

# GETTING CONNECTED

Improving Access to Opportunity in your Community

# DECLINE IN SUBURBIA?

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# COMMON CHARACTERISTICS OF DECLINING SUBURBS

- Residential separated from all nonresidential uses
- Homes with little aesthetic charm
- Locations remote from employment and from public transportation
- Poor access to public amenities including parks and libraries
- Streets designed to limit through traffic



# SUBDIVISION TO SLUM?!

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separated

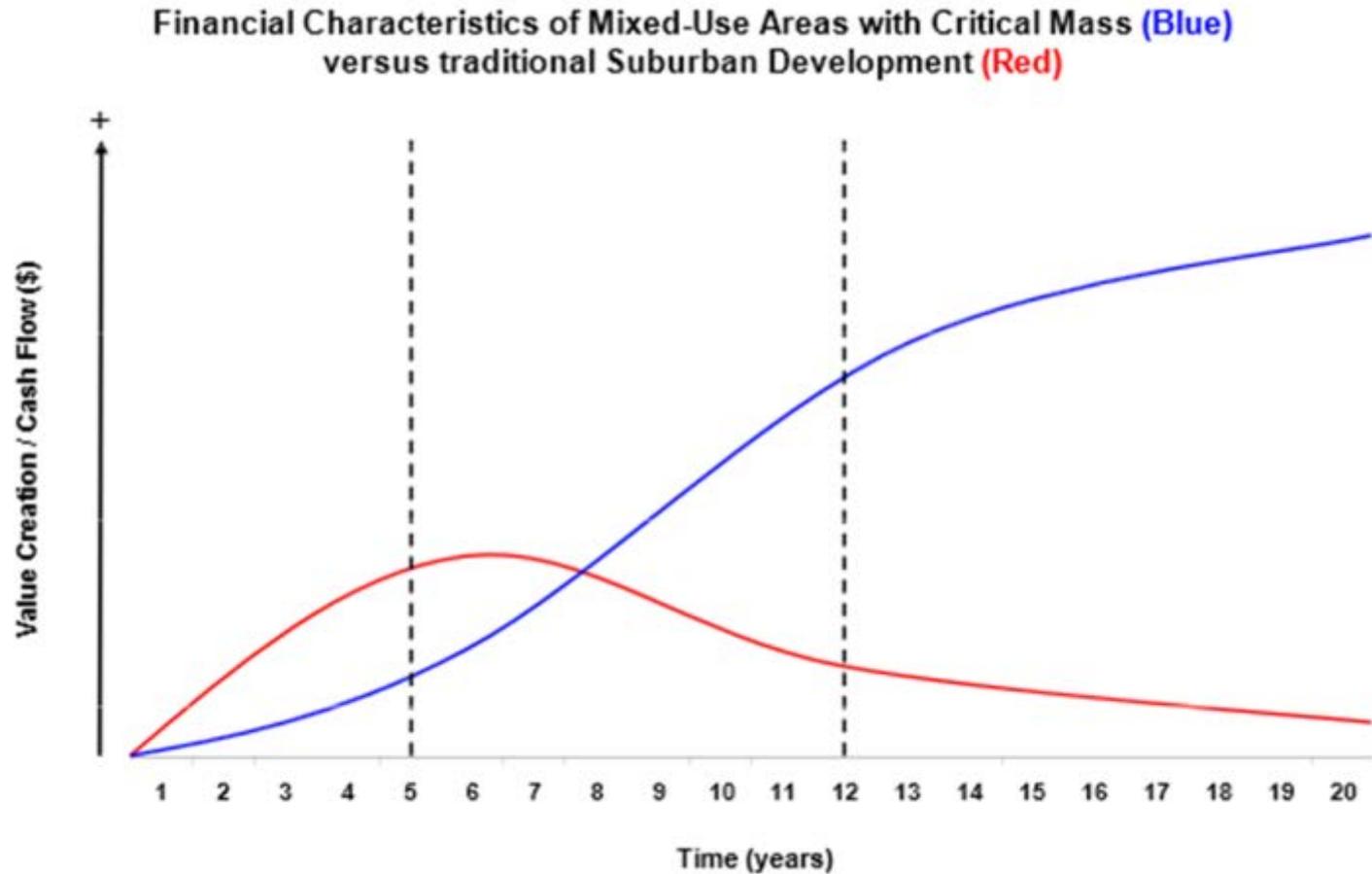
remote

poor access

limit

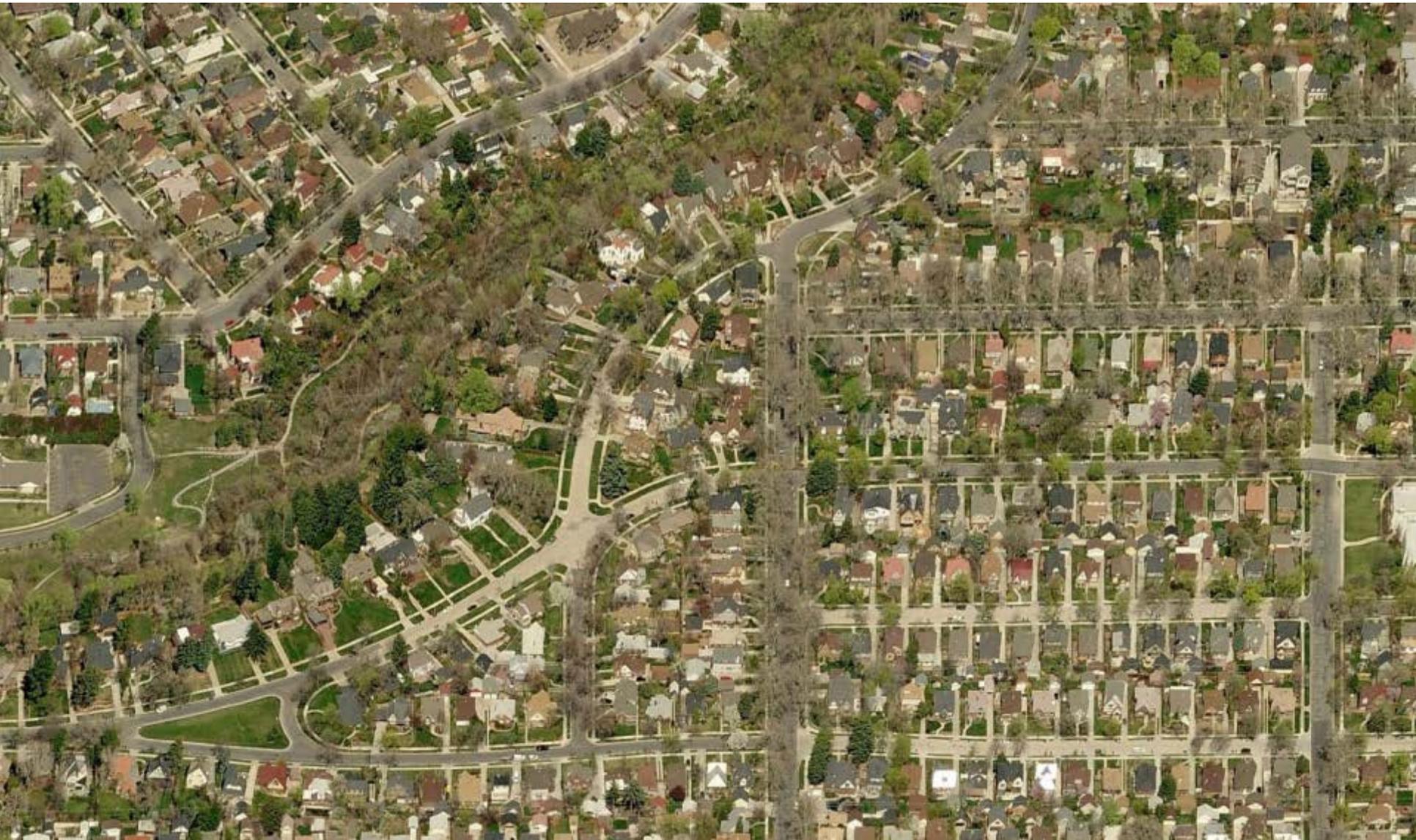
**Designed to be  
inconvenient**

# CONVENIENCE + AMENITIES = FINANCIAL HEALTH



SOURCE: The Brookings Institution

# EXAMPLE SUBURB FROM THE 1920S



# KEY CONCEPT: “ACCESS TO OPPORTUNITY”

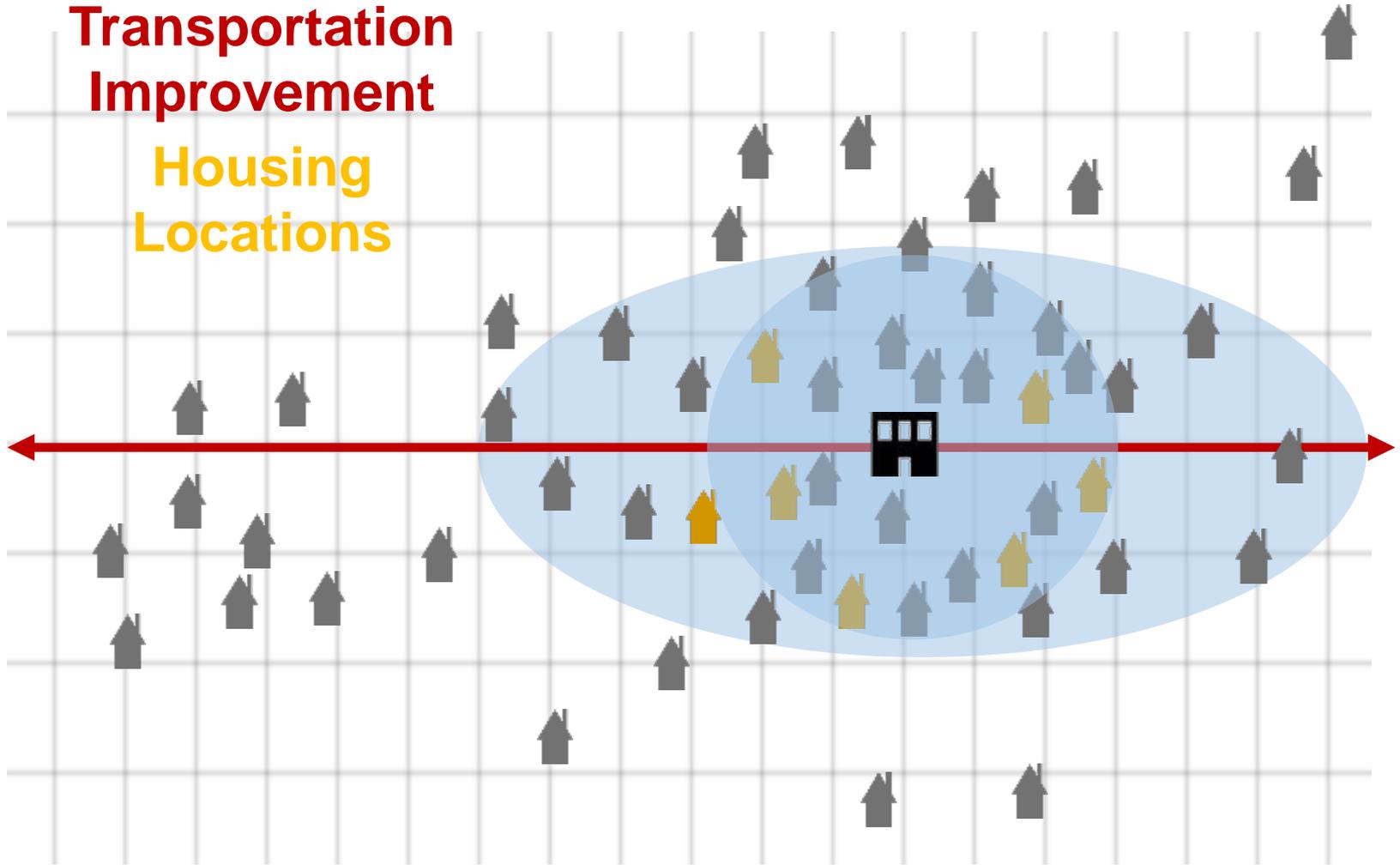
How many valued destinations can be reached in a reasonable period of time?



