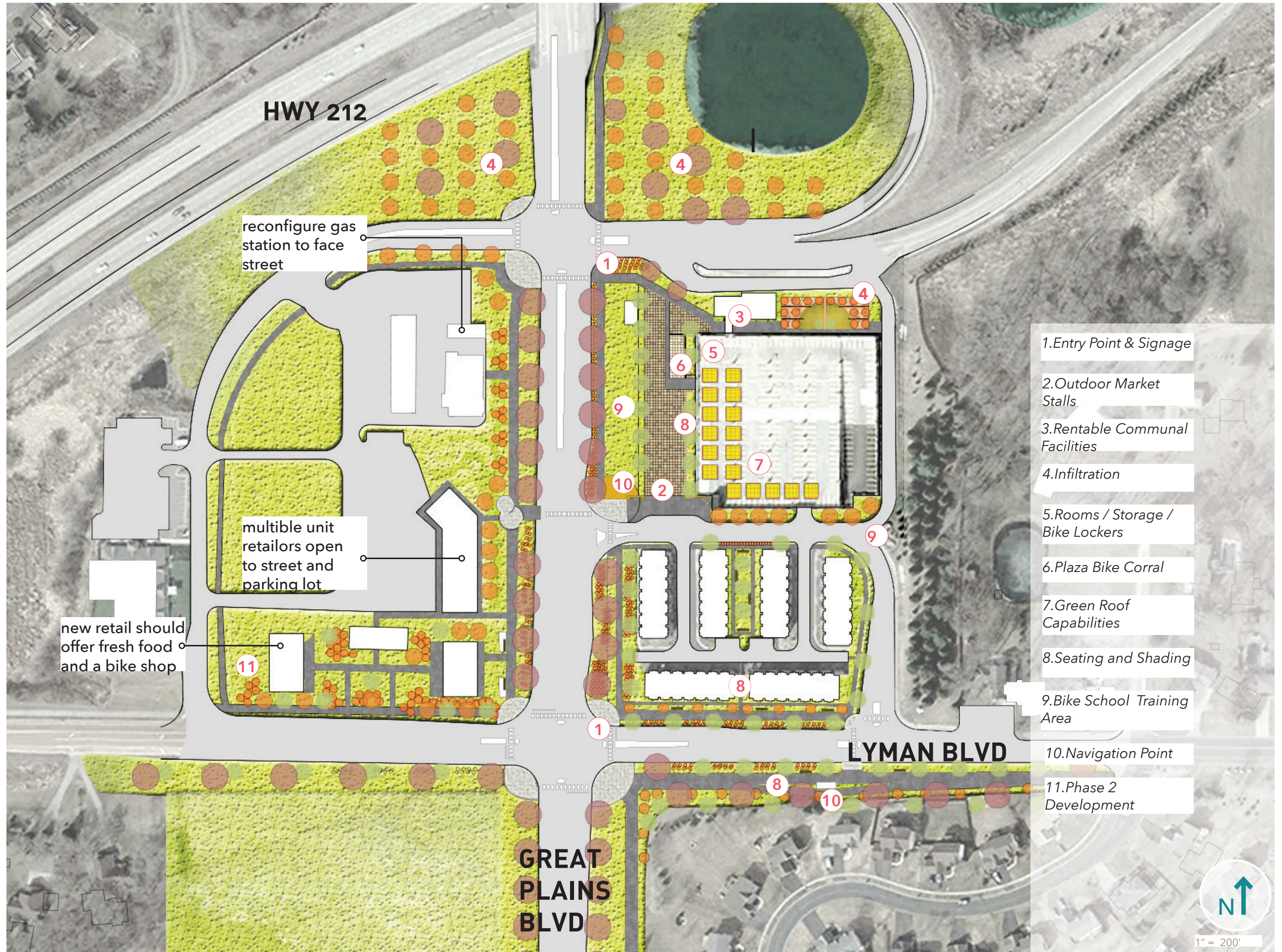


SW VILLAGE STATION PLAN

Park and ride station at highway 212 between Lyman Blvd and Great Plains Blvd.

