



DESIGNING TRANSIT ACCESSIBLE COMMUNITIES STUDY

Technical Working Group Meeting
February 23, 2012





Agenda

1. Introductions & Roles (10 minutes)
2. Project Overview (10 minutes)
3. Stakeholder Outreach (15 minutes)
4. Elements of Working Paper #1 (5 minutes)
5. Categorization of Bus Stops & Case Studies
(30 minutes)
6. Next Steps (10 minutes)
7. Adjourn at 3:00 pm



Role of the Technical Working Group

- Oversight of the Study
- Timely Input
- Feedback on Technical Approaches
- Timely Review of Study Products



Project Overview



Transit Accessibility

Transit Accessibility is...
the segment of an individual
trip that occurs between an
origin or destination point and
the transit system.

~ Source: American Public Transit Association



Project Overview – Goals & Objectives

- Identify the challenges faced by users getting to transit.
- Recommend improvements, policies and guidelines to enhance transit accessibility.
- Provide measures and strategies for local governments to create transit accessible and livable neighborhoods.
- Identify options and provide a regional framework for applying for federal grants.



Transit Accessibility

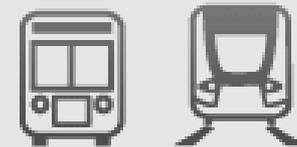
ACCESS HIERARCHY

WALKING

(PRIMARY ACCESS MODE)



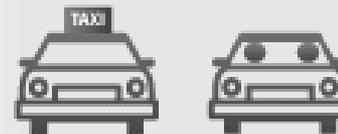
TRANSIT ROUTE TRANSFER



BIKE



PICK-UP
DROP-OFF



VEHICLE
PARKING





ACCESS & COMFORT INVENTORY

LOW

MODERATE

HIGH

**TRANSIT CENTER
PARK-N-RIDE**



- ⊖ Not ADA Accessible
- ⊖ No Sidewalks
- ⊖ No Passenger Waiting Amenities
- ⊖ No Weather Protection



- ⊕ Sidewalk
- ⊕ Adjacent Bike lane
- ⊕ Passenger Waiting Amenities
- ⊖ No Weather Protection



- ⊕ Adjacent Land Use Access
- ⊕ ADA Accessible
- ⊕ Weather Protection
- ⊕ Bike Racks



GILBERT CENTER

- ⊕ Adjacent to Western Canal Trail
- ⊕ Weather Protection
- ⊕ Bike Lockers
- ⊕ Restrooms



- ⊕ Sidewalk
- ⊖ No Buffer Against Traffic
- ⊖ No Passenger Waiting Amenities
- ⊖ No Weather Protection



- ⊕ Sidewalk
- ⊕ Access to Shade
- ⊖ No Passenger Waiting Amenities
- ⊖ No Weather Protection



- ⊕ Passenger Waiting Amenities
- ⊕ ADA Accessible
- ⊕ Weather Protection
- ⊕ Bike Racks



SYCAMORE TRANSIT CENTER

- ⊕ Adjacent Bike Lanes
- ⊕ Bike Lockers
- ⊕ Weather Protection
- ⊕ Restrooms



- ⊕ Sidewalk
- ⊖ No Adjacent Access to Neighborhood
- ⊖ No Passenger Waiting Amenities
- ⊖ No Weather Protection



- ⊕ Bike Facilities
- ⊕ Passenger Waiting Amenities
- ⊕ ADA Accessible
- ⊖ No Weather Protection



- ⊕ Passenger Waiting Amenities
- ⊕ ADA Accessible
- ⊕ Weather Protection
- ⊕ Bike Racks

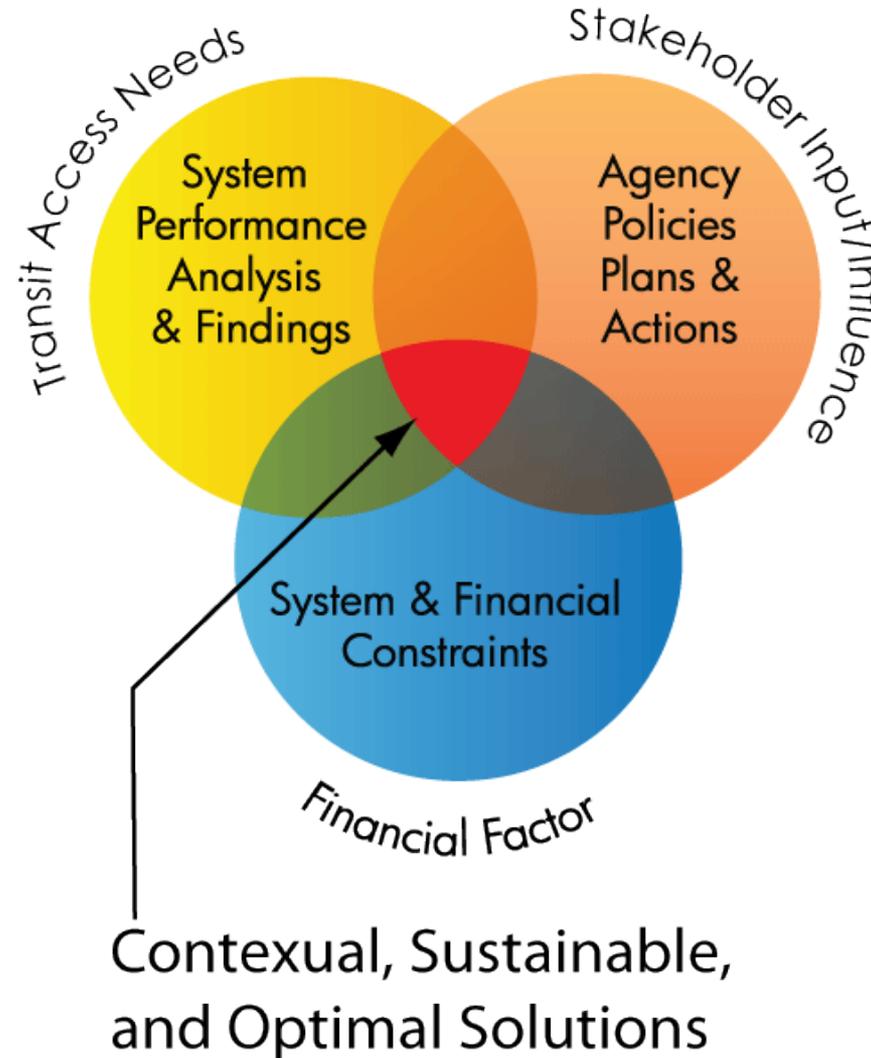


CHANDLER PARK-N-RIDE

- ⊕ Security Cameras
- ⊕ Adjacent Bike Lanes
- ⊕ Weather Protection
- ⊕ Bike Lockers