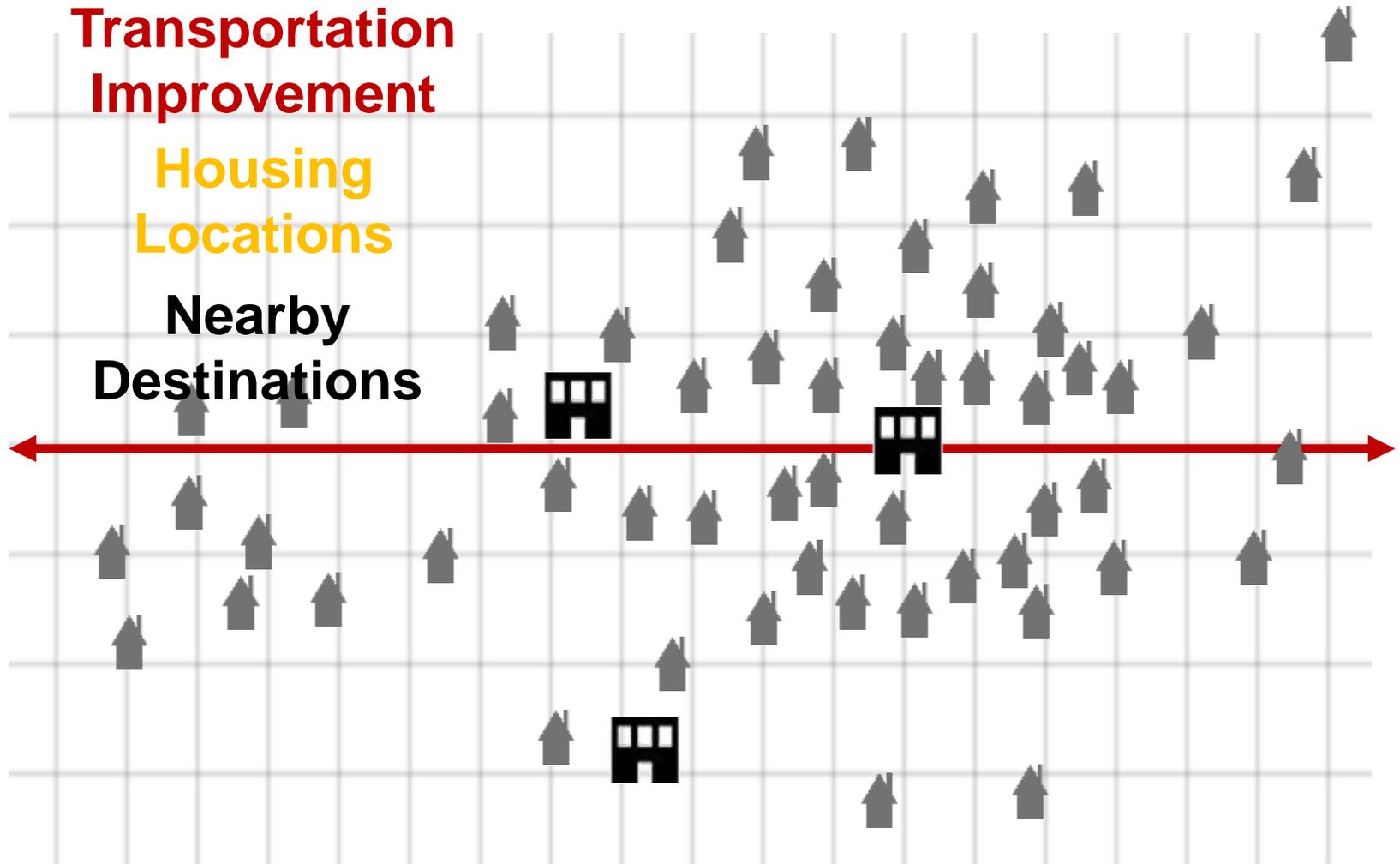
# Access to Opportunity: Improvement

**Transportation  
Improvement**

**Housing  
Locations**



# Access to Opportunity: Improvement



# ACROSS THE STATE, PEOPLE WANT TO....

70%

walk more

58%

bike more

46%

take transit more

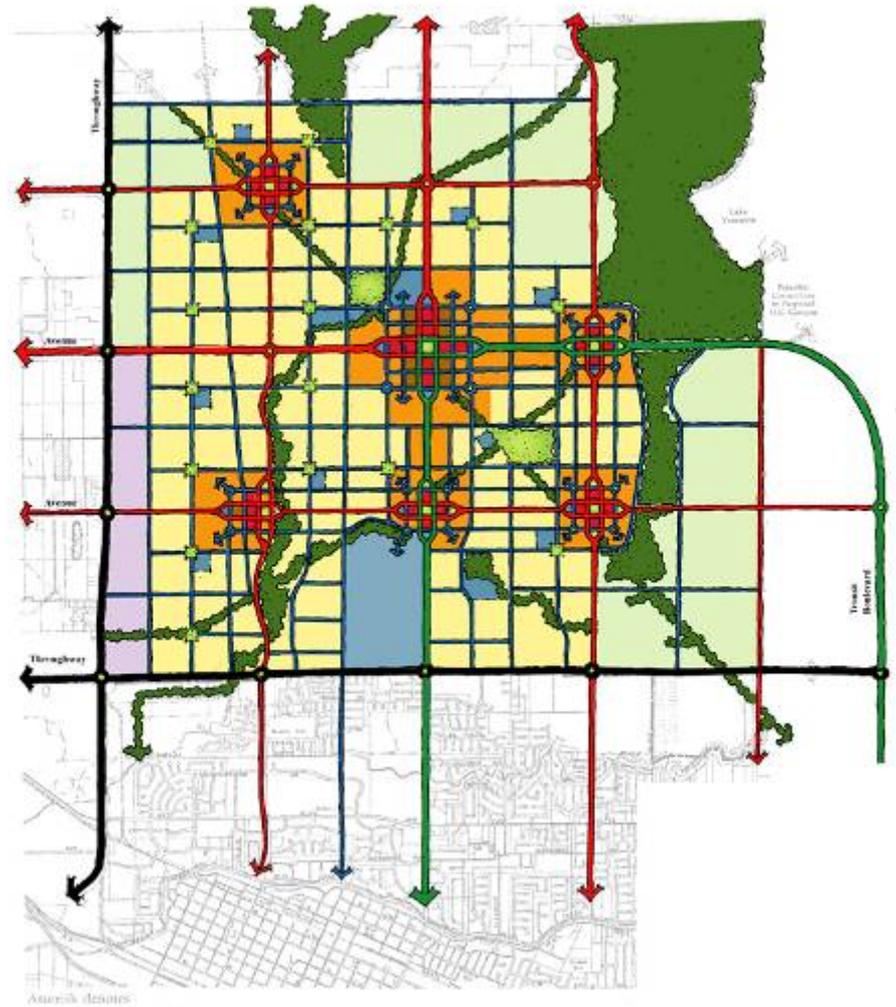


Source: Utah Statewide Household Travel Survey

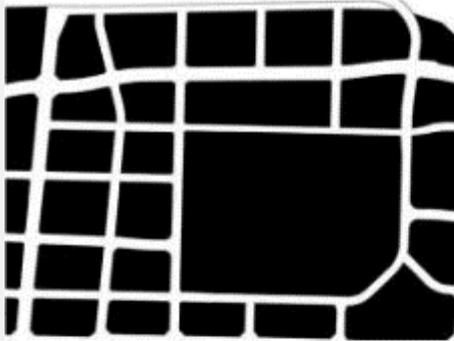
# ACCESS TO OPPORTUNITY IN A COMMUNITY?

## TWO PROVEN INGREDIENTS:

- Connected streets
- Key nearby destinations



# STREET NETWORKS ENDURE!



MISSISSAUGA



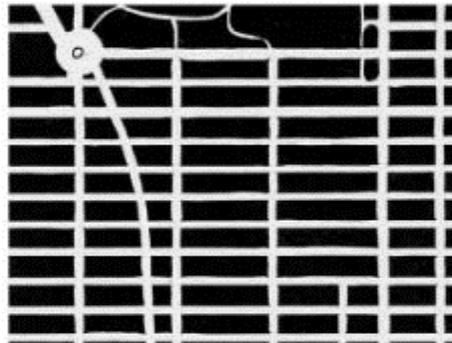
BARCELONA



COPENHAGEN



LONDON



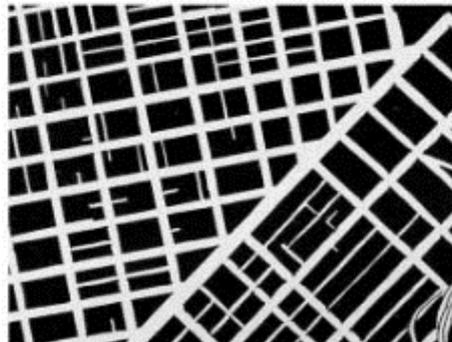
NEW YORK



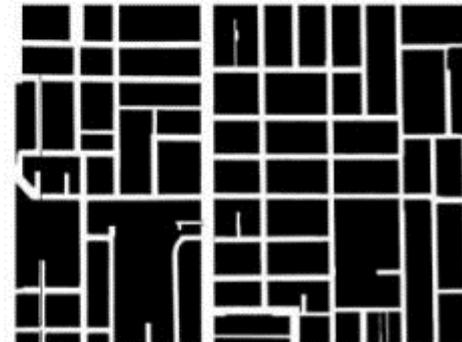
PARIS



ROME



SAN FRANCISCO



TORONTO



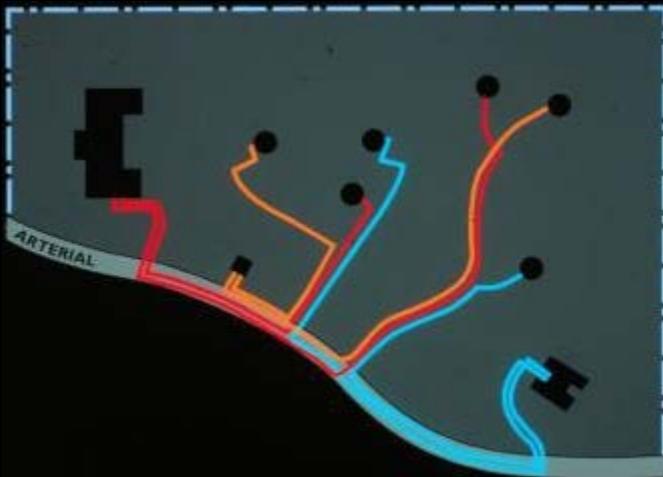
GET THE MOST PERMANENT FEATURES RIGHT!



WHAT IS STREET CONNECTIVITY?

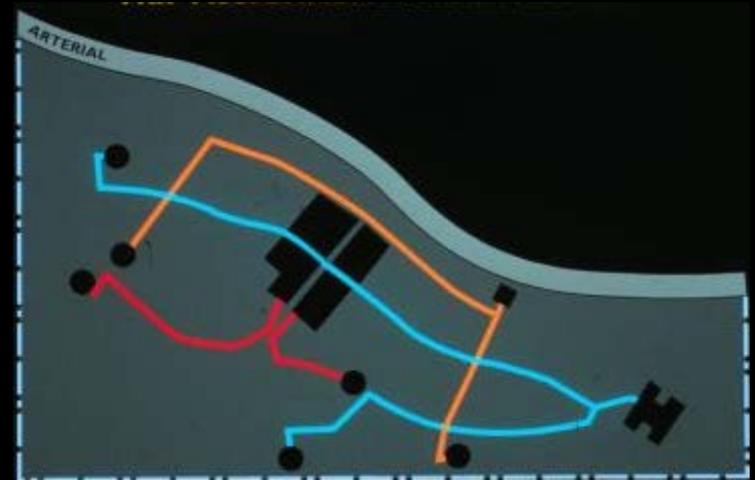
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# What is Street Connectivity



Hierarchical

VS.

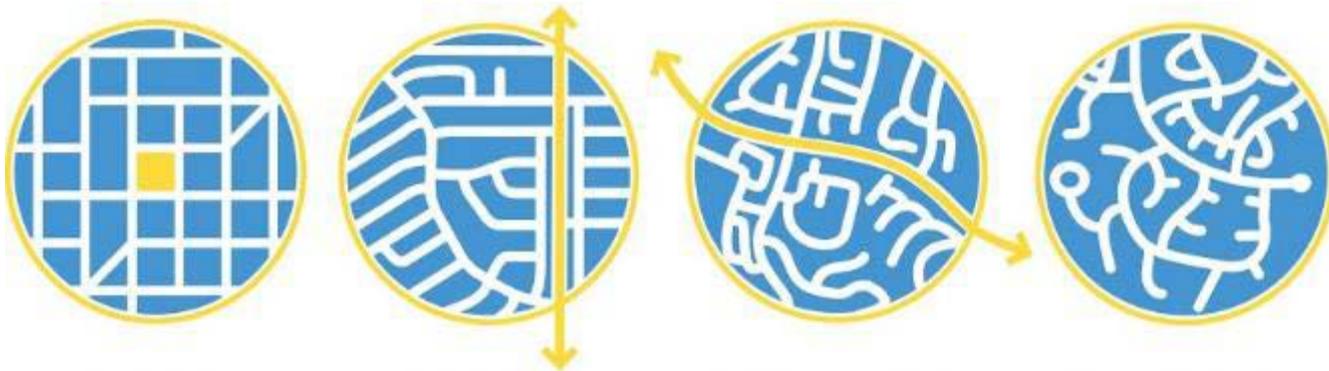


Connected

# OVERVIEW

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- » What is street connectivity
- » Why it matters
- » Why we don't connect our streets
- » Utah Street Connectivity Study
- » How to improve connectivity



WHY IMPROVE CONNECTIVITY?

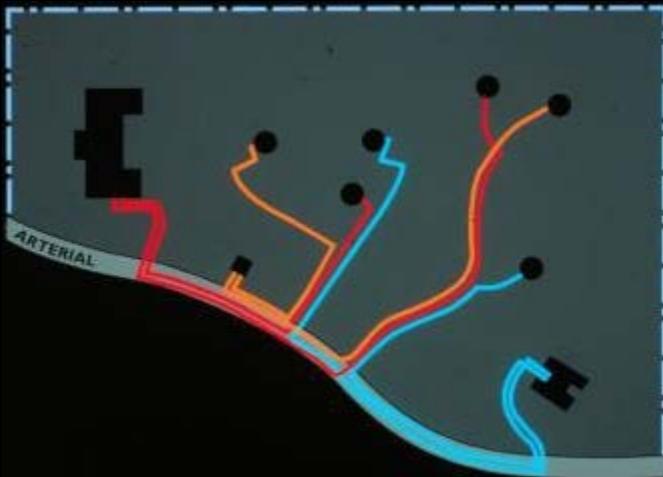
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# STREET CONNECTIVITY IMPROVES ACCESS TO OPPORTUNITY