This site has the potential to become the *community collaboration space* for social engagements, riding bikes on public roadways, shopping, events and meeting neighbors on the way to work.

The newly designed site will host a seasonally adaptable mounded site and plaza, with event rental spaces, food vending site opportunities, and community programming opportunities.

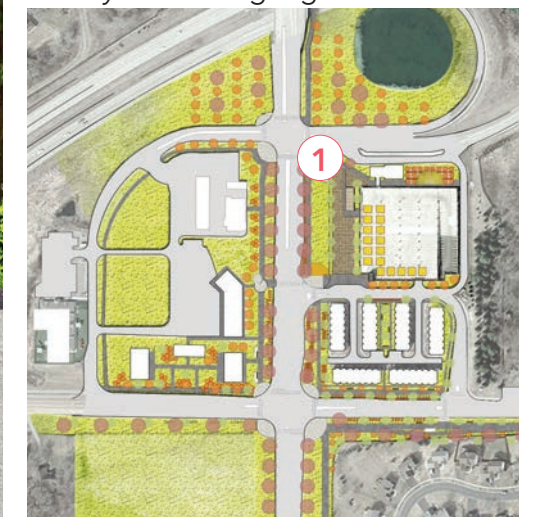


- 1. Entry Point & Signage
- 2. Outdoor Market Stalls
- 3. Rentable Communal Facilities
- 4. Infiltration
- 5. Rooms / Storage / Bike Lockers
- 6. Plaza Bike Corral
- 7. Green Roof Capabilities
- 8. Seating and Shading
- 9. Bike School Training Area
- 10. Navigation Point
- 11. Phase 2 Development



SW VILLAGE N. ENTRY POINT & SIGNAGE

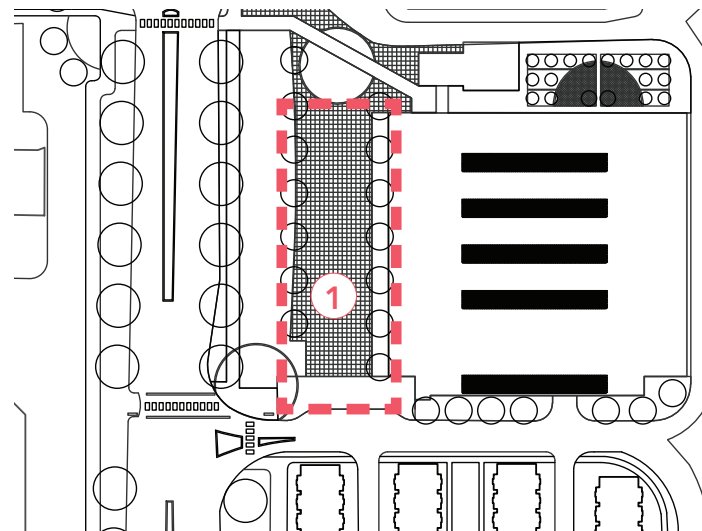
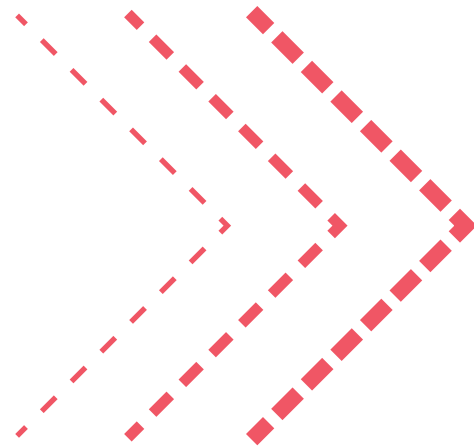
1. Entry Point & Signage