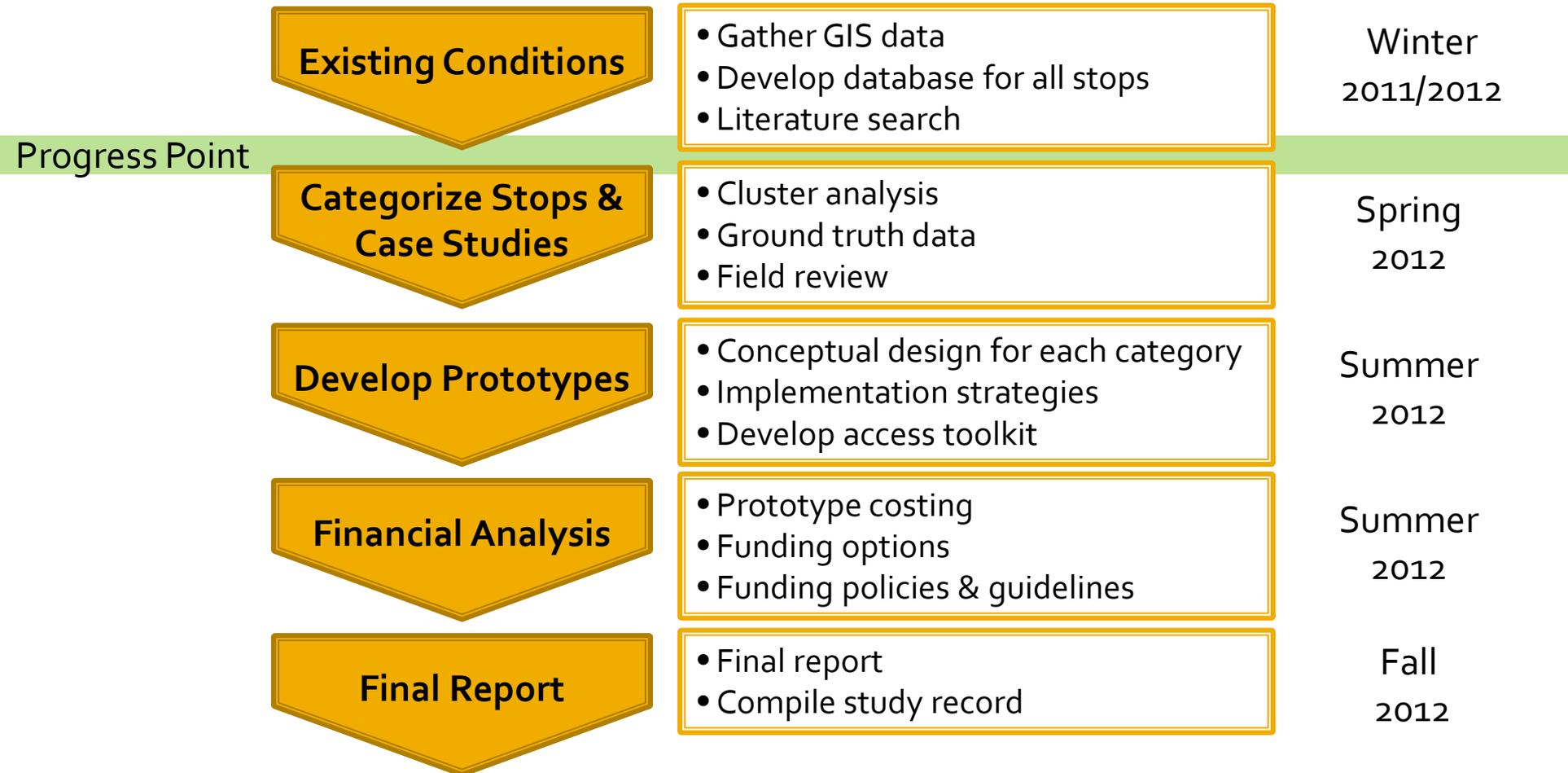


Transit Accessibility



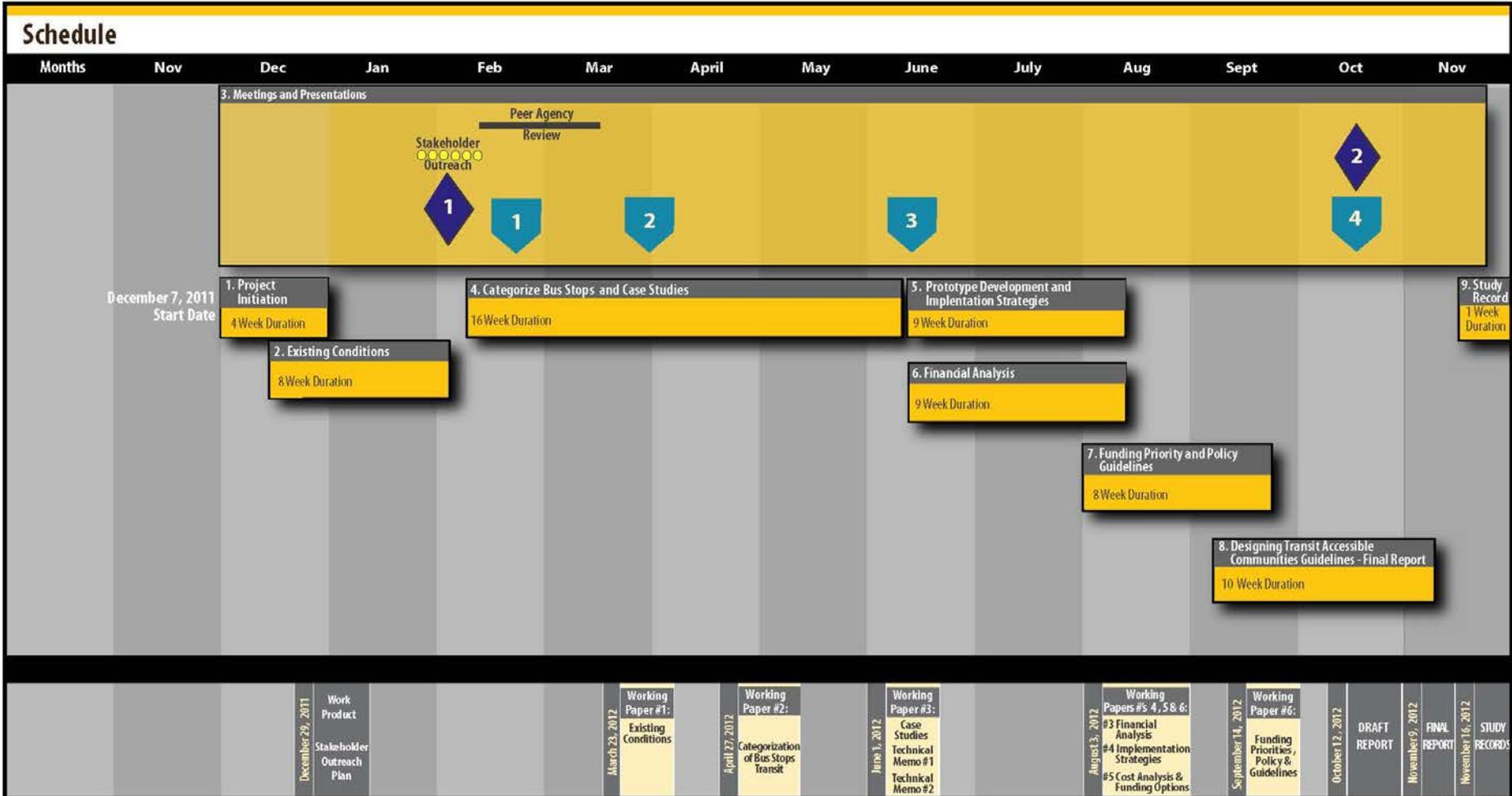


Project Overview – Work Program





Schedule



UPDATED 02/17/12



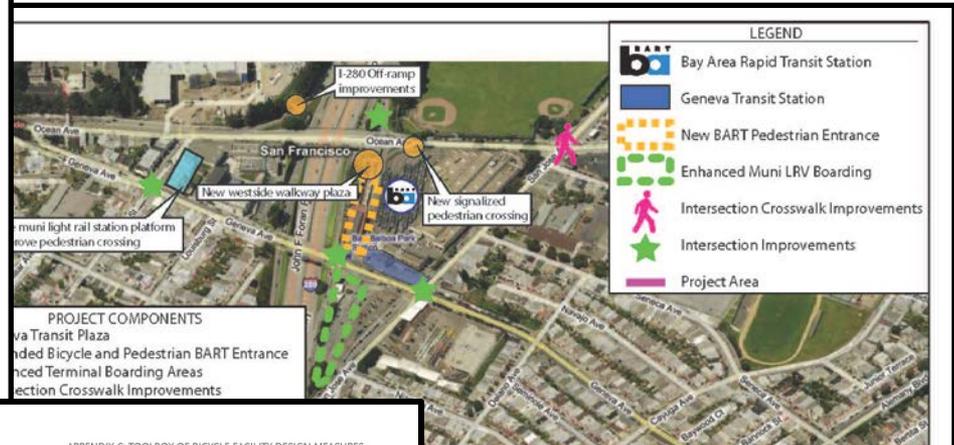
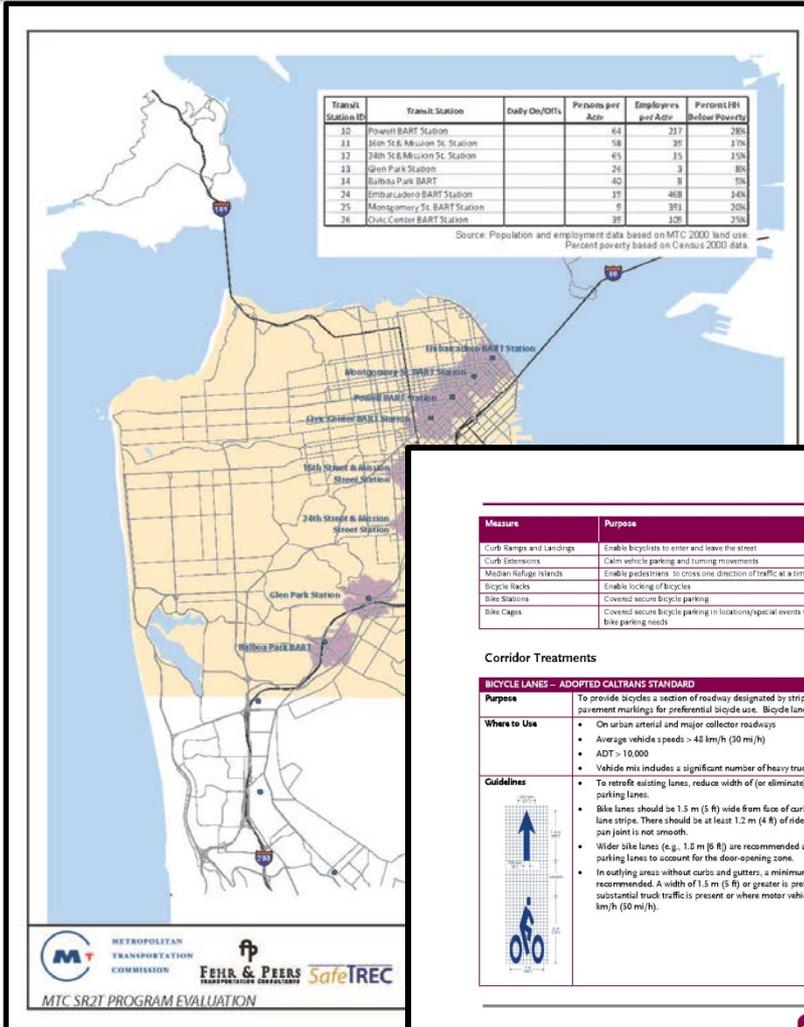