» Access more within a travel distance

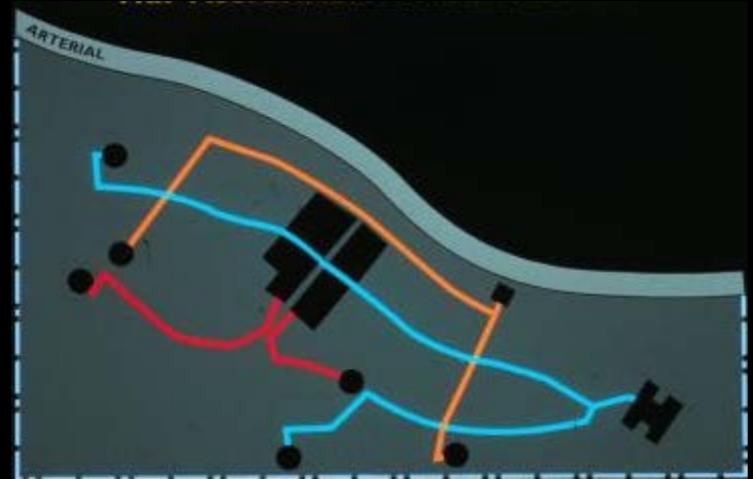


# The street network matters

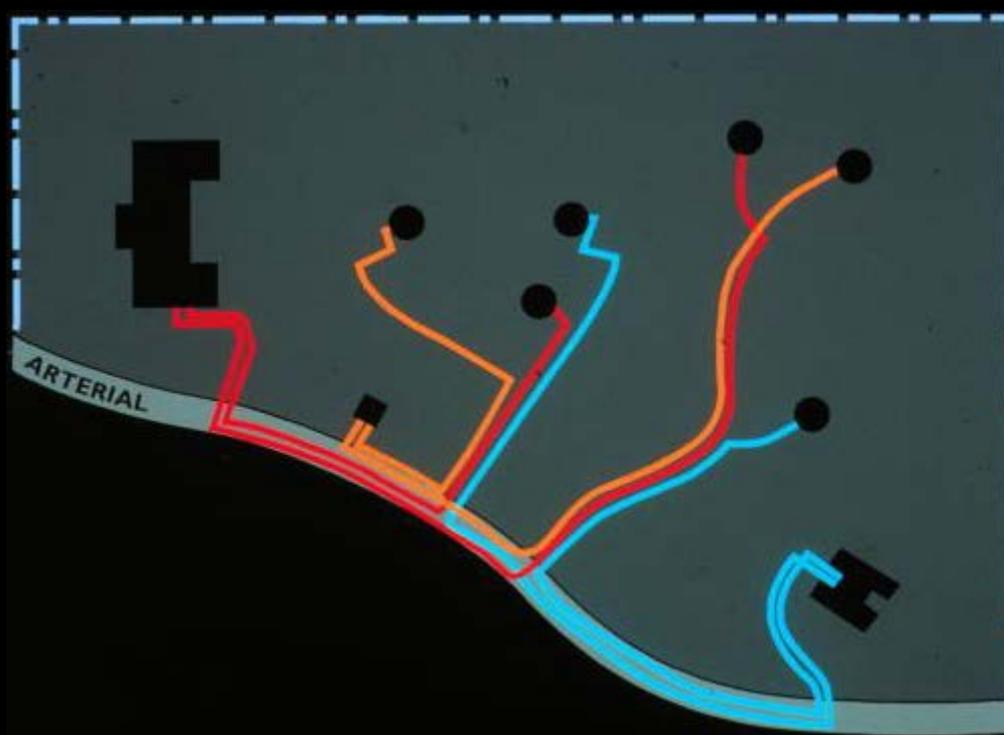


Hierarchical

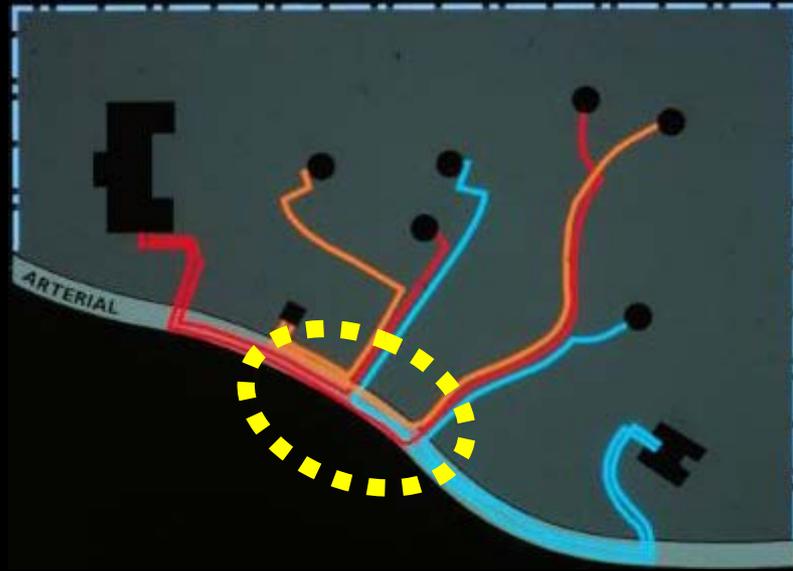
VS.



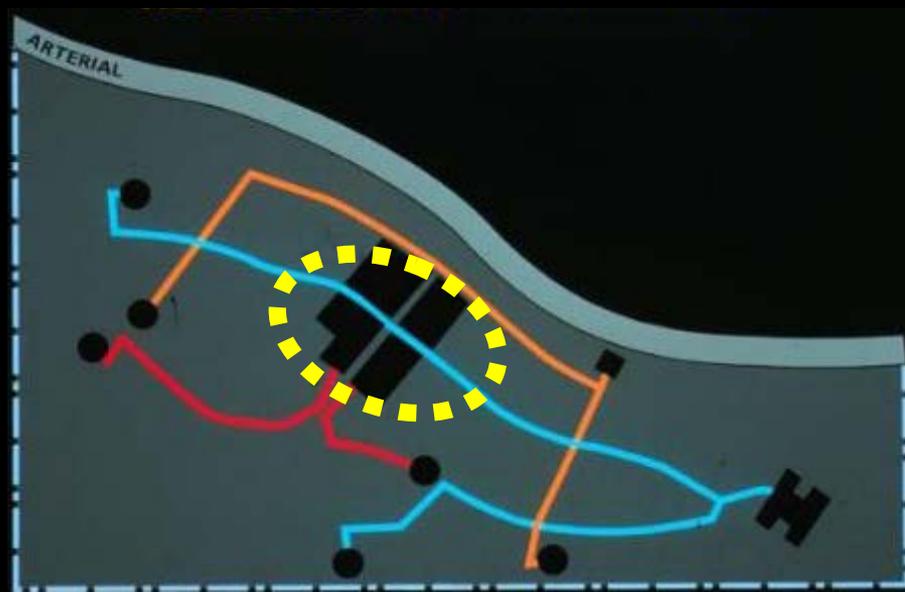
Connected



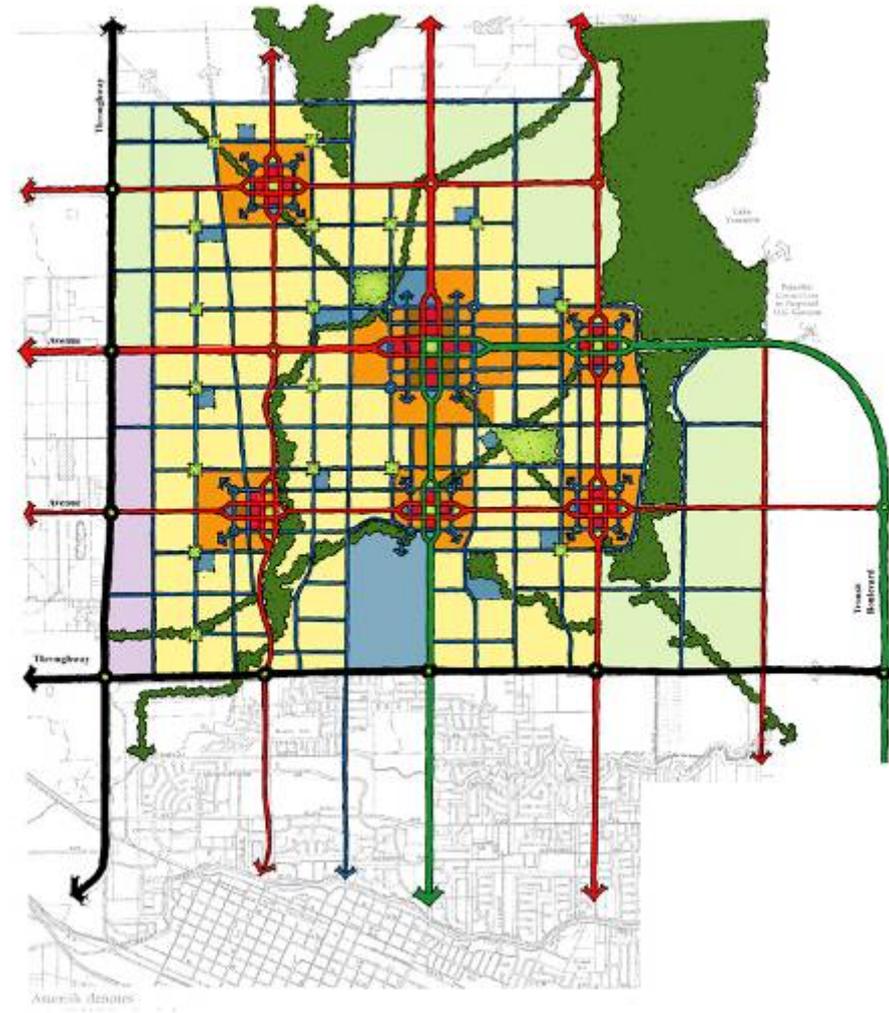
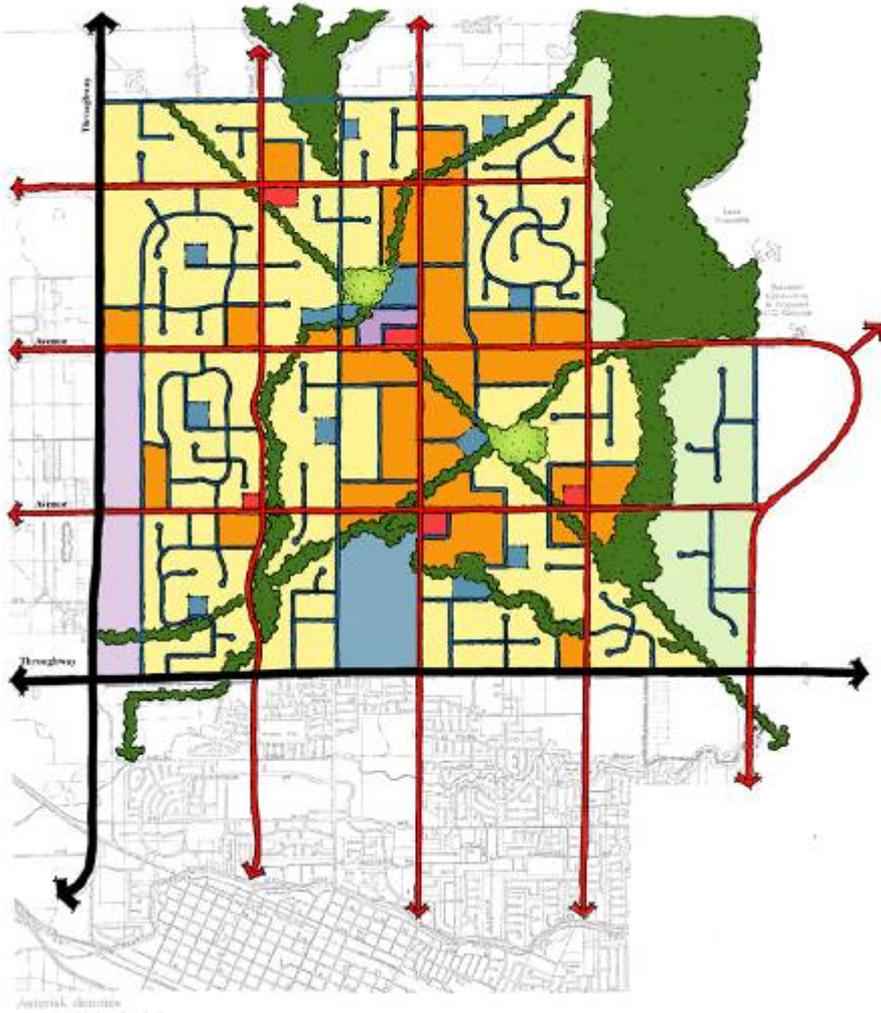
- Walk/bike distances longer
- Traffic congestion rougher
- Arterial character meaner
- Access to opportunity worse...r







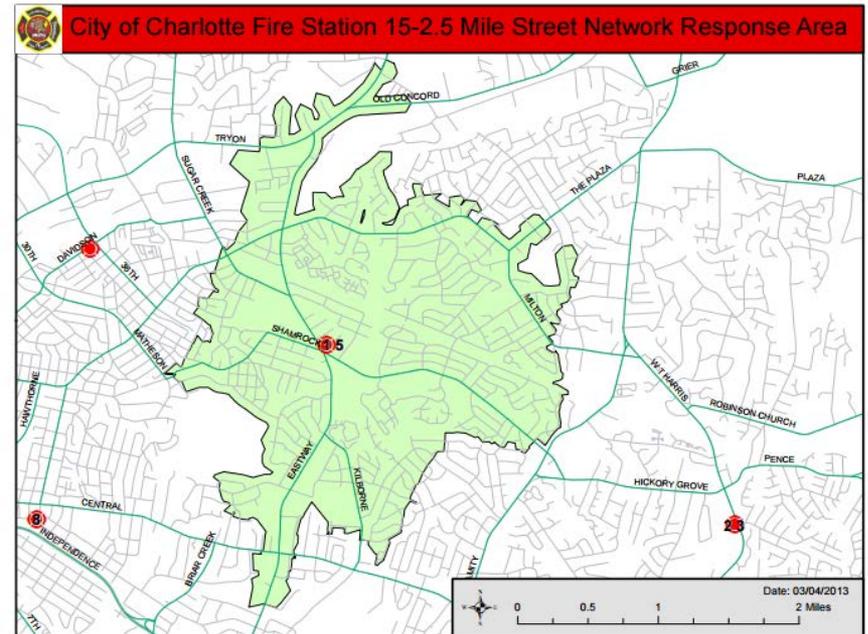
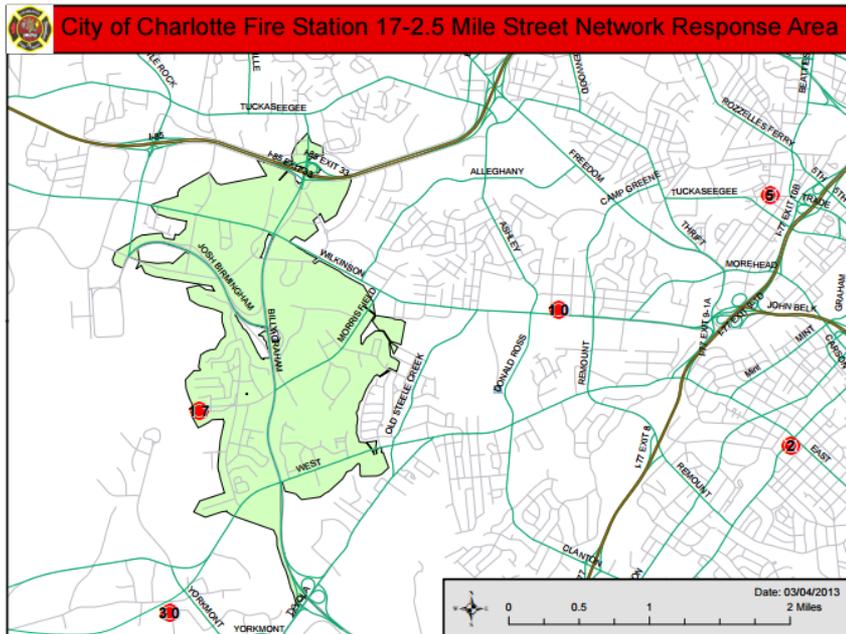
# Case Study: Merced, CA



# Merced Alternative's advantages:

- Fewer Vehicle Trips:  
20% lower
- Shorter Driving Distances:  
30% lower
- Fewer busy streets :  
30% fewer streets above 30,000 average daily trips

# SERVICES EFFICIENCIES (SAVE MONEY)



WHY WE *DON'T* CONNECT ALREADY

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# “BUT WHAT ABOUT THE CHILDREN?”