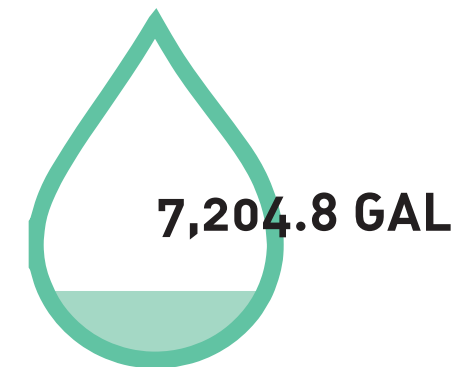
SW VILLAGE S. ENTRY POINT & SIGNAGE

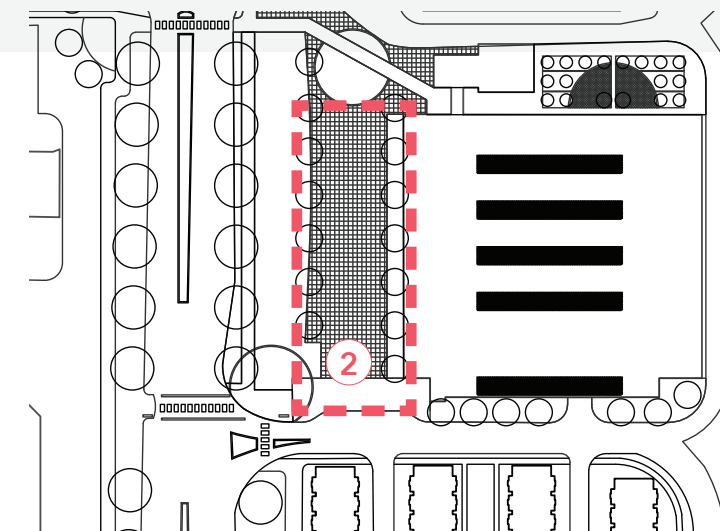


2. Outdoor Market Stalls



The existing 1,728 sq ft. exterior parking lot could be removed to increase public space and infiltration of the water on site. By shifting use of this exterior parking lot to a plaza with permeable pavers and vegetation, a total of 7,204.8 gallons of runoff water can be reduced.