Work Product Expectations

- Recommended set of improvement concepts, polices, and guidelines to enhance transit accessibility.
- Toolkit of measures and strategies for local governments to create accessible and livable neighborhoods.
- Identify options and provide a regional framework for applying for federal grants.



Work Product Expectations



APPENDIX C: TOOLBOX OF BICYCLE FACILITY DESIGN MEASURES

Measure	Purpose	Where to Use	Caltrans Standard	Page No.
Curb Ramps and Landings	Enable bicyclists to enter and leave the street	Street intersections, street-park intersections, major destinations	X	A-40
Curb Extensions	Calm vehicle parking and turning movements	Street corners and mid-block parking lanes		A-41
Median Refuge Islands	Enable pedestrians to cross one direction of traffic at a time	Mid-block crossings		A-42
Bicycle Racks	Enable locking of bicycles	Rail stations, bus transfer hubs, destinations		A-43
Bike Stations	Covered secure bicycle parking	High use locations		A-44
Bike Cages	Covered secure bicycle parking in locations/special events with large bike parking needs	High use locations, especially employment centers and special events		A-44

Corridor Treatments

BICYCLE LANES – ADOPTED CALTRANS STANDARD

Purpose	Where to Use	Guidelines
To provide bicyclists a section of roadway designated by striping, signing and pavement markings for preferential bicycle use. Bicycle lanes must be well marked.	<ul style="list-style-type: none"> On urban arterial and major collector roadways Average vehicle speeds > 40 km/h (30 mi/h) ADT > 10,000 Vehicle mix includes a significant number of heavy trucks and/or buses 	<ul style="list-style-type: none"> To retrofit existing lanes, reduce width of (or eliminate) travel, turning or parking lanes. Bike lanes should be 1.5 m (5 ft) wide from face of curb or guardrail to the bike lane stripes. There should be at least 1.2 m (4 ft) of rideable surface if the gutter pan joint is not smooth. Wider bike lanes (e.g., 1.8 m [6 ft]) are recommended adjacent to parallel parking lanes to account for the door-opening zone. In outlying areas without curbs and gutters, a minimum width of 1.2 m (4 ft) is recommended. A width of 1.5 m (5 ft) or greater is preferable where substantial truck traffic is present or where motor vehicle speeds exceed 60 km/h (30 mi/h).

Source: Oregon Department of Transportation

Toolkit for the assessment of Bus Stop Accessibility and Safety





Stakeholder Outreach Update



Stakeholder Outreach Plan

- **Technical Working Group** - Meets at crucial milestones during entire process; Responsible for technical review and comments/input.
- **MAG Committees** – Inform and solicit input from various MAG committees as needed.
- **Stakeholder Workshops** – Solicit or address specific issues, and/or concerns.
- **One on One Meetings** – Meet with a specific stakeholder(s), as needed, on a specific issue or concern.



Stakeholder Workshop Objectives

- Identify challenges faced by users getting to transit.
- Identify the universe of potential improvements to help users get to and from bus/transit stops.
- Offer possible solutions to help create transit accessible neighborhoods.
- Propose ways to prioritize accessibility improvements.



Stakeholder Outreach Workshop

WORKSHOP AGENDA

1. Introductions
2. Project Overview
3. Workshop Objectives
4. Workshop Overview
5. Workshop Breakout Group Discussion
6. Review Breakout Sessions & Wrap-up





Agency Participants

- City of Phoenix
- Southwest Valley YMCA
- Sun City West Foundation
- Scottsdale Training and Rehabilitation Services
- Valley Metro RPTA
- Civic Service Institute
- Benevilla
- Foothills Caring Corps
- City of Mesa
- Arizona Developmental Disabilities Council
- NOVA Safe Haven
- Northwest Valley's Transportation Stakeholders Committee
- Save the Family
- Sustainable Cities Coalition
- Maricopa County Department of Public Health
- City of Surprise
- City of Scottsdale
- Town of Youngtown
- Salvation Army
- City of Glendale
- Town of Buckeye



Questions Asked

PROJECT GOAL	QUESTION
1. Identify the challenges faced by users getting to transit.	<ol style="list-style-type: none">1. What are transit users' challenges in accessing transit?2. How can these challenges be addressed?
2. Recommend improvements, polices and guidelines to enhance transit accessibility	<ol style="list-style-type: none">1. What type of bicycle and pedestrian facilities should be provided near transit stops in the MAG region?2. What does ADA not address when considering bus/transit stops?



Questions Asked

PROJECT GOAL	QUESTION
<p>3. Provide measures and strategies helpful in creating transit accessible neighborhoods.</p>	<ol style="list-style-type: none">1. What obstacles do communities face in planning and implementing transit accessible improvements?2. What ideas do you have to help communities better plan and implement improvements for transit accessibility?
<p>4. Provide a cost analysis and framework for funding options and prioritization of improvements.</p>	<ol style="list-style-type: none">1. If the region were to invest in transit accessibility improvements, what would you list as the most important criteria in prioritizing improvements and why?2. What are the challenges in funding accessibility improvements and how can we overcome them?



Workshop Outcome

- See Handout
- Additional Discussion
- Stakeholder Workshop #2
 - Area agency staff
 - Input regarding implementation strategies
 - Input on toolkit
 - Local agency acceptance & incorporation





Elements of Working Paper #1



Elements of Working Paper #1

- Existing and On-going Studies
 - See handout

MINETA TRANSPORTATION INSTITUTE

Bicycling Access and Egress to Transit: Informing the Possibilities



environmental update
find out what's new
mailto:info@mti.org

enews

stop sprawl!

Community Characteristics Promoting Transit and Walking

Dr. John Holtzclaw
(from "Using Residential Patterns and Transit To Decrease Auto Dependence and Costs"; Natural Resources Defense Council, June 2004)

[Updated March 2007]

Several analysts have identified the densities necessary to support transit systems. Certainly, transit can be operated at high frequencies in low-density areas with adequate subsidies or fares. Costs can be cut on low-ridership routes by using smaller vehicles or automating the system. (Automating can backfire and substantially raise the capital and operating costs of complex systems.) However, considering the unwillingness of the American public to subsidize "empty buses" in normal operation, these subsidies are small. These studies provide a indication of patronage changes with density. Other studies have shown the efficacy of mixing uses and locating shopping near housing concentrations on reducing driving.

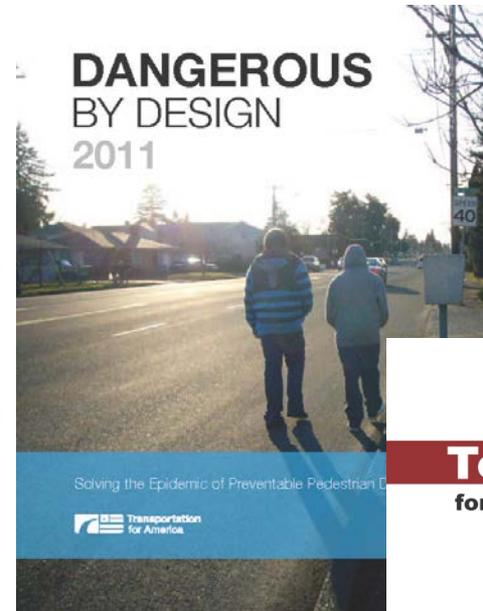
Two California agencies have guides for developing pedestrian and transit accessible communities: California Air Resources Board (1993 Draft), and Nancy Hanson of the California Energy Commission (1994, with updates).