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“I love living on a cul-de sac”

“Who wants cut-through traffic?”



# CONNECTIVITY DOESN'T HAVE TO MEAN NO CUL-DE SACS

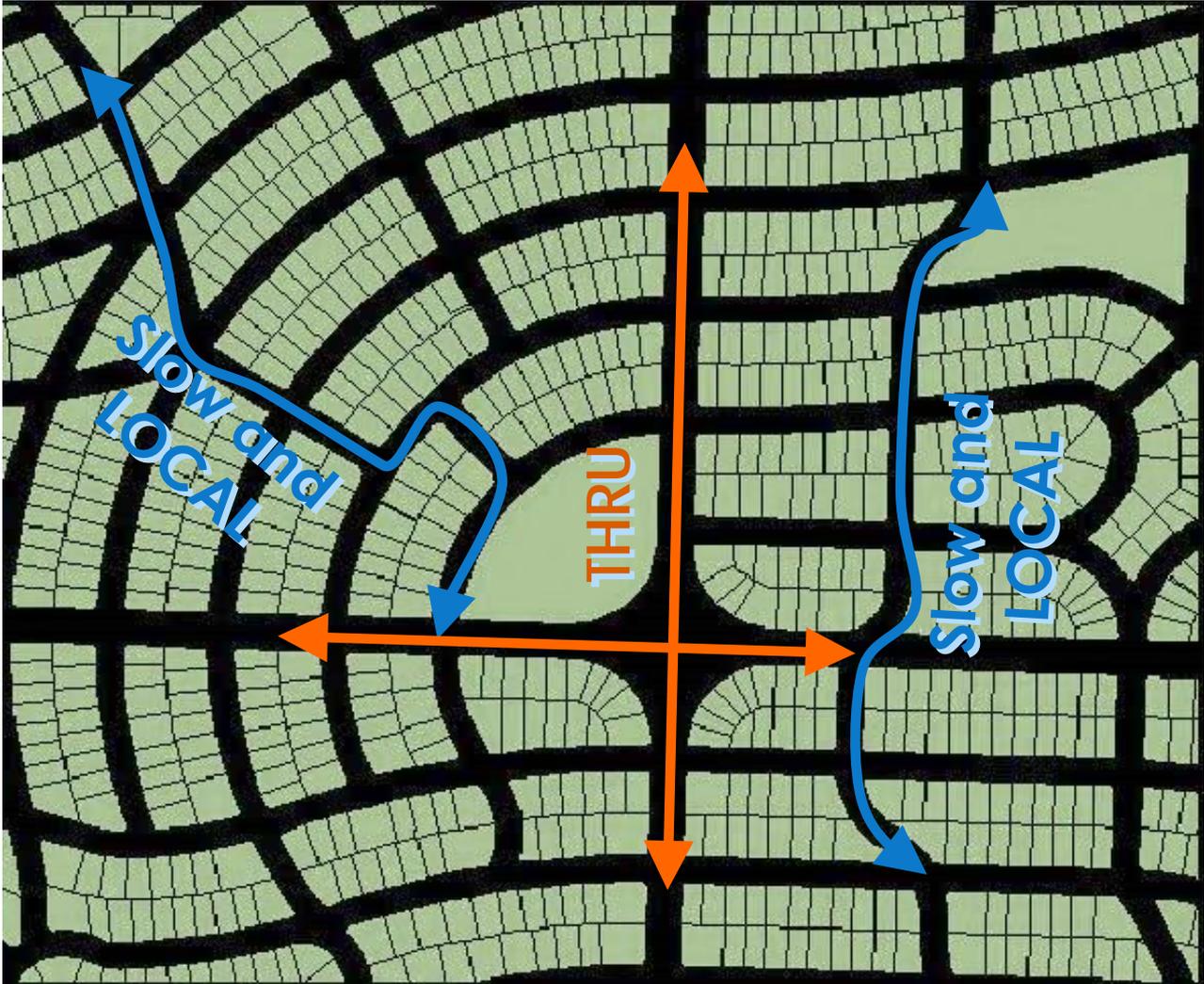


Shorter cul-de sacs

Pedestrian connections  
through cul-de-sacs

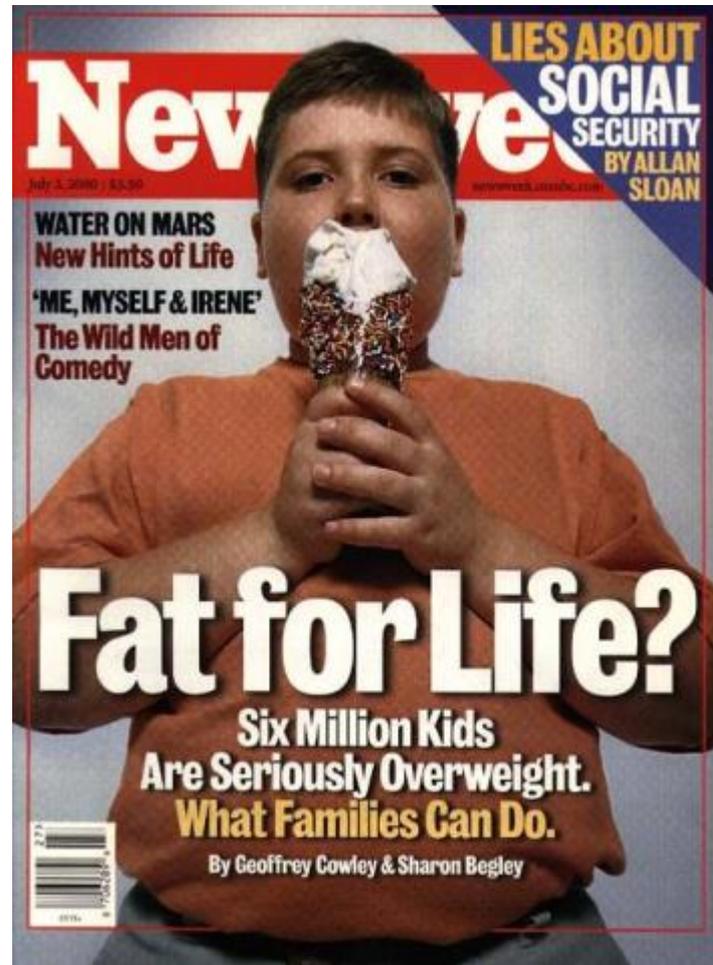


# THRU VERSUS SLOW AND LOCAL STREETS

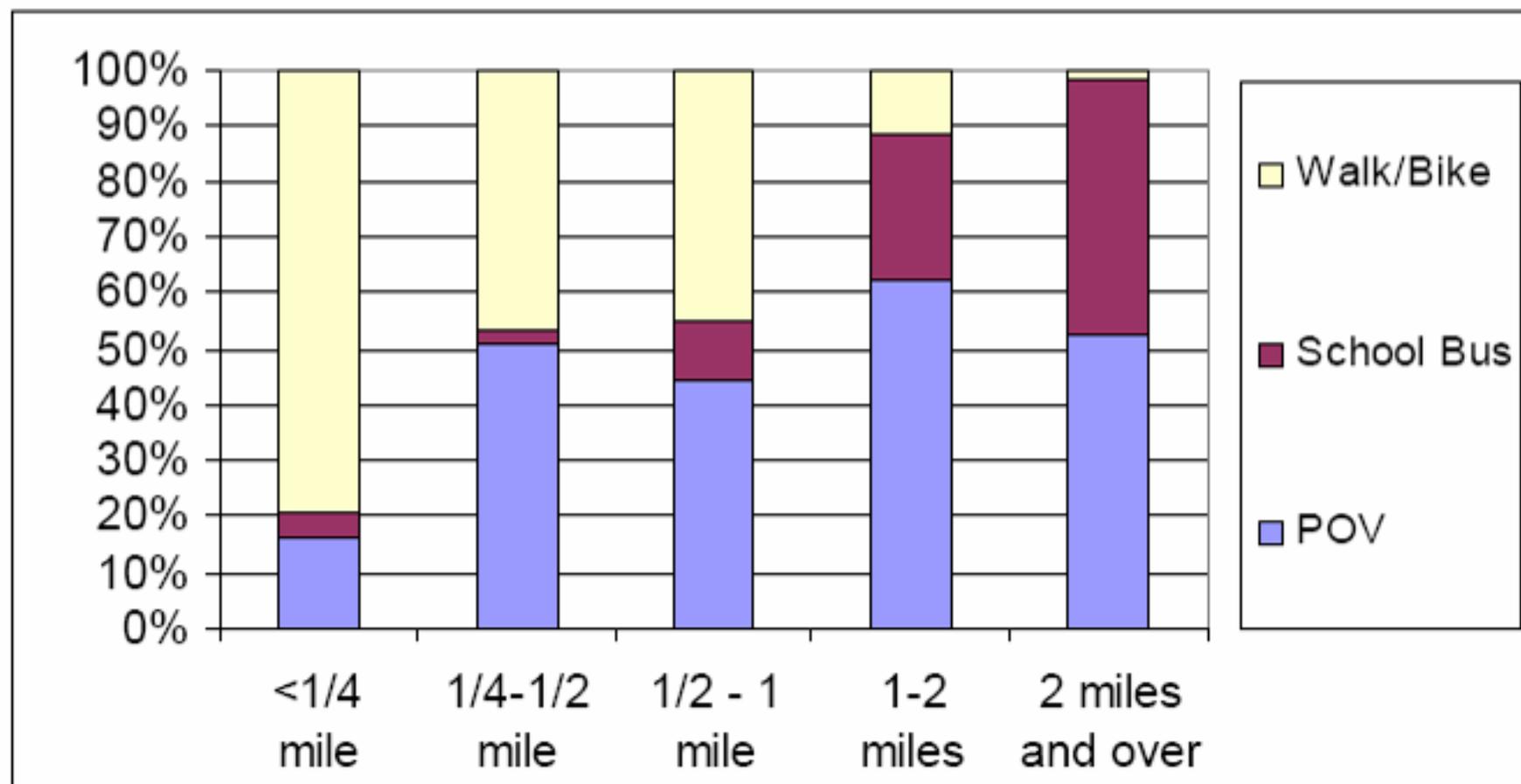


# WHAT ABOUT THE CHILDREN REDUX

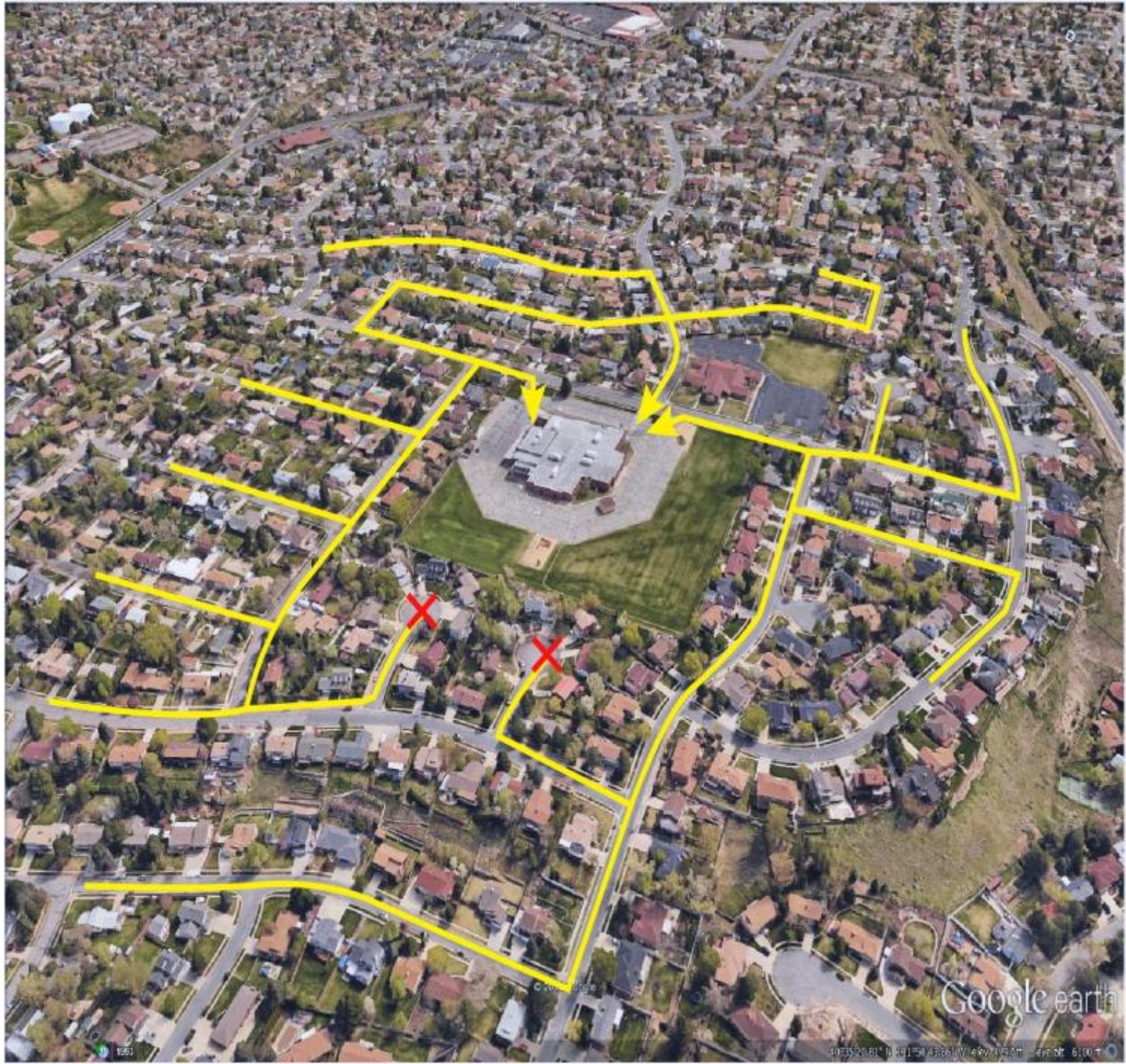
- 18% of children are obese



### Exhibit 3 – Mode of Travel to School by Distance for Children ages 6-12

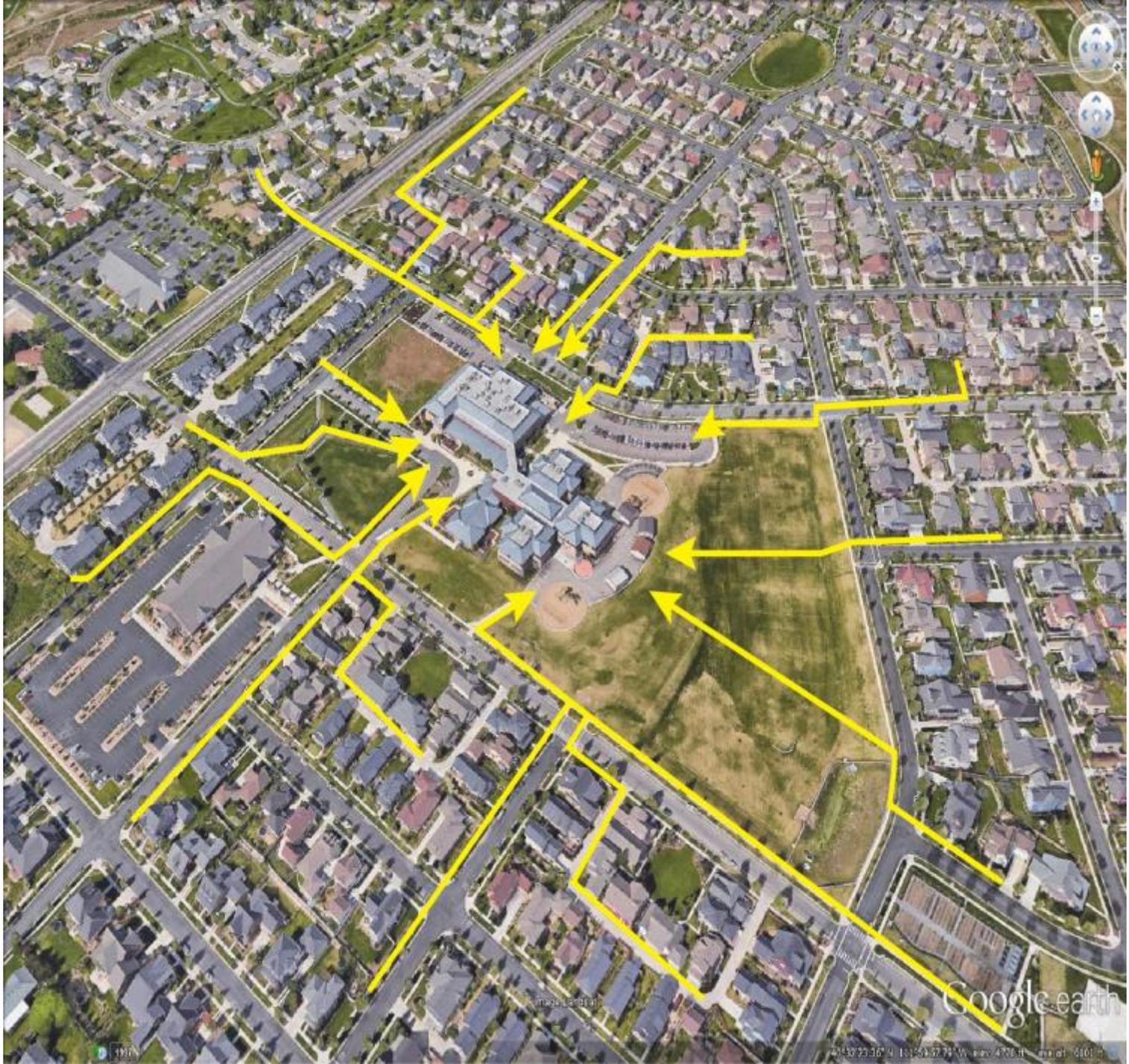


Source: 2001 NHTS



Google earth

40.352081° N 101.7503266° W 400m 6100m



# WHY IMPROVE CONNECTIVITY?

Connected streets led to more walking

88%

of students in Daybreak  
walk to school

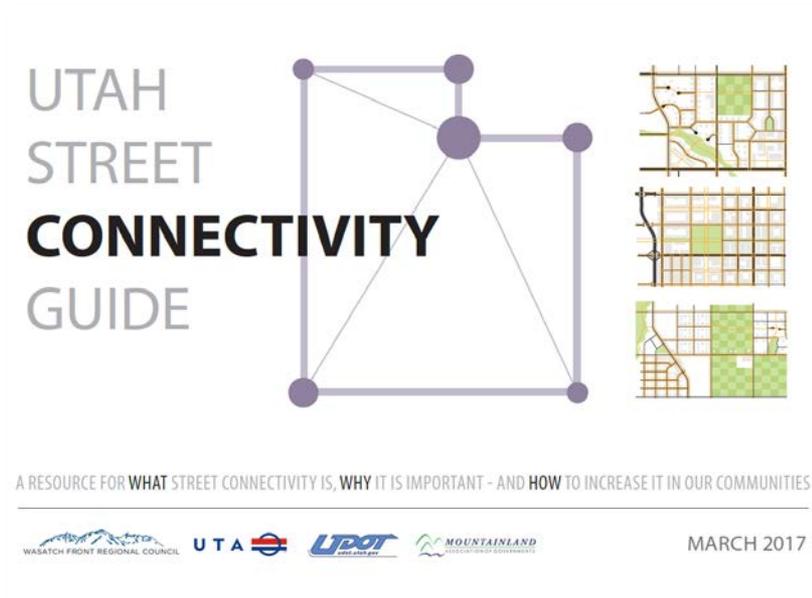


17%

Of students in similar, less  
walkable neighborhoods  
walk to school

# Utah Street Connectivity Guide

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- » The Case for Connectivity
- » Tools for Connectivity
- » Design Guide and Case Studies

# Utah Street Connectivity Guide

## WHY is connectivity important?

A highly-connected street network – one where a dense set of intersections each connect to several streets, that connects a community to its key destinations, and is walkable – provides a multitude of benefits for Utah communities.

### Regional and community mobility

Good street connectivity redistributes traffic among different routes in a network, providing more options and better accessibility for local traffic. This in turn frees some of the capacity on the adjacent arterial roads, which are mostly used by the non-local traffic.

### Transportation choice

Higher street connectivity provides travelers with greater choice of travel modes. In a well-connected network, active transportation modes and transit become more viable choices. This means that these types of networks are less automobile-dependent.

### Safety

In recent years, many studies have focused on how built environment factors (such as street connectivity and community) affect physical activity and health.

### Infrastructure and growth management

Higher street connectivity improves the investment in municipal infrastructure, such as utilities, and services, such as fire and emergency services.

### Health

Street connectivity has been shown to offer indirect benefits related to health, largely stemming from the health effects of increased physical activity.

### Economic vitality

Increasing street connectivity has economic vitality. Many of the benefits stem from the fiscal well-being of households.

### Environment

Street connectivity has major impacts on air quality and active transportation modes, such as use of automobiles which results in less air pollution.

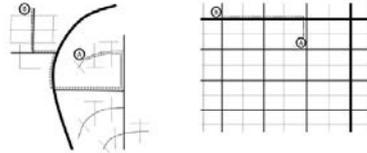
### Community access

At a regional or community-wide scale, street connectivity can reduce bottlenecks and reduce distance to shopping area within walking distance.

## WHAT is connectivity?

Street connectivity is a simple idea – providing a network of public streets whose intersections allow for easy movement around it. However, this simple idea is more difficult to define.

Look at the two images below. The images show two street networks, and they are clearly different. But why are they different?



These two networks differ in many ways. The network on the left has fewer four-way intersections than the one on the right, and less of a grid pattern. It has larger, and less-defined blocks. It has fewer places to access a major street. It requires a longer path to get from Point A to Point B.

These differences all represent key aspects of street connectivity. The project team developed a working definition of street connectivity that has four aspects, two of them more general and “basic” and two others more specific and “advanced.”