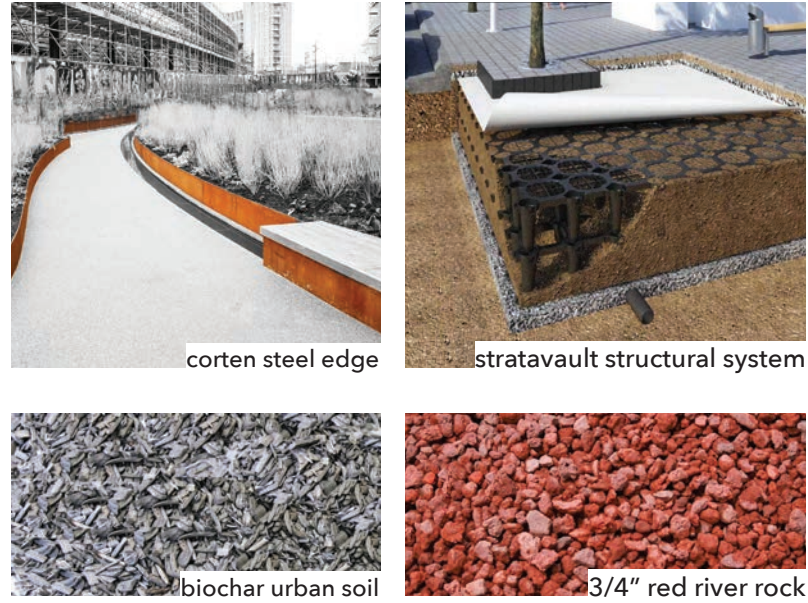




2. Outdoor Market Stalls



