Sustainable Infrastructure and South Mountain Village: Transportation

COURSE PROJECT PRESENTATION

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SPRING 2018 COURSE

Urban Infrastructure Anatomy and Sustainable Development

CEE 507 ▫ SOS 547 ▫ PUP 553

RIO SALADO 2.0 Transportation

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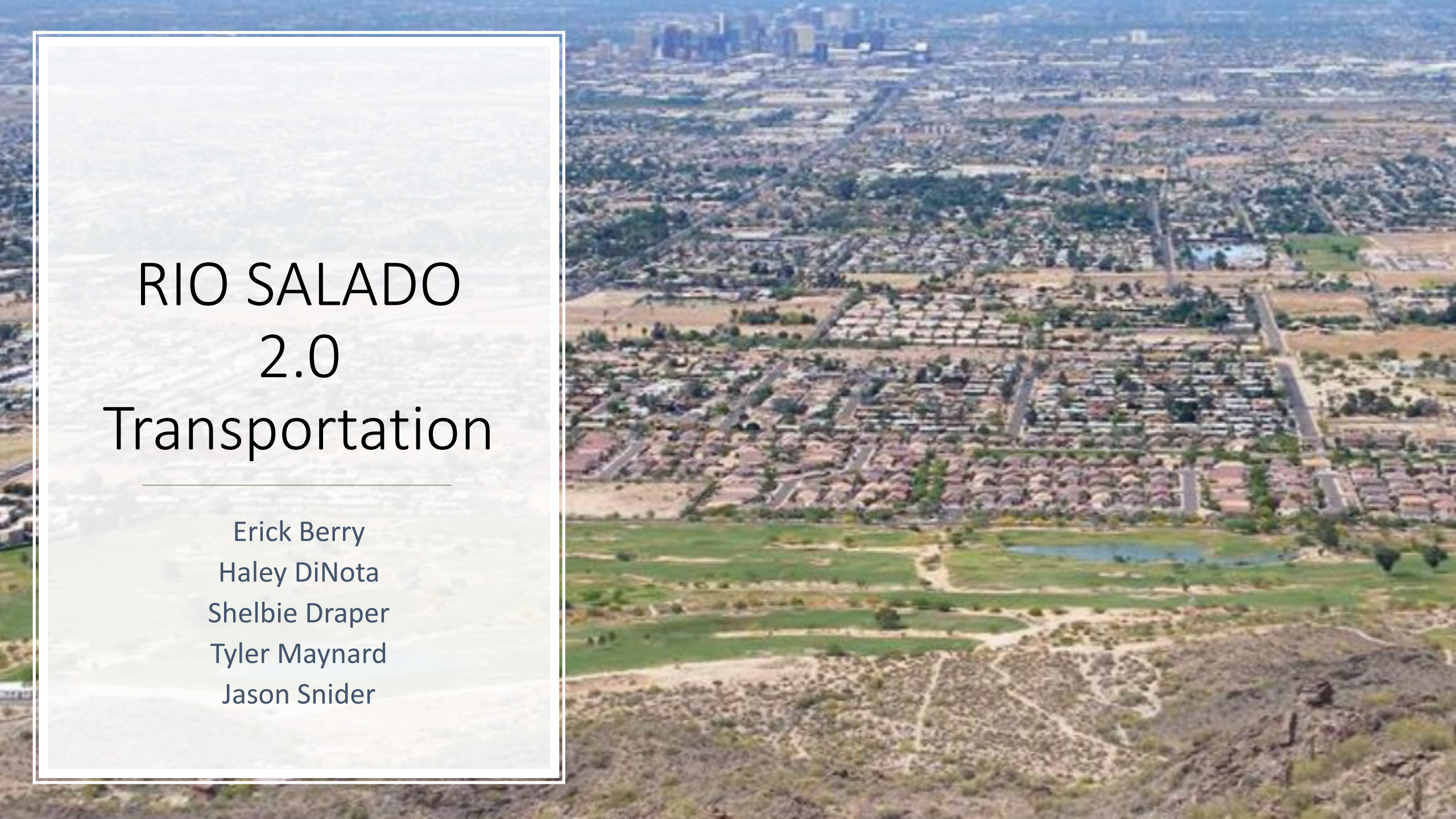
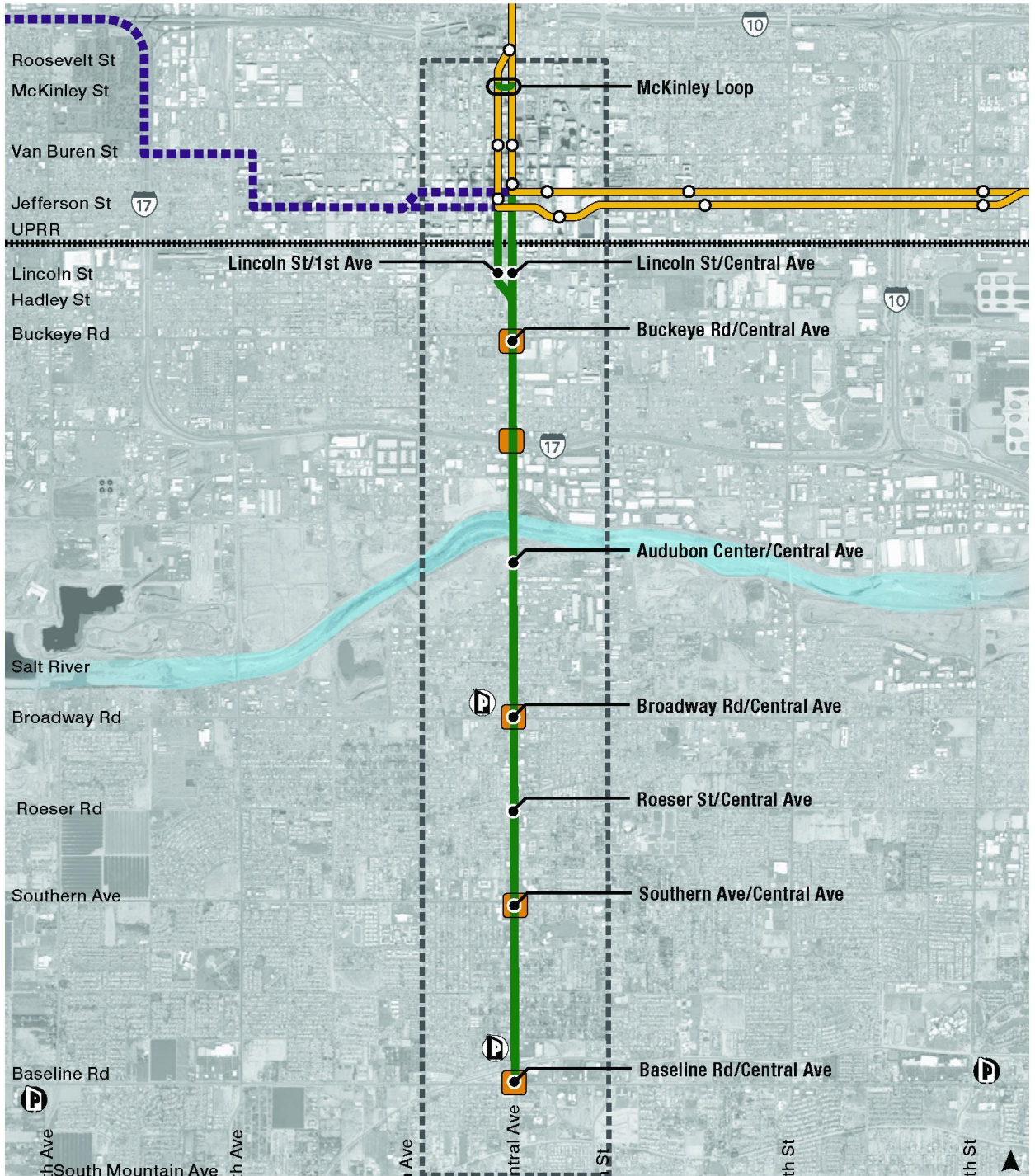