**The relative level of connection.** The most basic aspect of street connectivity is the degree to which streets are connected to one another at each intersection. In the example below, the Downtown Salt Lake City grid has a higher level of connection because of its consistently 4-way intersections, while the eastern Salt Lake City example has mostly 3-way intersections and cul-de-sacs.



**Network density.** To consider network density, take the very connected network in downtown Salt Lake City and compare it to Salt Lake City’s Avenues neighborhood. Because both are nearly perfect grids, have the same relative level of connection. However, the network in the Avenues is noticeably different, and more connected. This is due to their network density. With its 330-foot blocks, the Avenues has much higher network density than Salt Lake City, with its 660-foot blocks.



**Ability to connect to specific destinations.** This aspect addresses the problem that all destinations along a network are not equally popular – and, therefore, are not equally valuable for a network to connect to. An elementary school receives more trips along a network than a single family home, for example. So it is important to understand how well a given network connects the community to these specific points along it. Often improving access to key destinations such as schools is the most effective way a built-out community can improve its connectivity.

**Quality of the network for all users – walkability.** Each street offers a different environment for all the transportation modes – private vehicles, public transit, freight, bicycling, and walking. Among these, it is particularly important to pay attention to the conditions for walking. Pedestrians are the most vulnerable users of the network, and everyone is a pedestrian at some point during their trip. The pedestrian environment is critical for transit access. Walkability- how well a street provides infrastructure for walking- is a key aspect of street connectivity.

**CONNECTIVITY IMPROVES MOBILITY**

Within this guide's case studies each **1%** increase of connectivity yields the same travel time benefits as **1 lane mile** of roadway

**CONNECTIVITY CREATES TRANSPORTATION CHOICE**

**High intersection density is the best predictor for use of active transportation**

**CONNECTIVITY IMPROVES EMERGENCY SERVICE**

Adding 300 feet of roadway between two subdivisions in Charlotte, N.C. increased the fire station service area by 17 percent

**CONNECTIVITY IMPROVES SAFETY**

**The highest fatal or serious injury rates tend to occur on low intersection density roads**

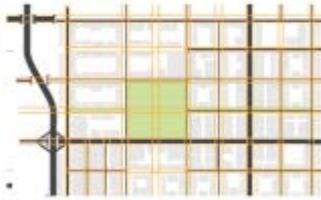
Utah Street Connectivity Guide

Utah Street Connectivity Guide

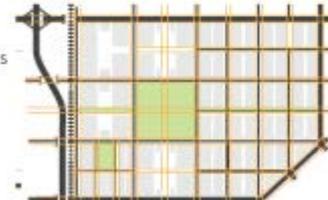
# One size does NOT fit all

This guide defines six types of neighborhoods/districts:

**Urban residential neighborhood:** An urban residential neighborhood is a higher-density residential area with a mix of civic, commercial, and office uses.



**Downtown district:** A mixed-use center of activity that attracts people from throughout the community and sometimes the region.



**Suburban residential neighborhood:** A lower-density residential area with other types of uses typically found on nearby arterial or collector corridors.



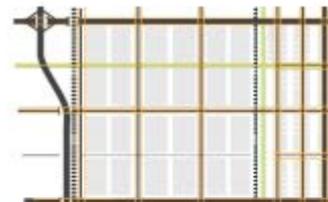
**Campus district:** A large land use such as an educational campus, shopping center, business park, or entertainment/lifestyle center.



**Rural residential neighborhood:** A very low density residential area with agricultural or natural space and few other uses present.



**Industrial district:** An area focused on production or distribution activities.

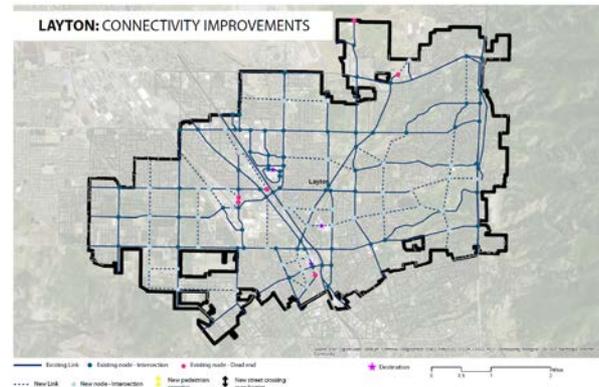
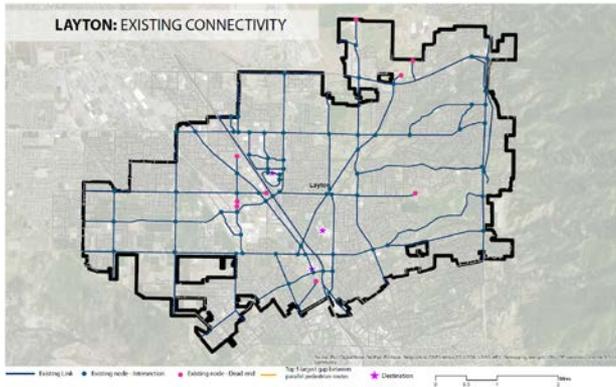


Neighborhood and district-scale connectivity considers all streets.