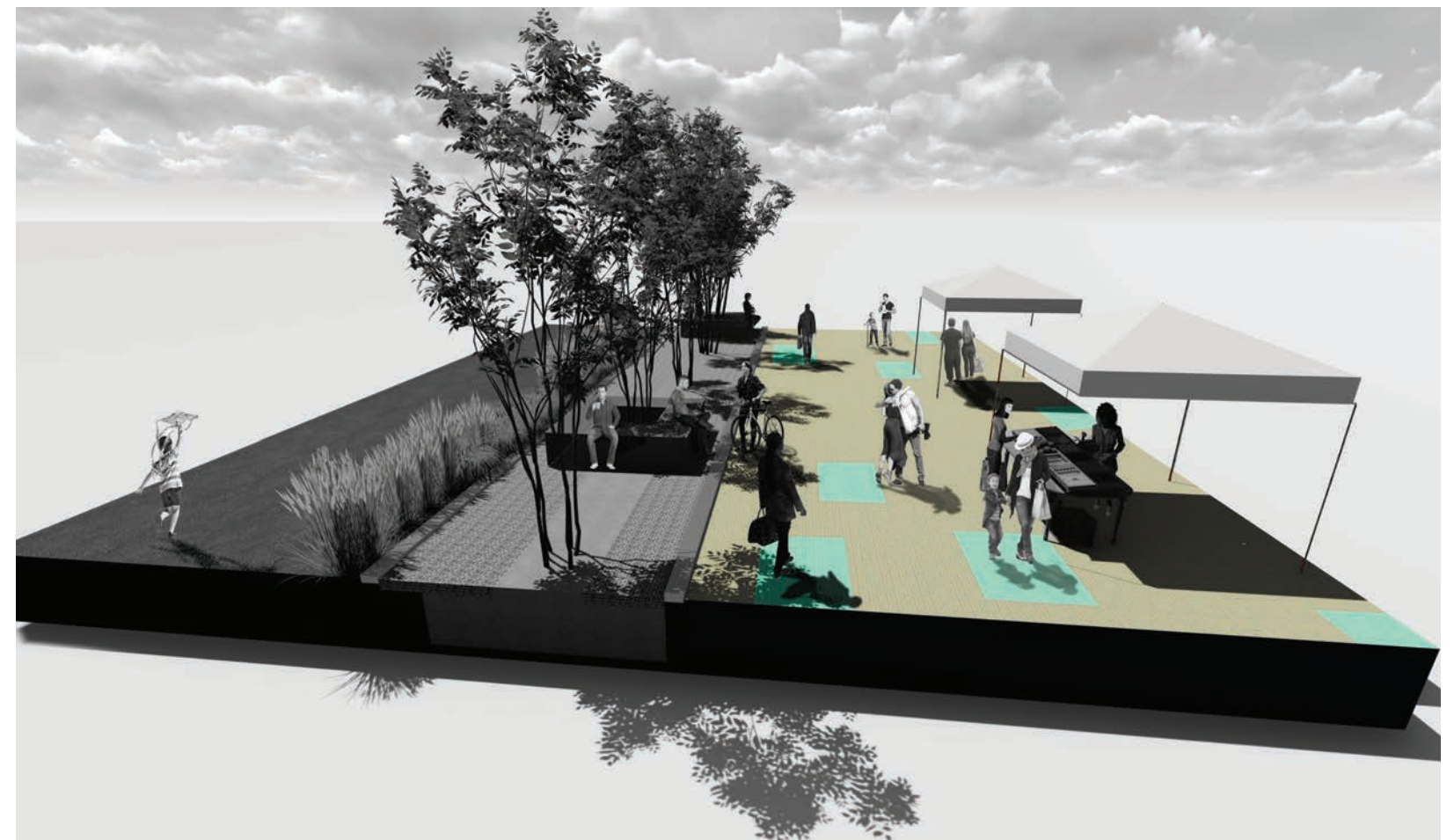
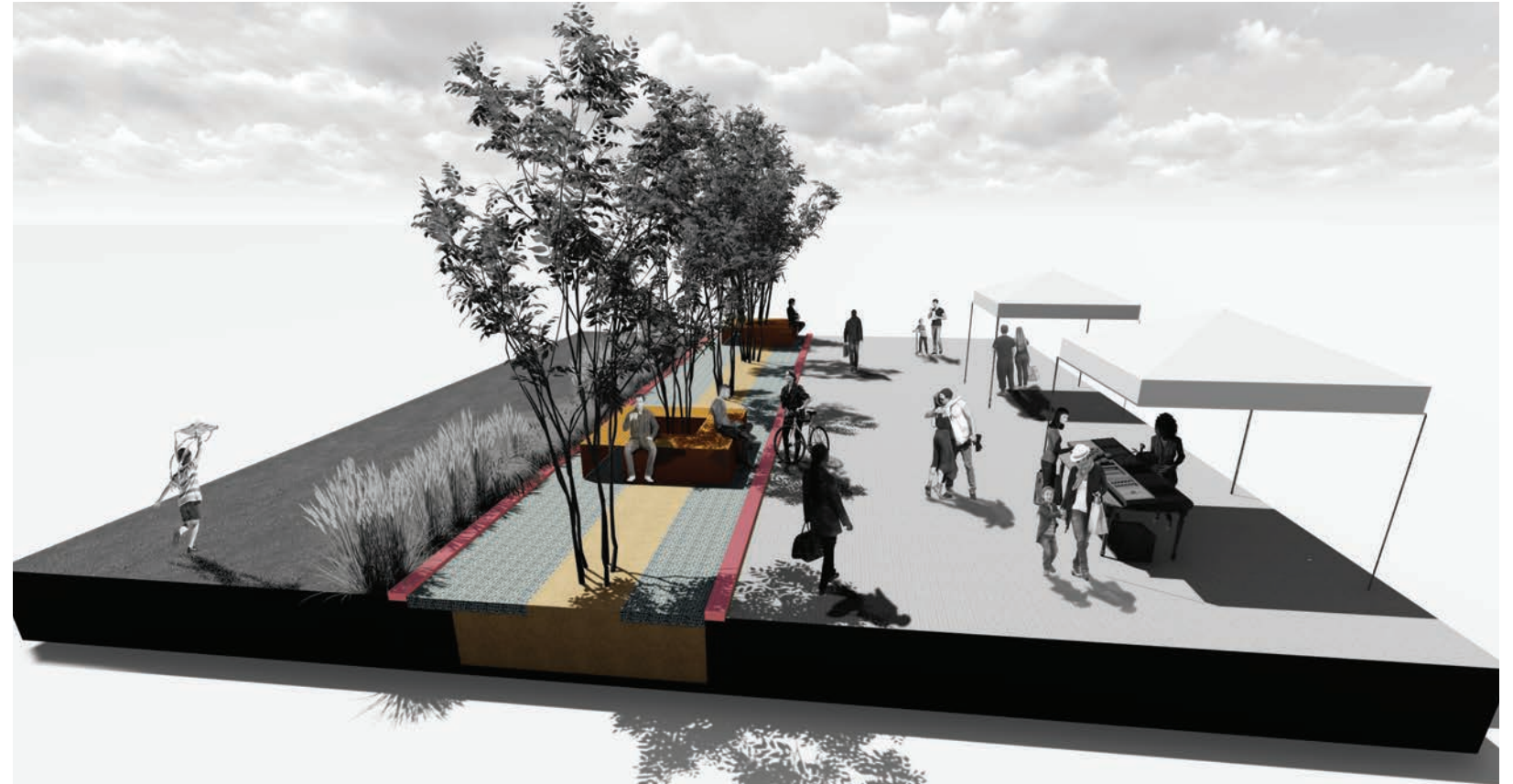