From their study of 32 major cities around the world, Peter Newman and Jeffrey Kenworthy (1989) report on a linked kingdom study and conclude that below 20 persons/hectare (8 persons/acre, and 8-12 duites/acre (dwelling units/residential area) at household sizes and land uses common to San Francisco area cities) there is a marked increase in driving, and below 30 persons/hectare (12 persons/acre, 12-16 duites/acre) the bus service becomes poor. They recommended densities above 30-40 persons/hectare (12-16 persons/acre, 12-20 duites/acre) for public transit oriented urban form.

[March 2007 update: Urban Design to Reduce Automobile Dependence Peter Newman & Jeffrey Kenworthy Clouzer, An International Journal of Industrial and Metropolitan Studies, Winter 2006.
<http://www.cars.org.au/transport.html>
<http://www.cars.org.au/transport.html>

"Conclusions
"Considerable variations in urban design and development are found around the world. But there is a widespread desire to find ways of minimizing car use in urban centers to make them more viable. This article tries to show that achieving less automobile dependence will require a certain minimum of urban intensity (residents and jobs). The value of the 30-person/hectare minimum has been found to have some basis in the literature and the authors' own data. It has been explained in theory through the travel time budget and the levels of amenities required to ensure that people do not have to live in a car."

www.cars.org.au/projects/urban_centers.htm



Toolkit for the assessment of Bus Stop Accessibility and Safety





Local Jurisdiction Efforts

- Outreach to some larger area communities
 - City of Chandler
 - City of Glendale
 - City of Mesa
 - City of Phoenix
 - City of Scottsdale
 - City of Tempe



Peer Agency

- San Diego, California
San Diego Association of Governments
- San Francisco, California
Metropolitan Transportation Commission
- Seattle, Washington - Puget Sound Transit
- Denver, Colorado - Regional Transportation District
- Salt Lake City, Utah - Utah Transit Authority
- Kansas City, Missouri - Kansas City Area Transit Authority



Socio-Economic/Built Environment

DATA REQUEST LIST
Designing Transit Accessible Communities
Updated: 02/13/12

Data Requested	File Type/Needs	Agency	Contact	Date Requested	Date Received	Notes
City of Phoenix North Central Bridal Path ADA Study/Guide	PDF	City of Phoenix	Jorie Bresnahan 602.534.8294 jorie.bresnahan@phoenix.gov	1/3/2012		
2010 Population	Census Block shapefile or smallest available geography	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	12/12/2011	12/20/2011	
2010 Employment	Census Block	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	12/12/2011	12/20/2011	2010 Employment data may not be available.

Socio-Economic and Macro-Scale Built Environment Data is Complete

2010 Housing Units	Census Block shapefile or smallest available geography	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	12/12/2011	12/20/2011	
2010 Land uses	Polygon shapefile	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	12/12/2011	12/20/2011	
210 Roads with ADT	Line shapefile	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	12/12/2011	12/20/2011	
2010 Bicycle Facilities	Line shapefile	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	12/12/2011	12/20/2011	Only 2008 Bikeway information available.



Transit System Data

Transit System Data Partially Complete

Data Requested	File Type/Needs	Agency	Contact	Date Requested	Date Received	Notes
2010 Bicycle and Pedestrian Collisions	Point shapefile	Maricopa Association of Governments	Sarath Joshua 602.254.6300 sjoshua@azmag.gov	1/3/2012		May need to request from ADOT if RPTA or MAG have sufficient data.
2010 Building Footprints	Polygon shapefile	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	1/3/2012		May need to contact City of Phoenix and other member agencies.
2010 Tax Assessor Parcels	Polygon shapefile	Association of Governments	602.452.5066 achen@azmag.gov	1/3/2012		May need to contact Maricopa County.
Employment Centers	Shapefiles	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	1/12/2012		
Employment by TAZ	Shapefiles	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	1/12/2012		
MAG Region Roadway Network	Shapefiles	Maricopa Association of Governments	Alice Chen 602.452.5066 achen@azmag.gov	1/4/2012	1/4/2012	
Transit Stops - all modes	Point shapefile	Valley Metro/ Regional Public Transit Authority		1/3/2012	1/6/2012	



Transit System Data

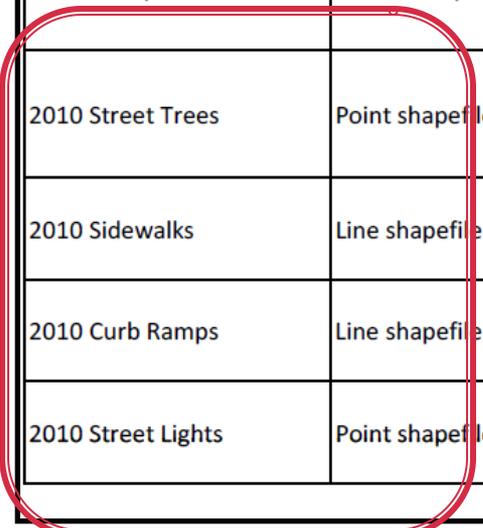
Data Requested	File Type/Needs	Agency	Contact	Date Requested	Date Received	Notes
Transit Routes - all modes	Line shapefile	Valley Metro/ Regional Public Transit Authority	Jorge Luna 602.254.6300 JLuna@azmag.gov	1/3/2012	2/8/2012	
2010 Transit Ridership Ons/Offs by Stop	Point shapefile or Database with Unique Stop ID	Valley Metro/ Regional Public Transit Authority		1/3/2012		Data may be limited to only a few routes.
2011 RPTA O-D Study	Point shapefile	Valley Metro/ Regional Public Transit Authority	Ratna Korepella 602.253.604 rkorepella@valleymetro.org	1/3/2012		
Inventory of Parking at bus stop locations	Text or shapefile	Valley Metro/ Regional Public Transit Authority	Alice Chen 602.452.5066 achen@azmag.gov	1/3/2012	1/31/2012	Park-N-Ride information supplied by Jacobs (Vamshi Yellisetty)
Bus Service Frequency, by stop	Database or GIS files	Valley Metro/ Regional Public Transit Authority		1/10/2012		Limited data given to WCI by Jorge Luna at MAG on 2/8/12
2011 O & D Study Questionnaire	Text or PDF	Valley Metro/ Regional Public Transit Authority		1/13/2012		



Built Environment Data

Data Requested	File Type/Needs	Agency	Contact	Date Requested	Date Received	Notes
Bus Count APC Data		V: Re Tra				
Transit Stop Amenities	Text or shapefile	Varies by MAG member agency.				
2010 Street Trees	Point shapefile	Varies by MAG member agency.	Varies	1/3/2012		Will determine the appropriate agency when case study locations are finalized.
2010 Sidewalks	Line shapefile	Varies by MAG member agency.	Varies	1/3/2012		Will determine the appropriate agency when case study locations are finalized.
2010 Curb Ramps	Line shapefile	Varies by MAG member agency.	Varies	1/3/2012		Will determine the appropriate agency when case study locations are finalized.
2010 Street Lights	Point shapefile	Varies by MAG member agency.	Varies	1/3/2012		Will determine the appropriate agency when case study locations are finalized.

Micro-scale Built Environment Variables Not Available from Single Source.