LIGHT RAIL

Light Rail - South Central Extension

- City of Phoenix and Metro Valley proposal
- Completed by 2023 ($50 million)
- Approximately 6 miles of new rail
- Bridge crossing the Salt River along Central Ave



VALLEY METRO

South Central Extension – Recent Study and Analysis

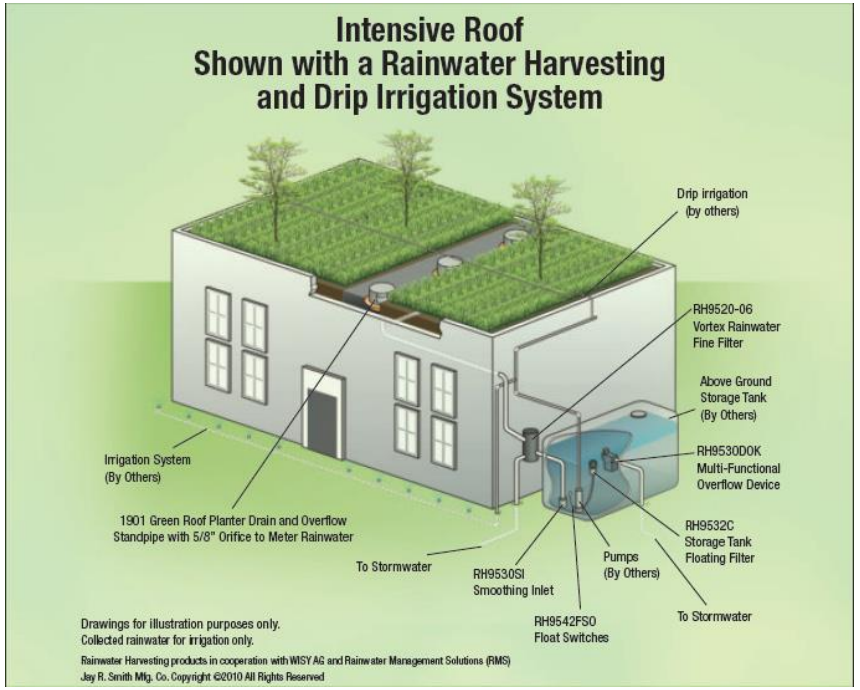
Valley Metro Study

- Increased future travel demand of 26% by 2031
- 19% increase in trips to Sky Harbor Airport and Tempe
- Existing bus routes delayed and approaching full capacity
- South Central intersections expected to be at/over capacity (MAG 2040, RTP)
- EA/FONSI Assessments

South Central Extension – Alternate Study and Analysis

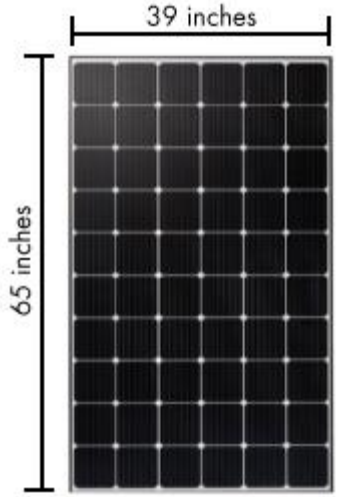
<u>Sustainability and Rail Extension</u>

- Solar panels on light rail stations
- Green roof water reclamation for irrigation
- Rail extension to Dobbins Rd