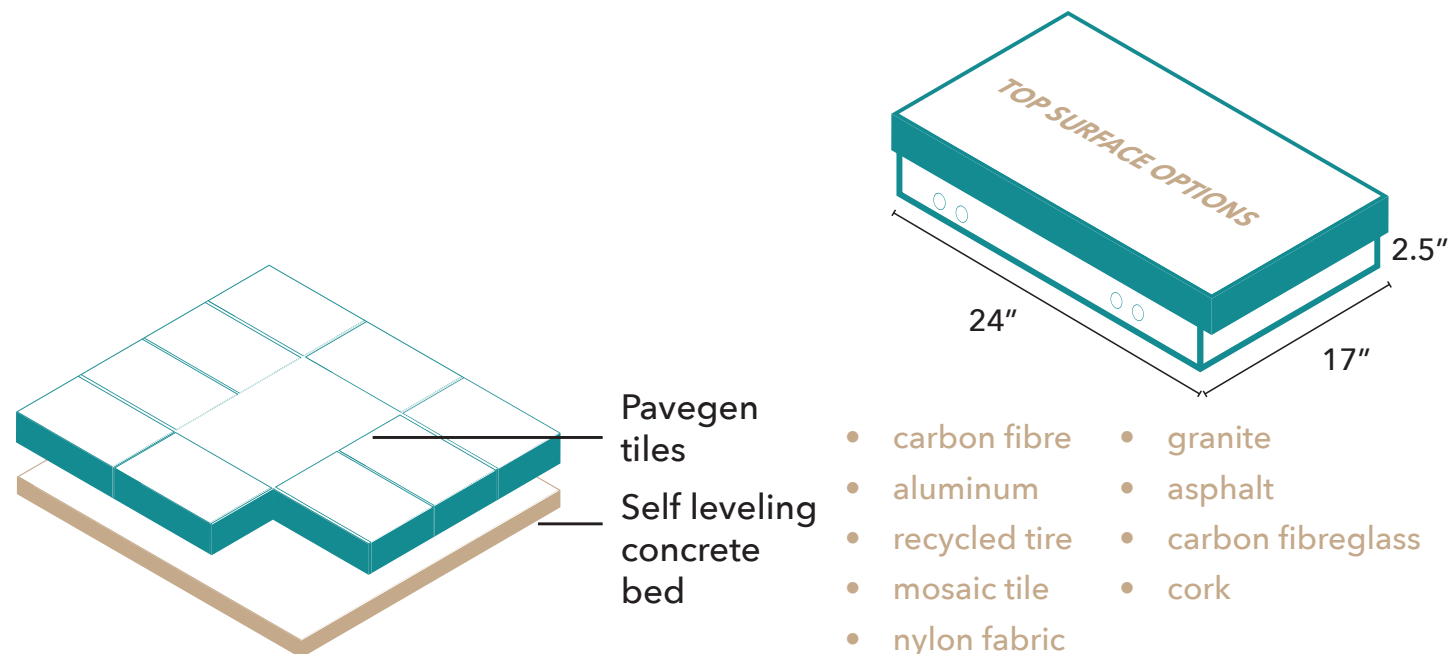
TRANSIT STATION / PUBLIC NODE