Categorization of Bus Stops & Case Studies



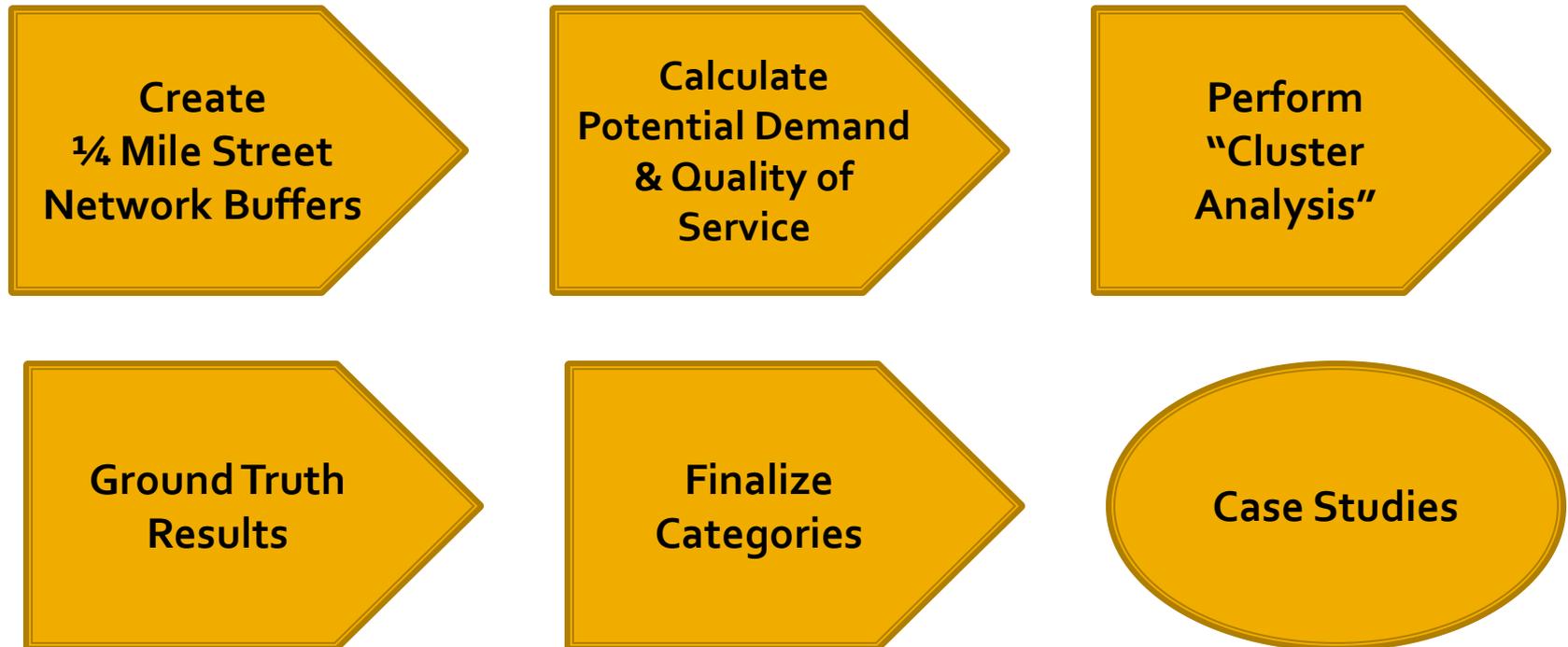
Goals of Categorization & Case Studies

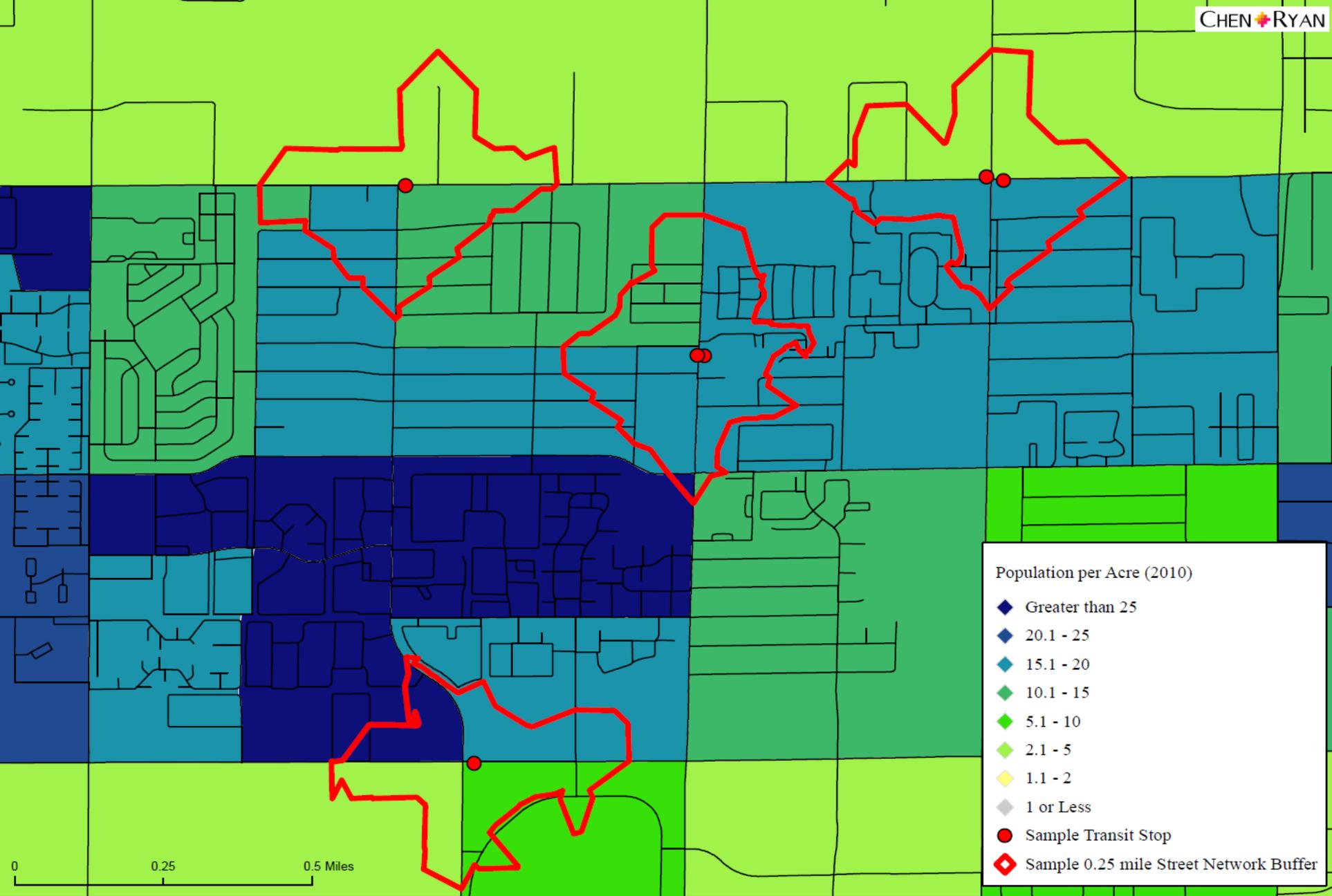
- Reduce the 7000+ bus stop areas into a set of categories.
- In depth examination of each category.