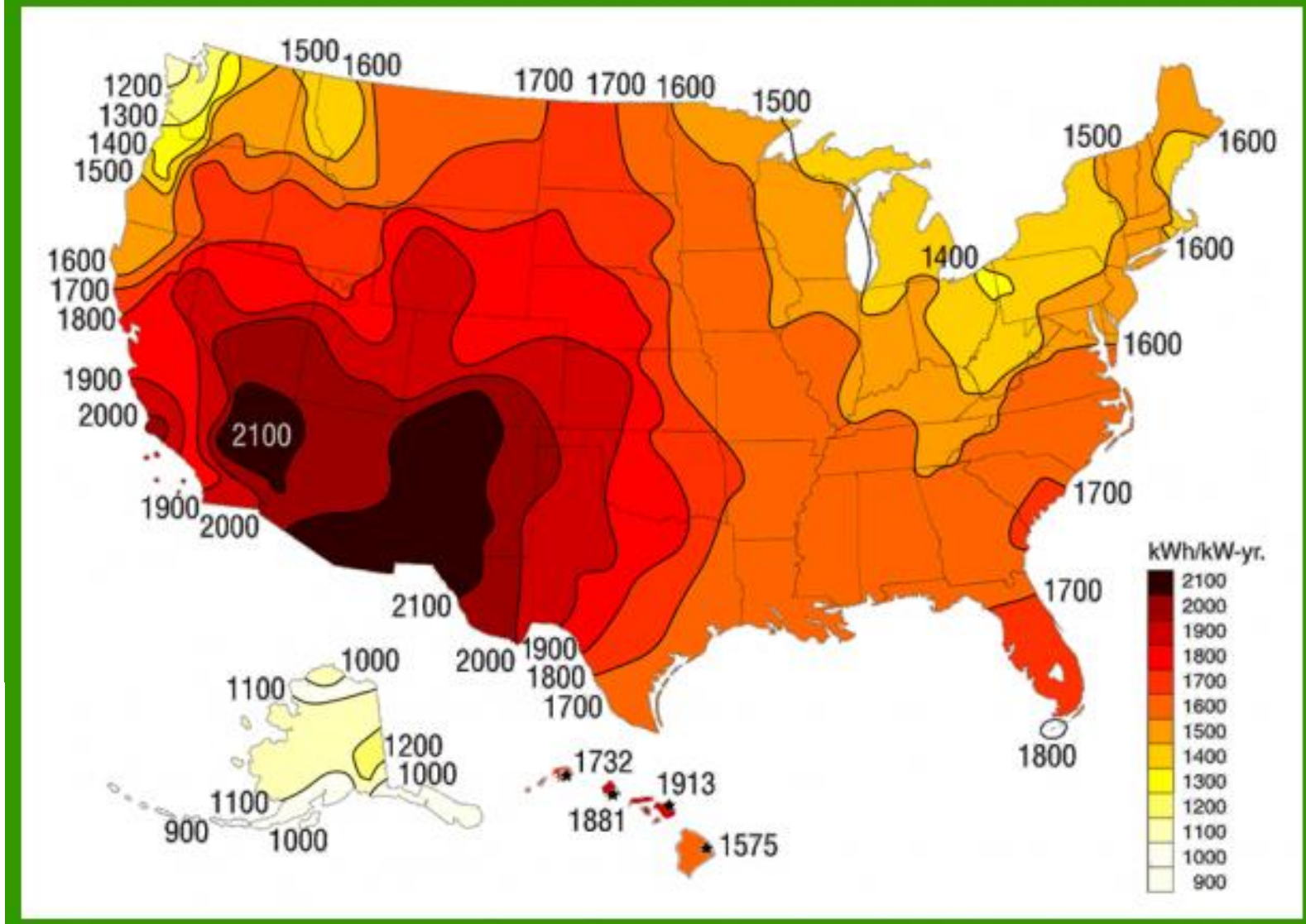


South Central Extension – Solar Panel Analysis

- Standard solar panel producing 250 kWh
- Under STC at 20% efficiency
- Typical Metro Valley light rail station roof area is approx. 1,300 sq ft
- Analysis of one station power output
- 432 panels, 114.4-kW generating power
- Savings of $21,952 a year