Utah Street Connectivity Guide 35



# Case Studies



BENEFITS

# HOW TO IMPROVE CONNECTIVITY

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# HOW TO IMPROVE CONNECTIVITY?

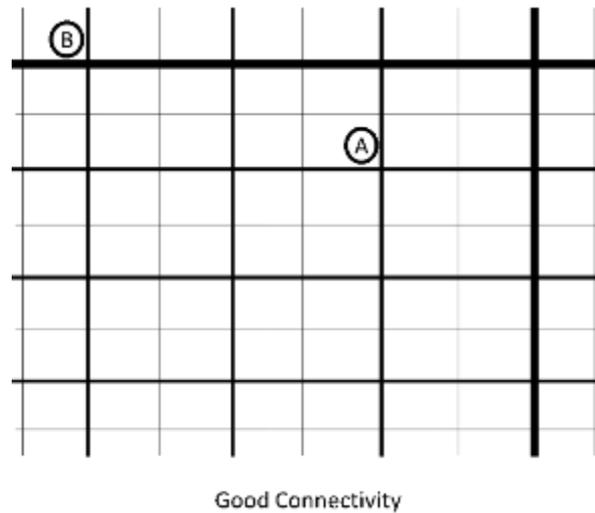
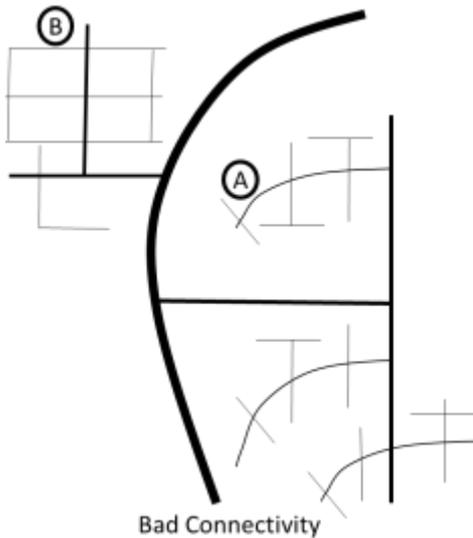
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- » Assess your city
- » Planning and ordinances
- » Street & development standards
- » Retrofit tools



# ASSESS WHERE YOU ARE AT

» Tools in the Utah Street Connectivity Guide





# CONNECTING STUB STREETS

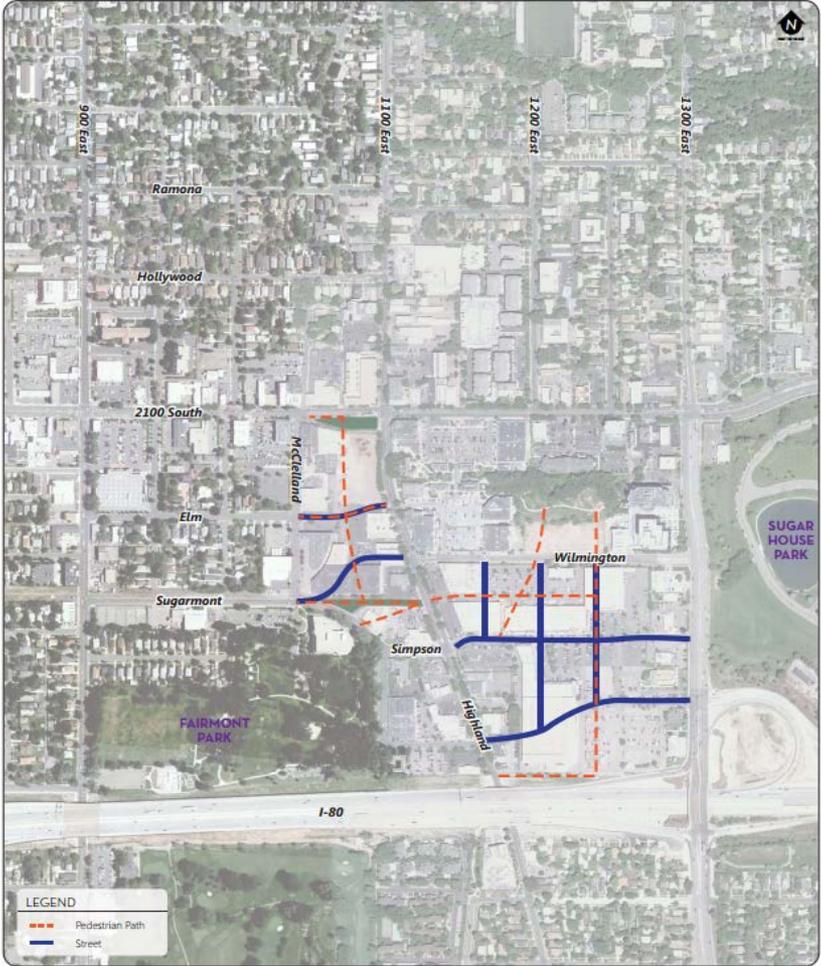


# RETROFITS



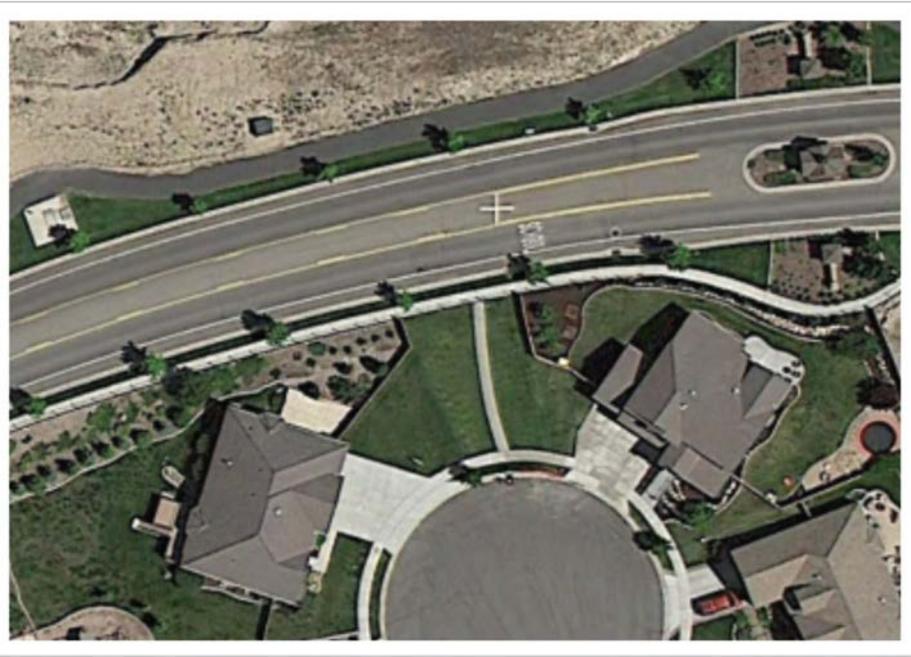
## DIVIDING LARGER BLOCKS

Figure 4.4-1 | Sugar House Business District Circulation Plan



Source: Lehi City

# CUL DE SAC CONNECTIONS



# STREET & DEVELOPMENT STANDARDS

## Section 37.050. Connectivity Standards

A. Purpose. These standards are intended to create a connected transportation system between neighborhoods and commercial areas within the City. The specific purposes of this Section include:

1. Promoting walkability through additional connections and shorter block lengths.
2. Improving emergency response time.
3. Increasing effectiveness of delivery access.
4. Providing better routes to schools and parks.
5. Reducing impacts of development on Master Planned arterial and collector roads by providing alternative routes.
6. Preventing isolated developments that increase dependency on automobiles.

## B. Definitions.

1. **Block Length** - The distance along any given road frontage between two intersections with 3 or more connecting links (see Figure 25). Links that connect into a cul-de-sac shall not be considered the termination point of a block length.



2. **Chicane** - An extension of a curb typically on a local street to provide an element of traffic calming.
3. **Connectivity Index** - A ratio of roadway

links and nodes that serves as a metric for measuring the level of connectivity.

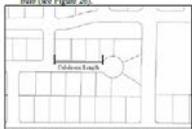


Figure 26. Example of curb extension measurement.

5. **Curb Extension** - An extension of a curb in a roadway to narrow the road at pedestrian crossings to provide additional safety for pedestrians and serves as a traffic calming measure.
6. **Links** - Streets that connect to nodes or external streets not included in the proposed development.
7. **Node** - Street intersection or cul-de-sac located within a proposed development. A street intersection exists where two or more named roads intersect.

C. **Circulation Plan** - A circulation plan shall be provided as part of a preliminary subdivision plat application.

1. The circulation plan must address street connectivity, pedestrian circulation, emergency access, and parking movements. In cases where cut-through traffic is likely, traffic calming measures such as curb extensions, chicanes, raised crossings, or other features may be required.
2. The circulation plan shall show the connectivity index, block length dimensions, cul-de-sac length dimensions, pedestrian facilities, and any proposed traffic calming features.
3. The circulation plan must take into account access and connectivity to adjacent parcels. On a case-by-case basis the Planning Director and City Engineer may require changes to stub road

locations if it will increase the connectivity with an adjacent property.

4. **Cul-de-sac Length** - The distance from the street intersection to the throat of the cul-de-sac bulb (see Figure 28).

D. **Connectivity Index Calculation** - The required connectivity index is calculated by dividing the total number of links by the total number of nodes (see Figure 27).



Figure 27. Example connectivity index calculation showing nodes and links. This example shows 22 links and 11 nodes which equates to a connectivity index of 2.0.

1. For the purposes of calculating the number of total links, one link beyond each node shall be included in the connectivity index calculation. Street stubs that provide future access to adjacent properties or streets that connect to existing streets are considered links.
2. An additional 1/2 link shall be included in the connectivity index calculation for each of the following:
  - (a) Hard surface pedestrian connection through a cul-de-sac with a minimum width of ten (10) feet including an additional two (2) foot soft shoulder on each side (see Figure 29);
  - (b) Hard surface master planned trail connection with a minimum width of (10) feet including an additional two (2) foot soft shoulder on each side (see Figure 29);
  - (c) Internal hard surface trail segment connecting two roads with a minimum width of ten (10) feet including an additional two (2) foot soft shoulder on each side (see Figure 30).



Figure 28. Cul-de-sac with a pedestrian connection to adjacent street.



Figure 29. Hard surface master planned trail connection through a cul-de-sac.

3. An additional 1/2 link shall be included in the connectivity index calculation for each of the following:
  - (a) Hard surface master planned trail connection with a minimum width of (10) feet including an additional two (2) foot soft shoulder on each side (see Figure 29);
  - (b) Internal hard surface trail segment connecting two roads with a minimum width of ten (10) feet including an additional two (2) foot soft shoulder on each side (see Figure 30).



Figure 30. Hard surface master planned trail connection through a cul-de-sac.

E. **Residential Connectivity Standards**. All new residential subdivisions with ten (10) or more units or more than one acre shall meet the following connectivity index, block length, and cul-de-sac length standards for public roads. Private roads shall be reviewed on a case-by-case basis; however, a public road may be required to prevent a private road in a subdivision from stubbing into a future or existing public road.

1. **Required Connectivity Index**. The minimum required connectivity index shall be required based on the project density as identified in the following table of minimum connectivity index scores:

Density	Minimum Index Score
0.5 - 4 U/AC*	1.5

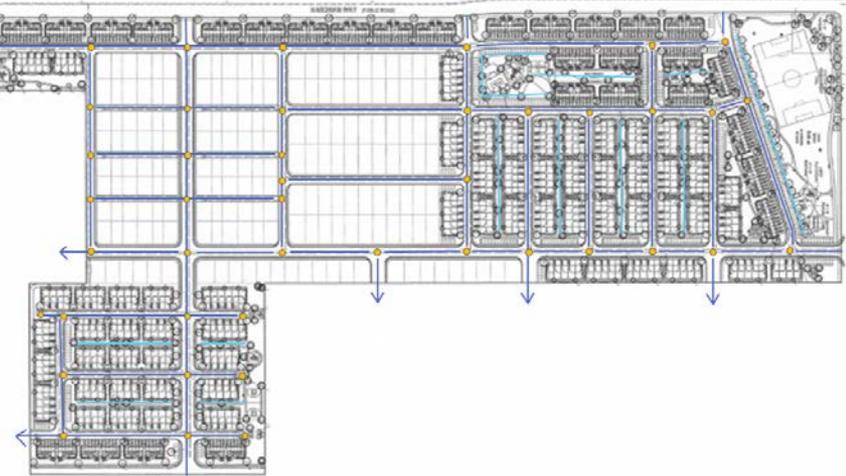


FIGURE 31.6 - MINIMUM INDEX SCORE

# PEDESTRIAN LINKAGES



# PEDESTRIAN LINKS *BETWEEN* DEVELOPMENTS



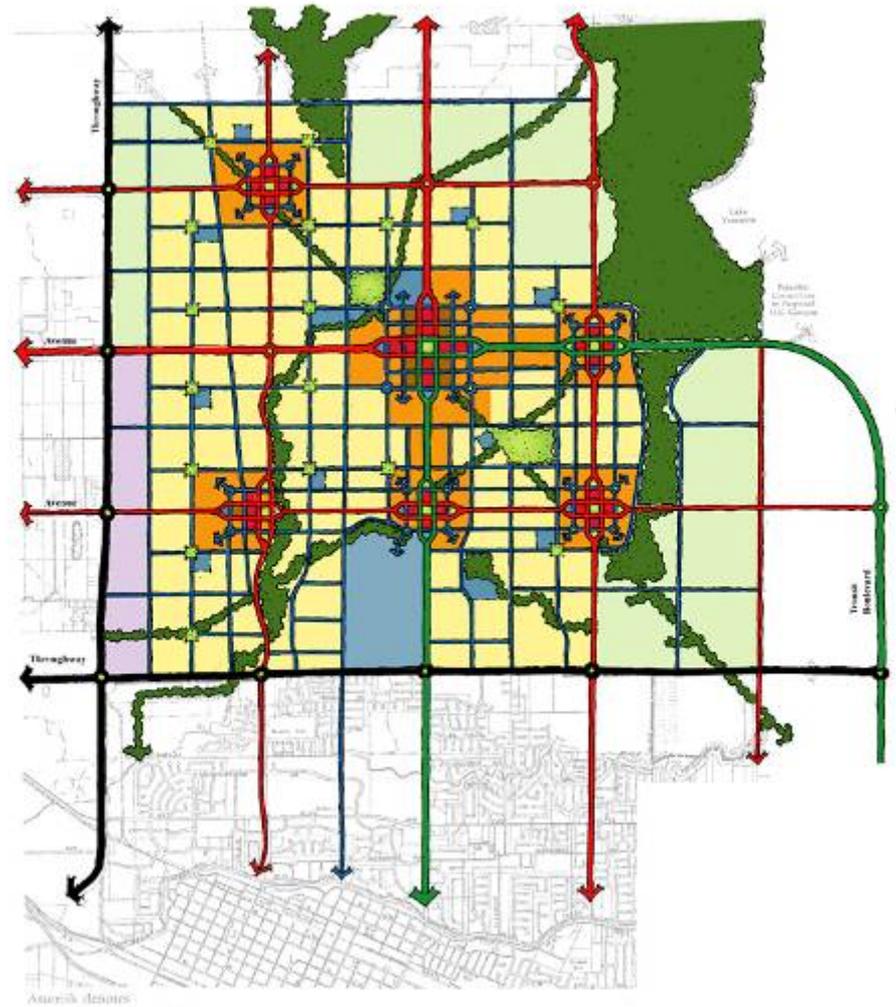
CONNECT TO WHAT?

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# ACCESS TO OPPORTUNITY IN A COMMUNITY?

## TWO PROVEN INGREDIENTS:

- Connected streets
- Key nearby destinations



# Utahan's spatial mapping: Attributes considered "important" close to an ideal community

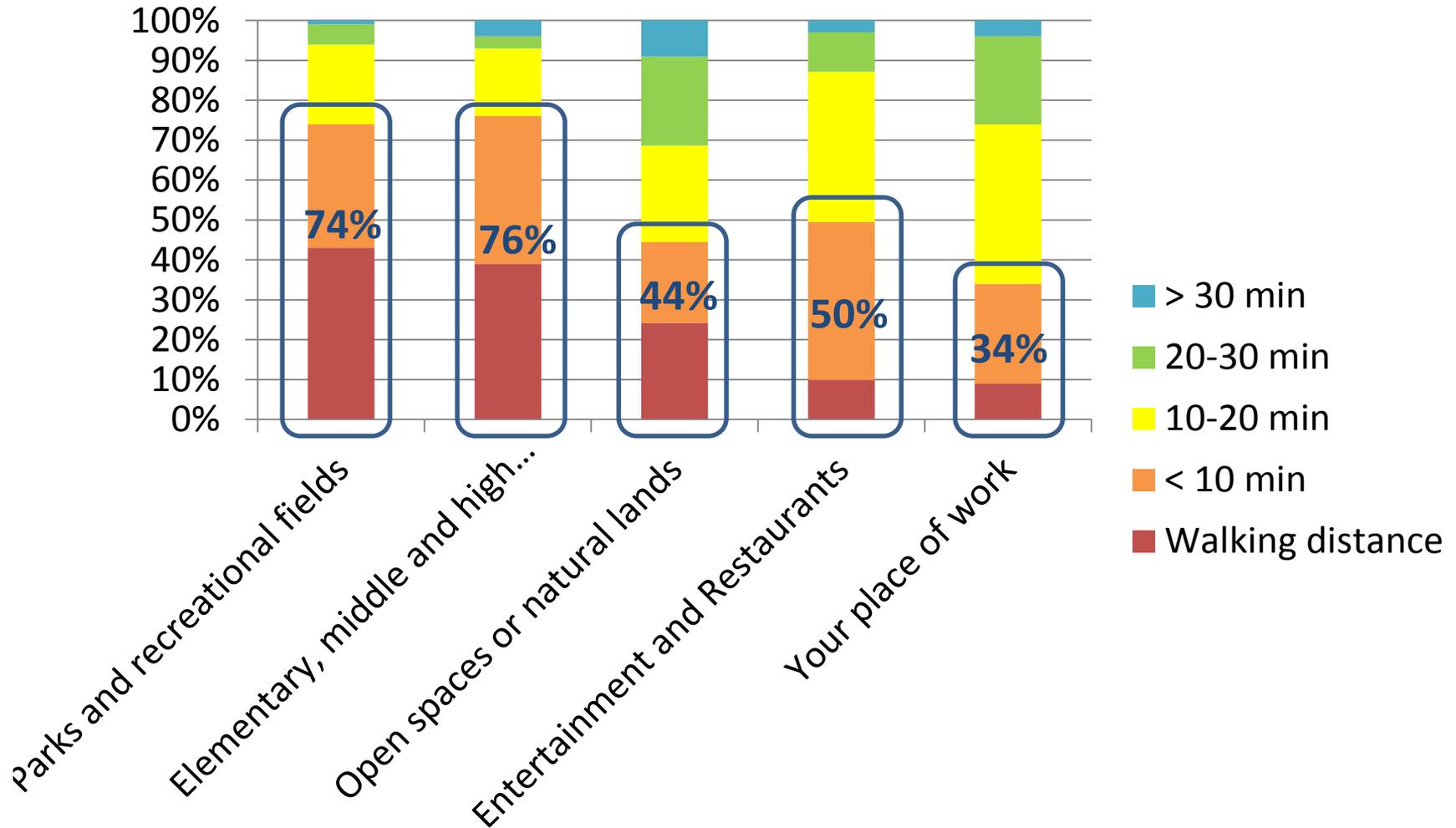
	<b>TOTAL Important</b>	<b>TOTAL Not Important</b>
Parks and recreational fields	73%	8%
Hospital	73%	7%
Open spaces or natural lands	67%	10%
Has its own elementary, middle and high schools	67%	15%
Grocery stores/gas stations	65%	9%
Library	63%	11%
Doctor/Dentist offices	55%	12%
Easy Access to highways	52%	18%
Entertainment and Restaurants	50%	19%
Your place of work	48%	20%
Small retail services (cleaners, salons, copy centers, etc.)*	44%	21%
Farm, ranch or other agricultural lands	40%	32%
Universities/Community or Technical colleges	37%	28%
Community Center (pool, fitness center, etc.)	36%	33%
Senior Center	34%	33%
Performing arts center	33%	34%
Shopping malls	19%	54%

*\* Importance assessed, but not ideal distance*

Source: Utah Values and Future Growth, Harris Interactive 2007

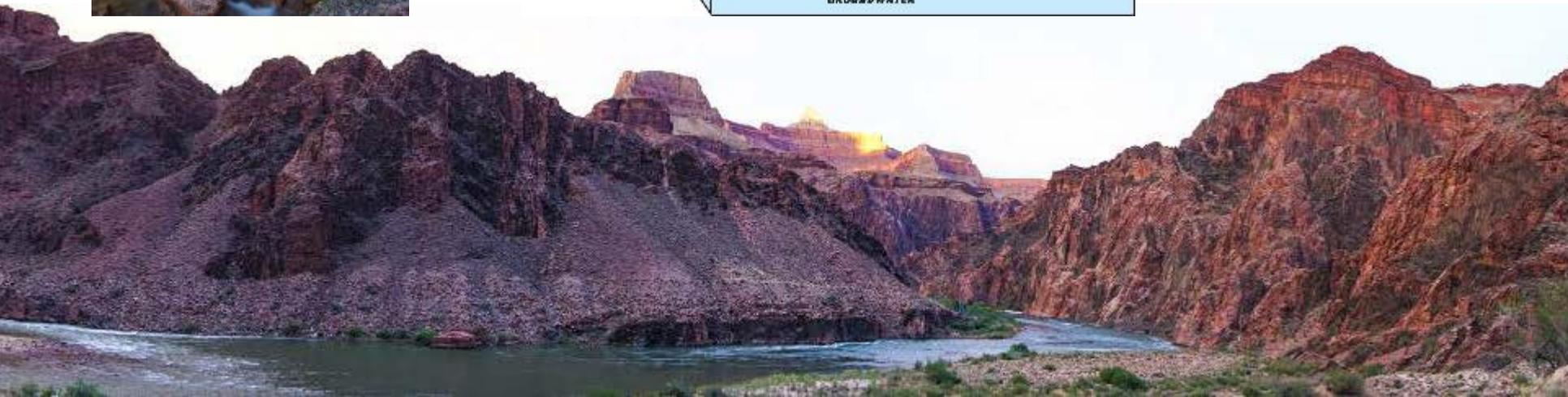
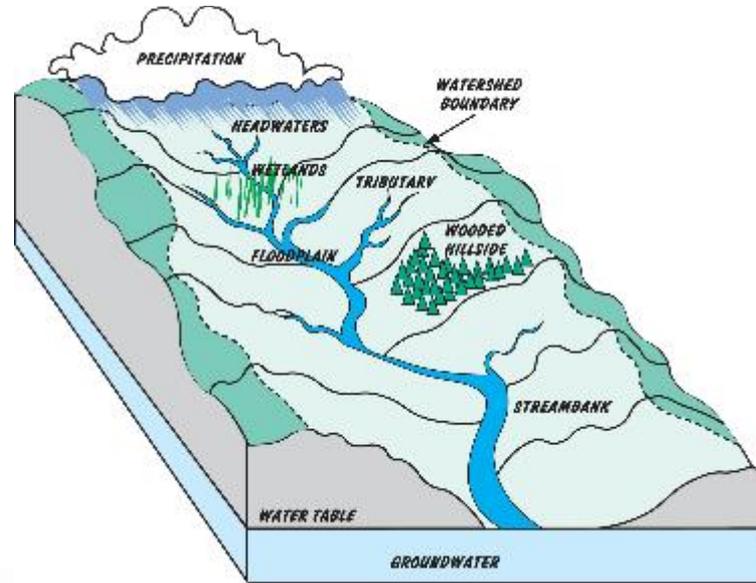
N=1,262 +/- 3%

# How many Utahans want it within biking distance....



# FLOWING TRANSPORTATION

» Some think its like a river system or watershed



# FLOWING TRANSPORTATION

- » What can happen to single system flows?