Categorization Process



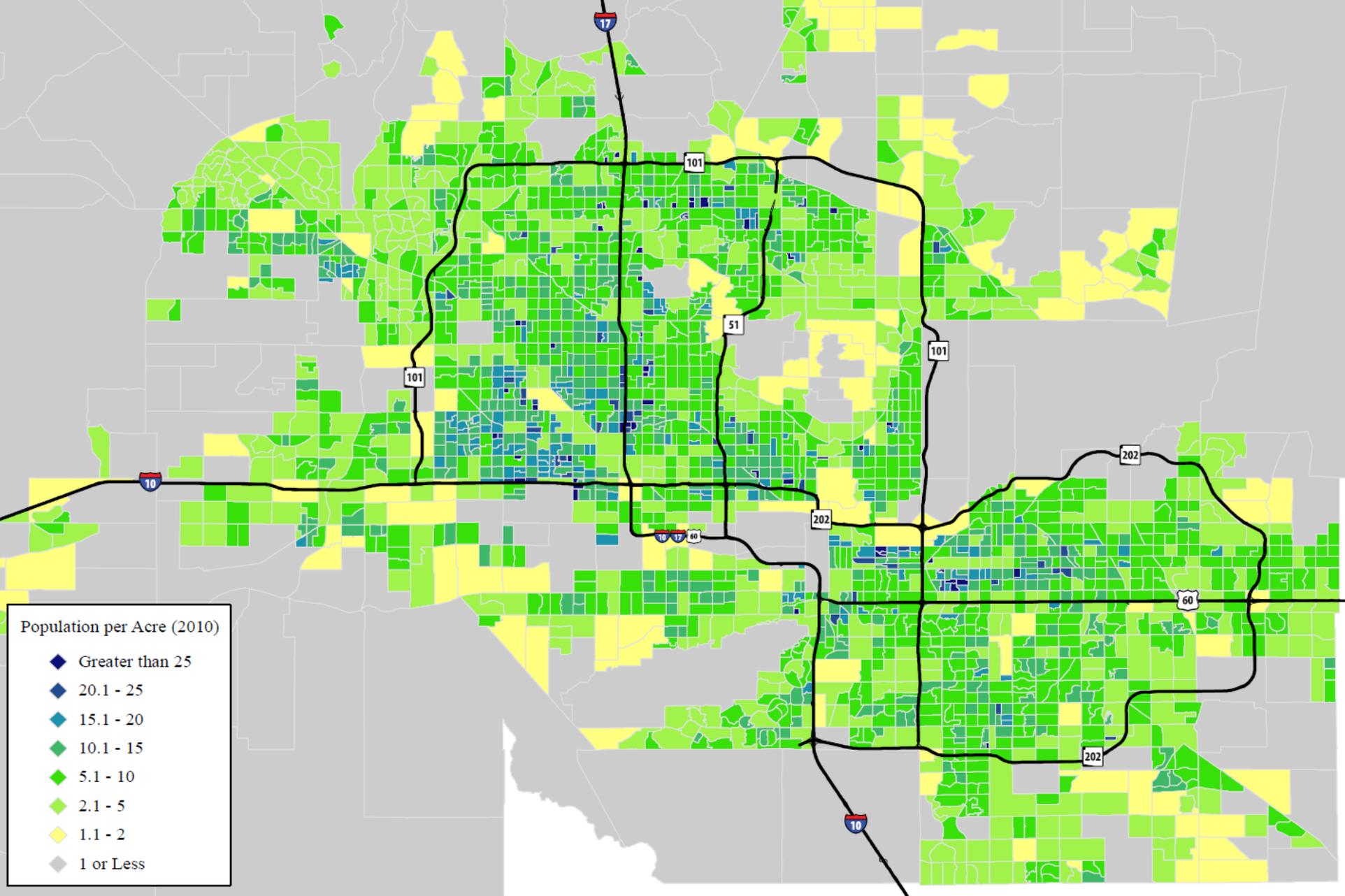


Sample 0.25 Mile Street Network Buffers Surrounding Transit Stops

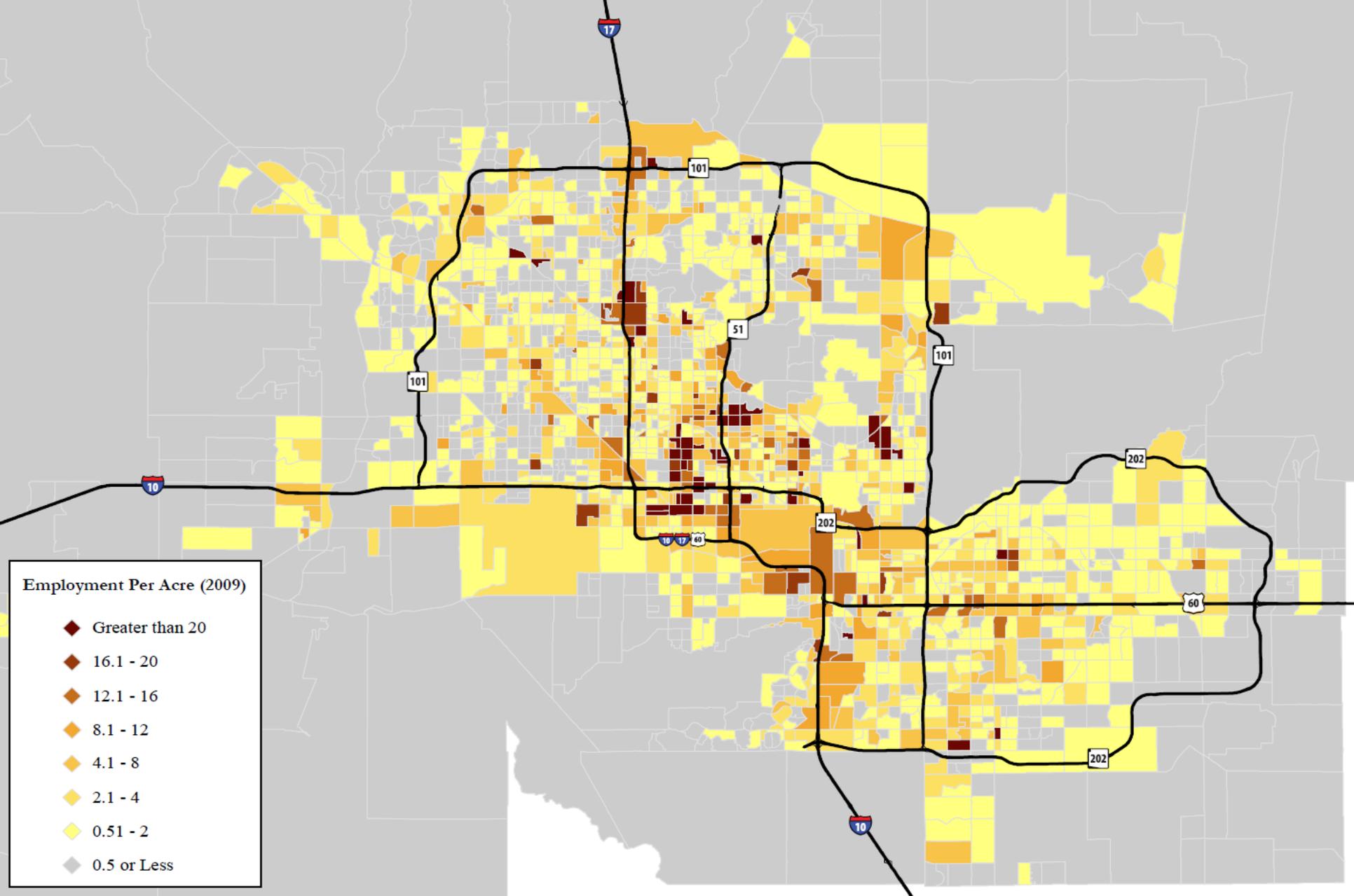


Inputs to Categorization

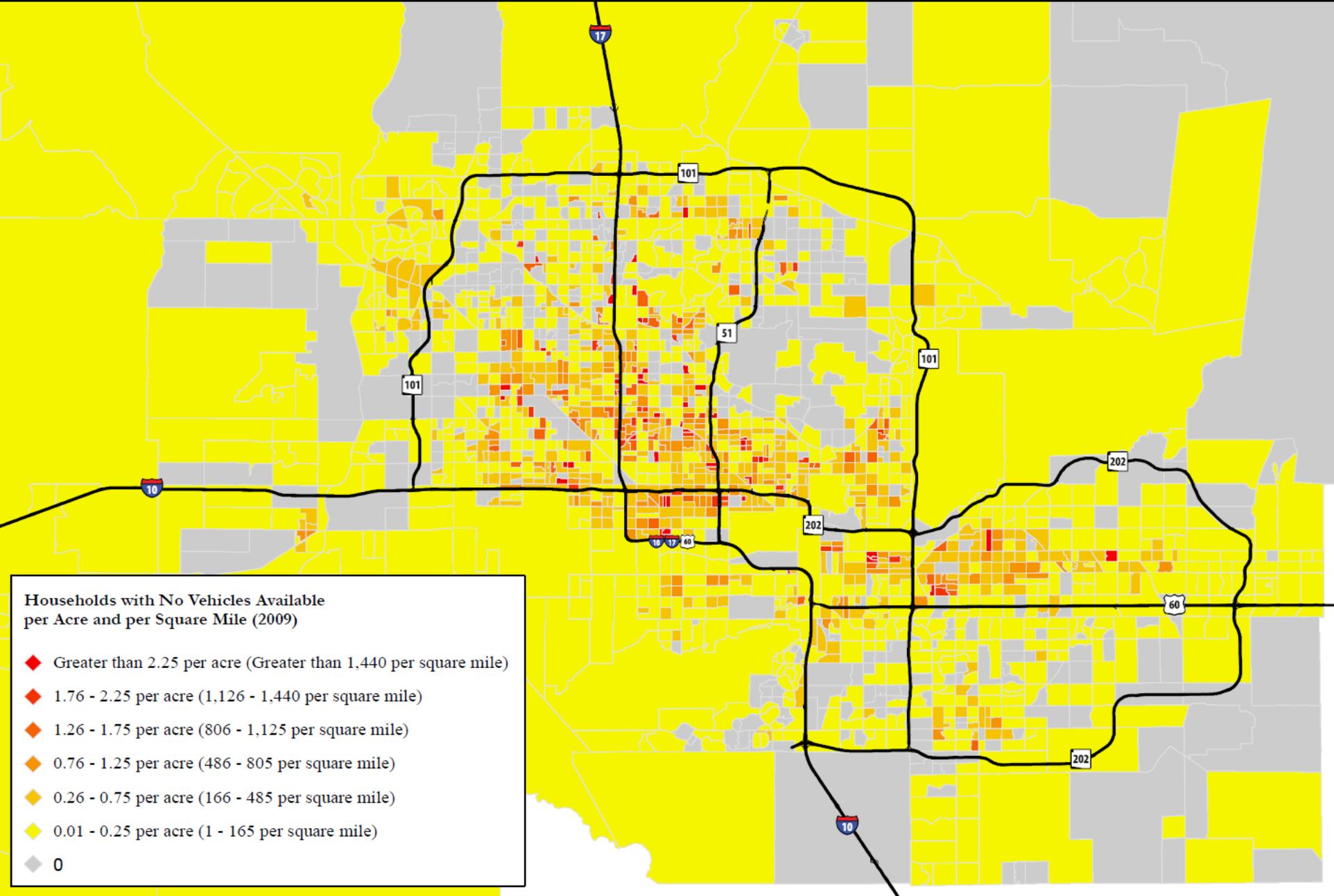
- *Transit-Bike-Pedestrian Demand Characteristics*
 - Population Density
 - Employment Density
 - Zero-Vehicle HH Density
 - Acreage of Retail