MATERIALITY:

MARKET PLAZA

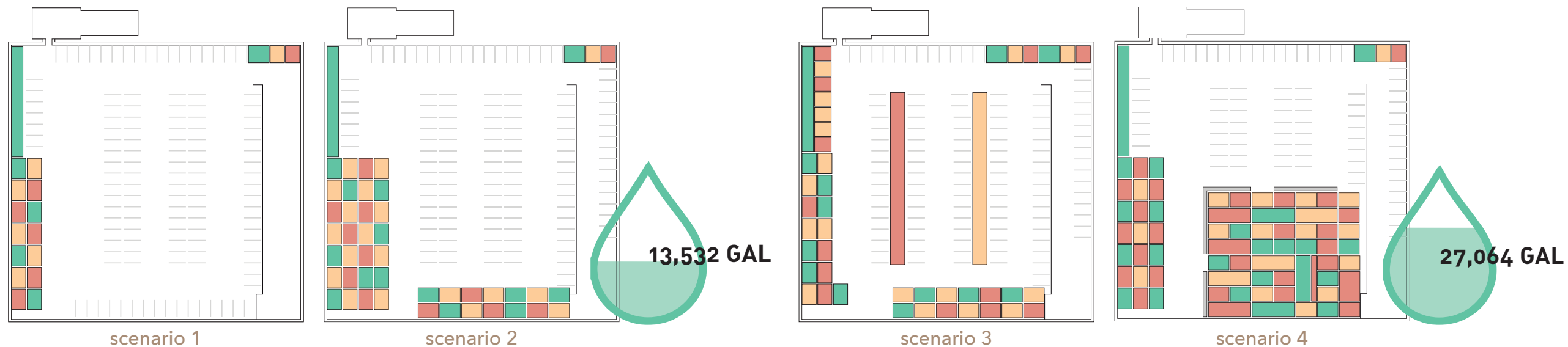
Systems and technologies should be wisely incorporated into new plaza designs to make materials and vegetation last as long as possible. These best management practices can extend tree life with structural soil cells. Pavers like PaveGen can harness kinetic energy and be used to help power lights and facilities on site.



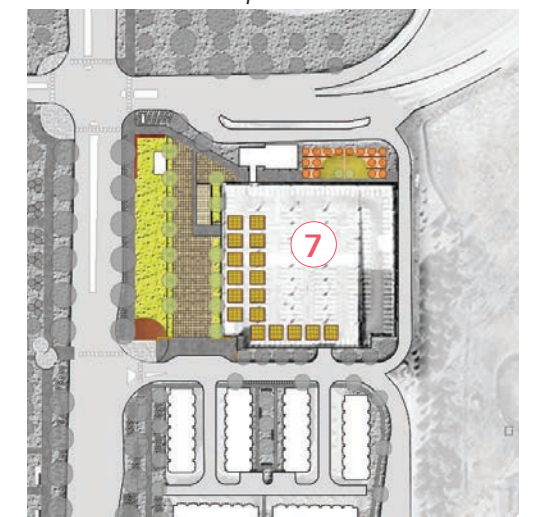


INFILTRATION & PARKING LOT: RUN OFF MITIGATION W/ GREEN ROOFS

The upper deck of the parking structure has space for more vehicular traffic than is currently necessary. This under utilized capacity area can be used for temporary and/or moveable green roof structures to help mitigate large volumes of runoff water.



7. Green Roof Capabilities



T.I.G.E.R. GRANTS

\$500 MILLION of FEDERAL MONEY offered
Modal and geographic equity
Rural projects awarded minimum of \$1Million

SELECTION CRITERIA:

- SHOW SAFETY INCENTIVES
- STATE OF GOOD REPAIR
- IMPROVE QUALITY OF LIFE
- ENVIRONMENTAL SUSTAINABILITY

“USDOT will consider the project’s ability to foster a safe, connected, accessible transportation system for the multimodal movement of goods and people”

[us-dot.tiger 2016 how to complete discretionary grants](#)



LANDSCAPE ARCH. FOUNDATION

Case studies investigation
No minimum award \$ amount

SELECTION CRITERIA:

- LANDSCAPE PERFORMANCE
- UNIQUE PROJECT
- STUDENT / SPONSOR / PARTNERSHIP
- SPECIFIC PERFORMANCE OBJECTIVES

“The CSI program is highly collaborative with the goal of better integrating the innovative work being done by academia and practice to advance our knowledge of landscape performance.”

lafoundation.org/foundation/case-study-investigation

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