# FLOWING TRANSPORTATION

» “It’s 5’ clock somewhere...” time for the traffic damn

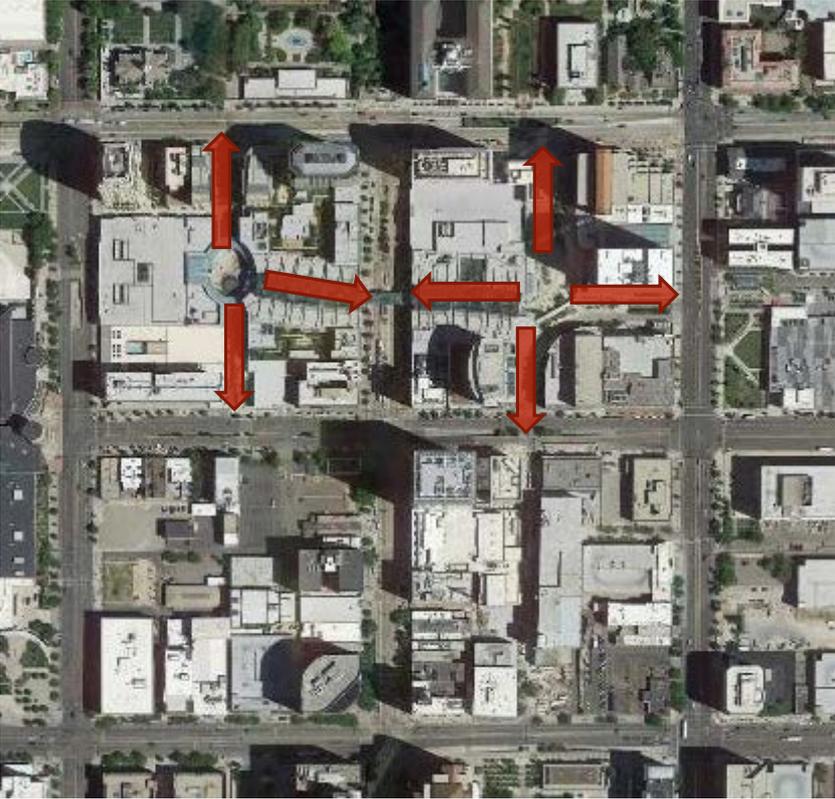


» Redundancy works from regional scale down to neighborhoods

# DOWNTOWN SLC CONNECTIVITY RENEWAL



SLC 2006



SLC 2016

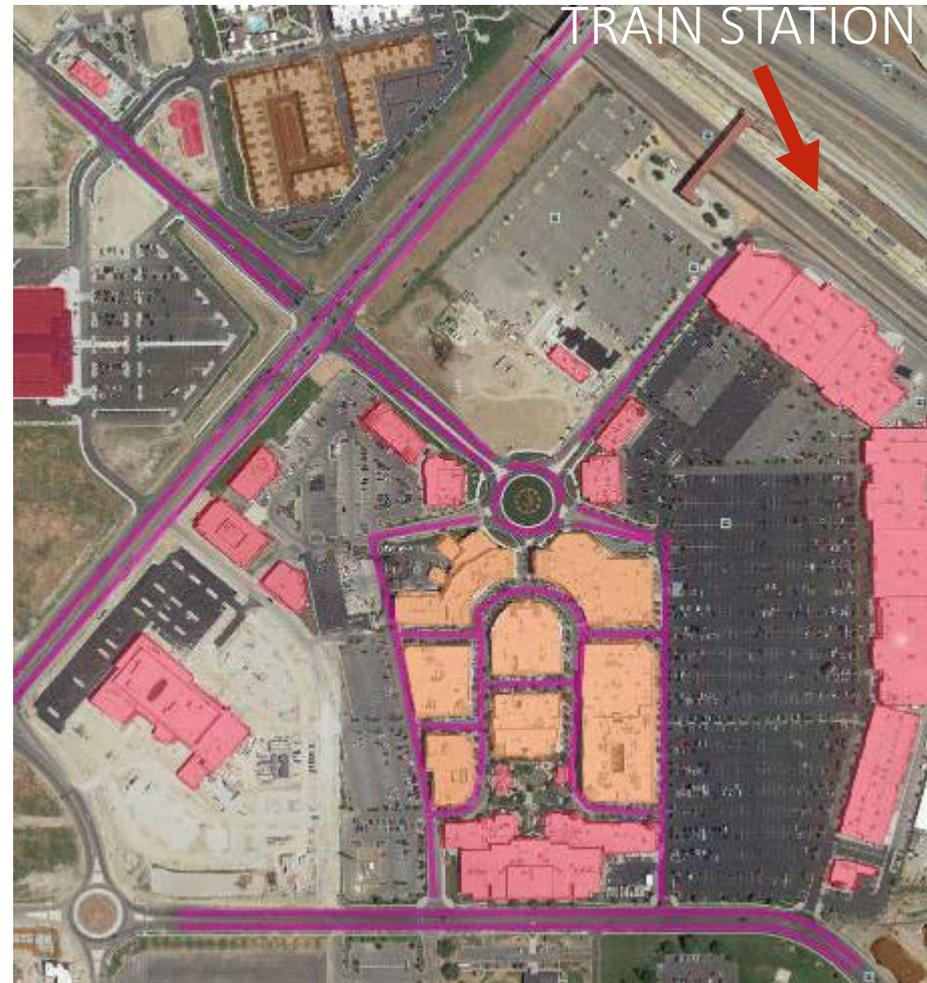
# LAND-USE FOR CENTERS/T.O.D. — SAME SCALE FOR BOTH PROJECTS

ORENCO STATION, HILLSBORO, OR



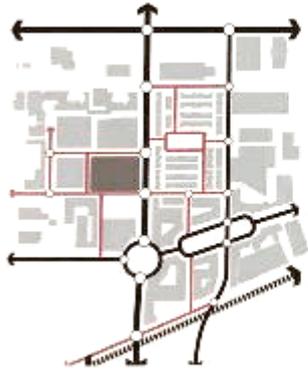
TRAIN STATION

STATION PARK, FARMINGTON, UT

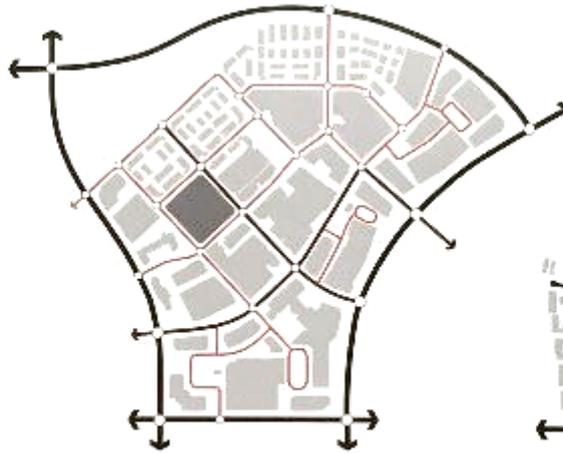


TRAIN STATION

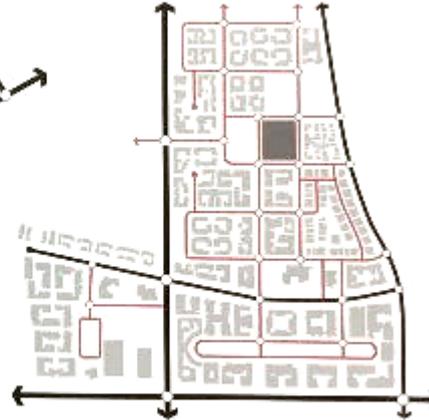
# LAND-USE FOR CENTERS/T.O.D. –



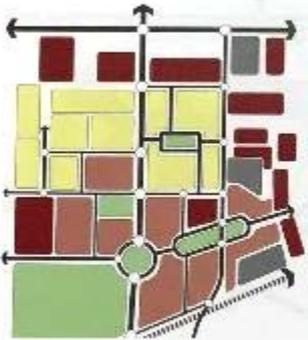
**ADDISON CIRCLE**  
352' X 251'  
3 acre block



**LEGACY PARK**  
350' X 325'  
3 acre block



**PLAYA VISTA**  
273' X 330'  
4 acre block



**ADDISON CIRCLE**  
Building Total: 3,721,000 SF  
Residential: 2,540,000 SF  
Retail + Office: 352,000 SF



**LEGACY PARK**  
Building Total: 4,145,000 SF  
Residential: 1,370,000 SF  
Retail + Office: 2,575,000 SF  
Hotel: 380,000 SF  
Civic: 200,000 SF



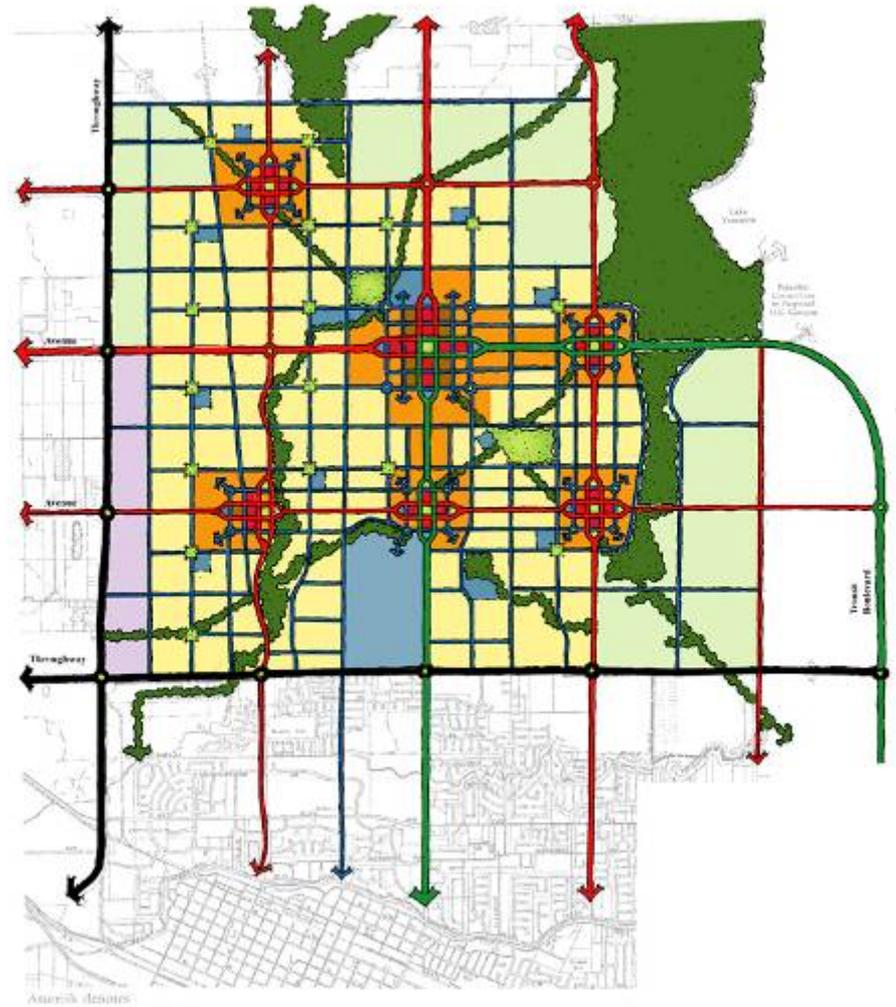
**PLAYA VISTA**  
Building Total: 8,445,000 SF  
Residential: 8,107,000 SF  
Retail + Office: 264,000 SF  
Civic: 74,000 SF



# ACCESS TO OPPORTUNITY IN A COMMUNITY?

## TWO PROVEN INGREDIENTS:

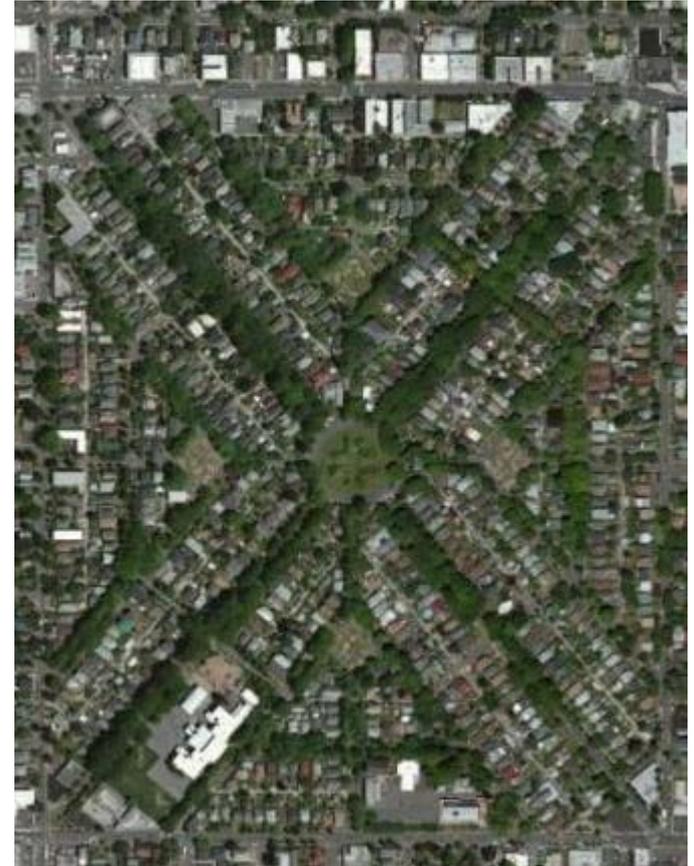
- Connected streets
- Key nearby destinations



# GET CONNECTED!

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- » Connectivity provides multiple wins
  - » Access to opportunities
  - » Walkability
  - » Reduce traffic congestion
  - » Reduces the burden on municipal services
  - » Neighborhood long-term value and stability
- » One size doesn't fit all: explore what works in your community
- » The Utah Street Connectivity Guide can help
- » Build in nearby destinations -- ask your residents





[wfrc.org/tlc](http://wfrc.org/tlc)

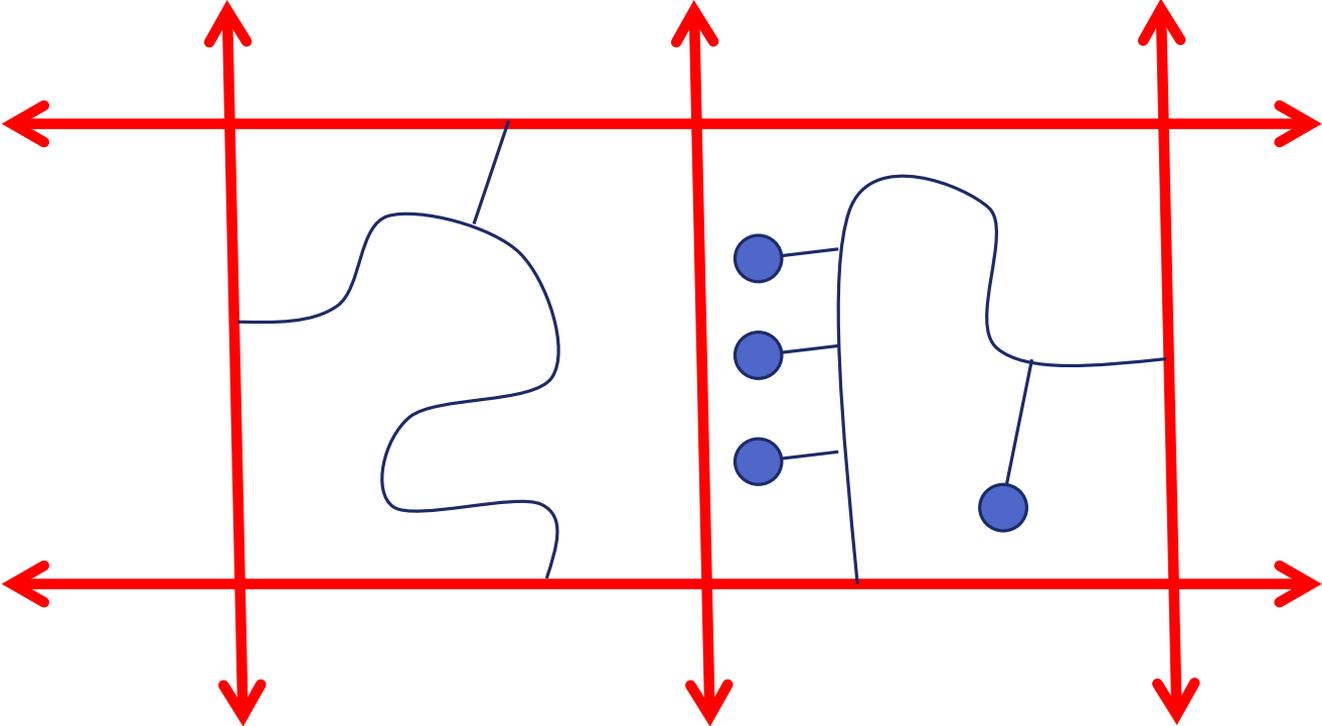
For more information, contact:

Julie Bjornstad  
[julieb@wfrc.org](mailto:julieb@wfrc.org)

# GETTING CONNECTED

Improving Access to Opportunity in your Community

# POLICY DISCONNECT



**Red = UDOT**

**Blue = local governments**