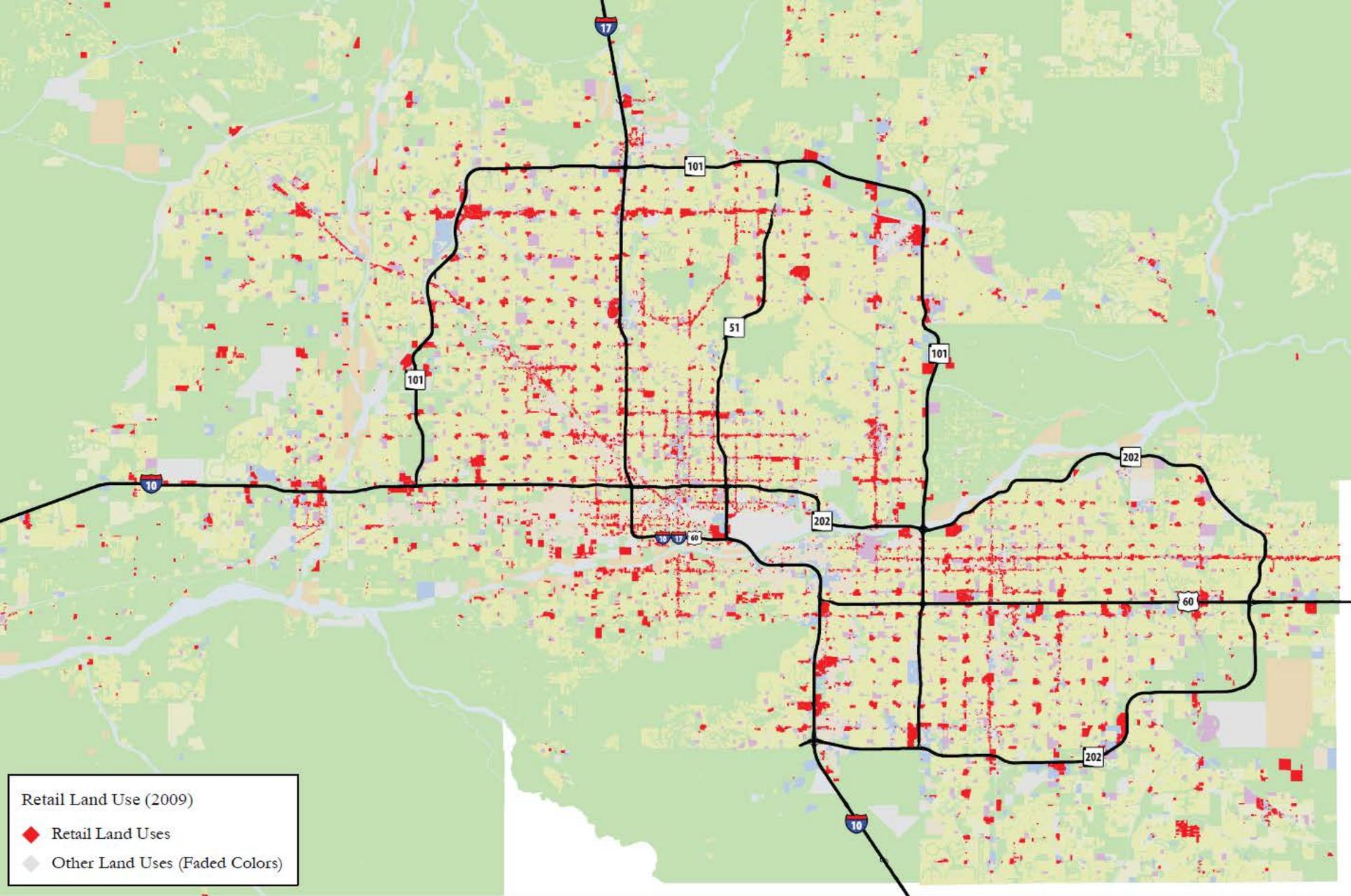
Population Density in Maricopa County (2010)



Employment Density in Maricopa County (2009)



Density of No Vehicle Households in Maricopa County (2009)

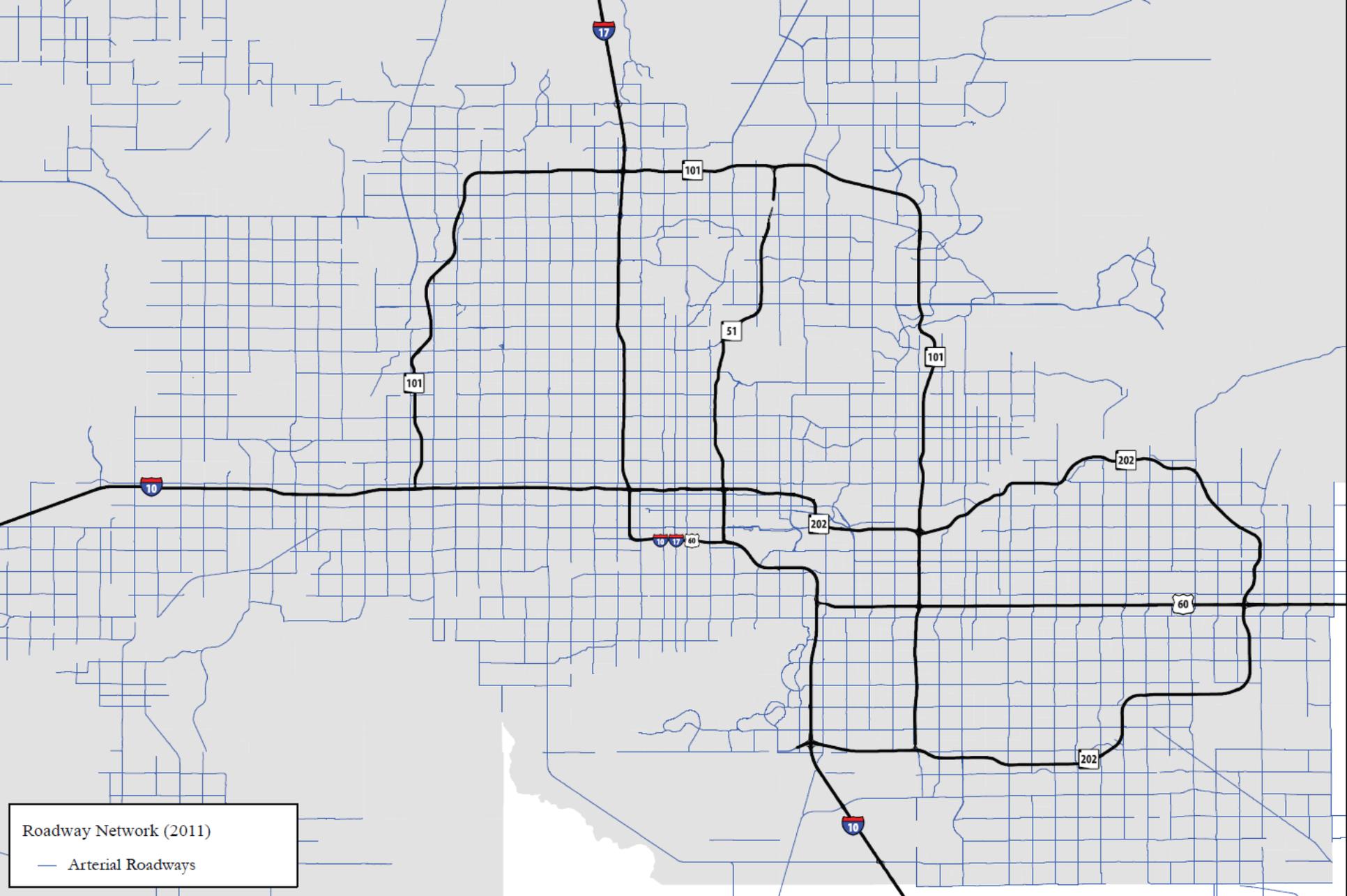


Retail Land Uses in Maricopa County (2009)

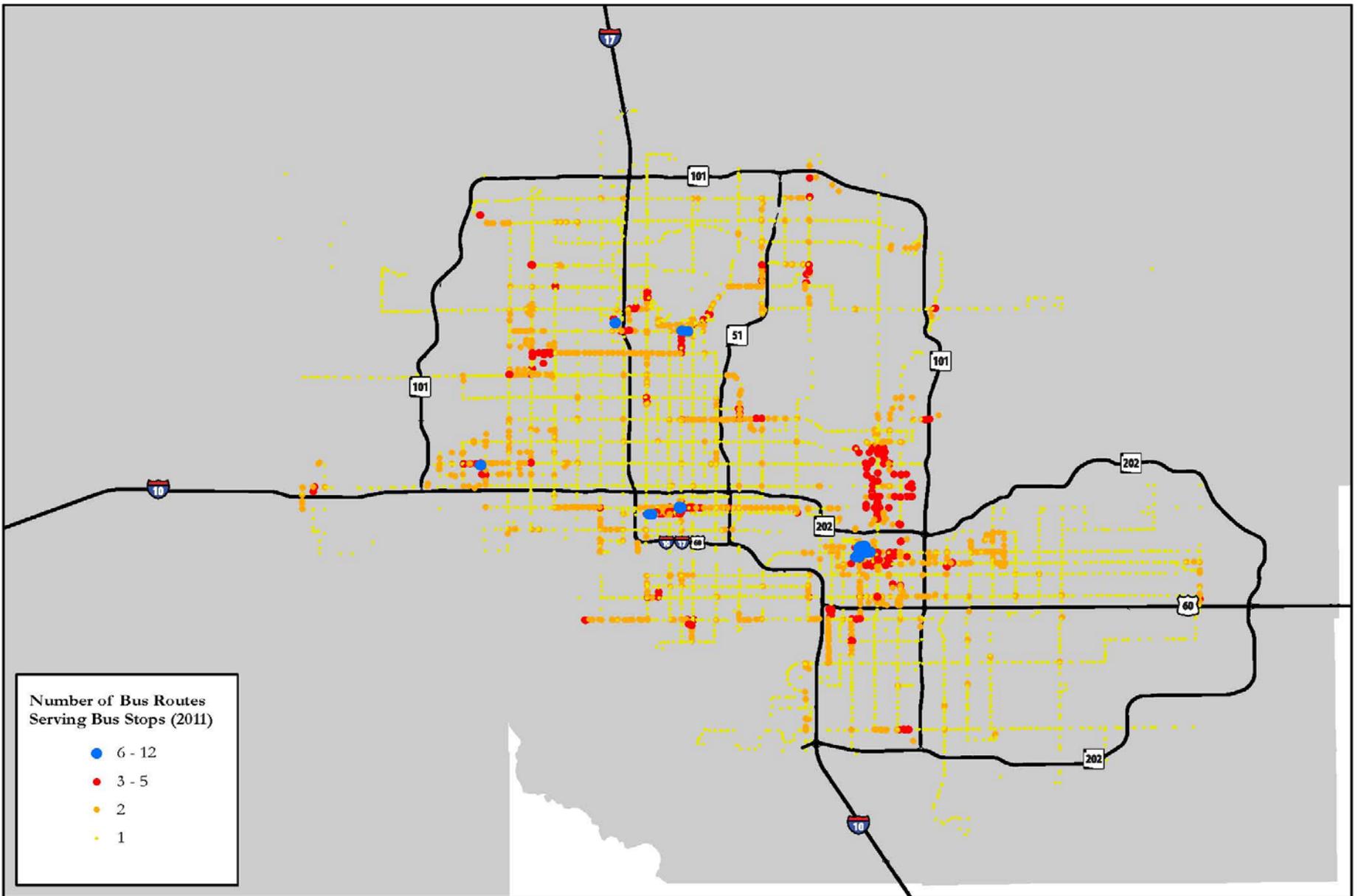


Inputs to Categorization

- *Bus Service Quality Characteristics*
 - Location of bus stop at arterial-arterial intersection
 - Number of routes per bus stop area



Arterial Roadways in Maricopa County (2009)



Number of Routes Serving Each Bus Stop (2011)



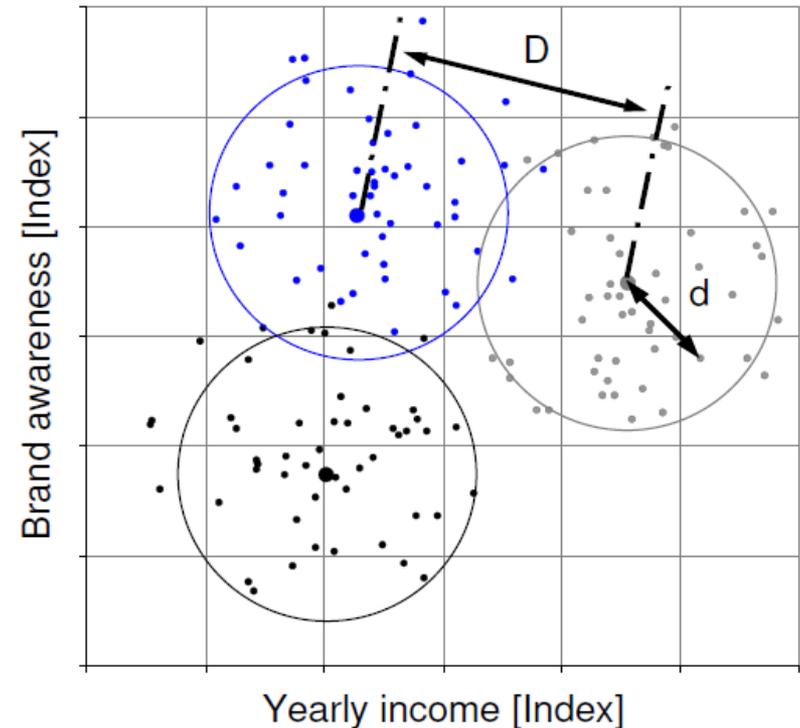
Inputs to Categorization

- *Walking and Cycling Deficiencies*
 - Number of lanes
 - Speed of Adjacent Street
 - Traffic Volume
 - Presence of Freeway Ramps
 - Safety (Bike and Pedestrian Collisions)



Cluster Analysis

- Assign every stop to a category (5 – 10).
- Cluster analysis is a statistical technique for classifying a “mountain” of information into manageable meaningful piles.
- Maximize distance “D” and minimize distance “d”.
- SPSS - Hierarchical Cluster Analysis.





Refine Categories

- Map results of preliminary categories to see spatial patterns.
- Google check categories.
- Consultant field review of preliminary categories
- MAG staff and Technical Working Group review of categories.
- Finalize categories.



Goal of Case Studies

- Quality of experience from transit user perspective.
- Usage rates by mode of access.
- Safety issues.
- Engineering constraints and deficiencies.



Case Study Methods

- Intercept Surveying
- Pedestrian, Cyclist, Driver Observations
- Mode of Access Counts
- Engineering Field Reviews

SDSU Bicycle Counting Form

Mainline Roadway: _____ Bike Lane Width (ft.): _____
 Nearest Intersecting Roadway: _____
 Observer Name(s): _____
 Date: _____
 Observation Time (Start) _____ (End) _____
 Temp. (°F) _____ Windy, cloudy, misty, etc.: _____
 Description of Counting Location: _____

Tally each time a bicycle passes the counter location in the bicycle lane, sidewalk, or any travel lane from either direction. Mark an "X" if the bicyclist is male and an "O" if the bicyclist is female. If a bicyclist is riding in the opposite direction of adjacent traffic flow, underline the tally mark.

Time Period #	Bicycle Counts						TOTAL
	From A to B			From B to A			
	Bicycle Lane	Traffic Lane	Sidewalk	Bicycle Lane	Traffic Lane	Sidewalk	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
TOTAL							

Draw a diagram of the count site below, including the bike lane, adjacent sidewalk, travel lanes, and nearby intersection. Mark the counter location with an "X". Mark the letter "A" upstream of the counter and the letter "B" downstream of the counter and draw arrows for directions of bicycle travel (A to B and B to A). Also draw a North arrow.





Open Discussion



Next Steps



Next Steps

- Proceed with categorization of stops
- Review Draft Working Paper #1 (March 23, 2012)
- Provide comments on Working Paper #1
- Meet again on Thursday, March 29, 2012
 - Confirm categorization results
 - Approve case study locations
 - Approve intercept survey questionnaire
- Distribute Working Paper #2 (April 27, 2012)
- Stakeholder Workshop #2 (Summer 2012)



Project Contact

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