20% efficient

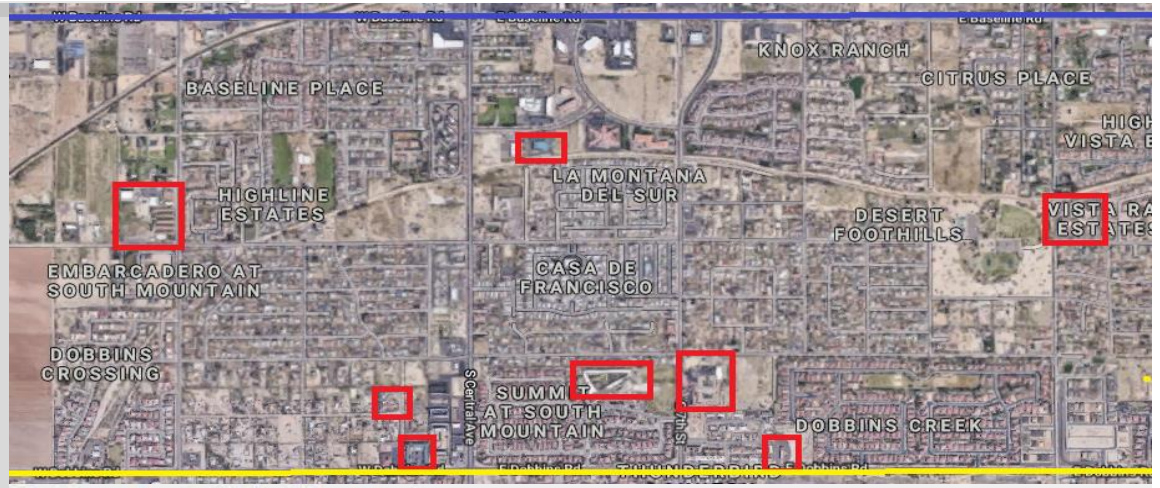


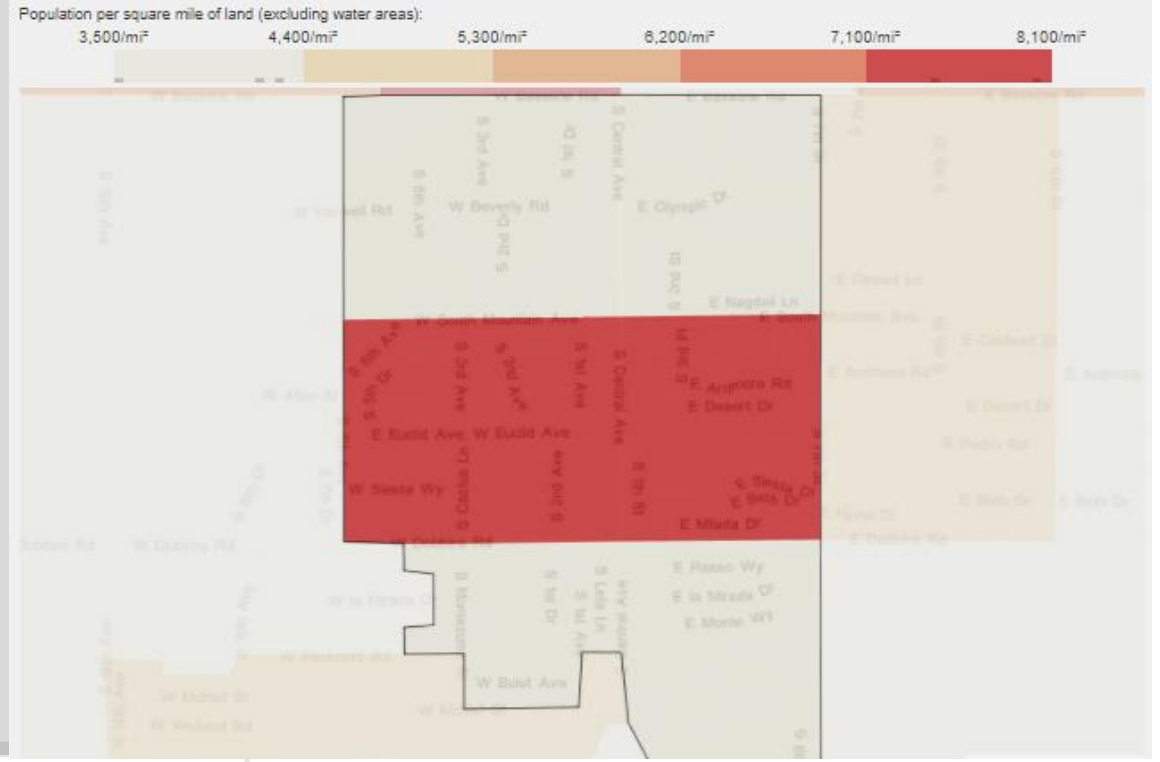
Your roof can hold up to **54** solar panels, which equals **14.3-kW** of generating power.

Here's the best part: In one year, the panels can produce enough to reduce your energy bills by **$2,744**!

South Central Extension – Dobbins Rd Extension

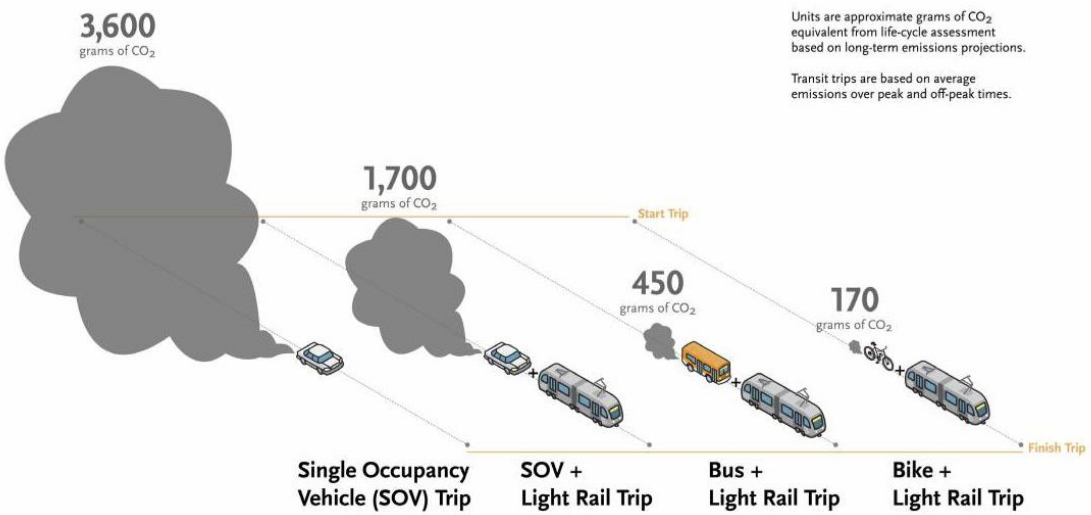
- Important facilities south of Baseline Rd
- High population densities on Central Ave
- More convenient access to South
- Mountain Park





South Central Extension – Analysis Conclusions

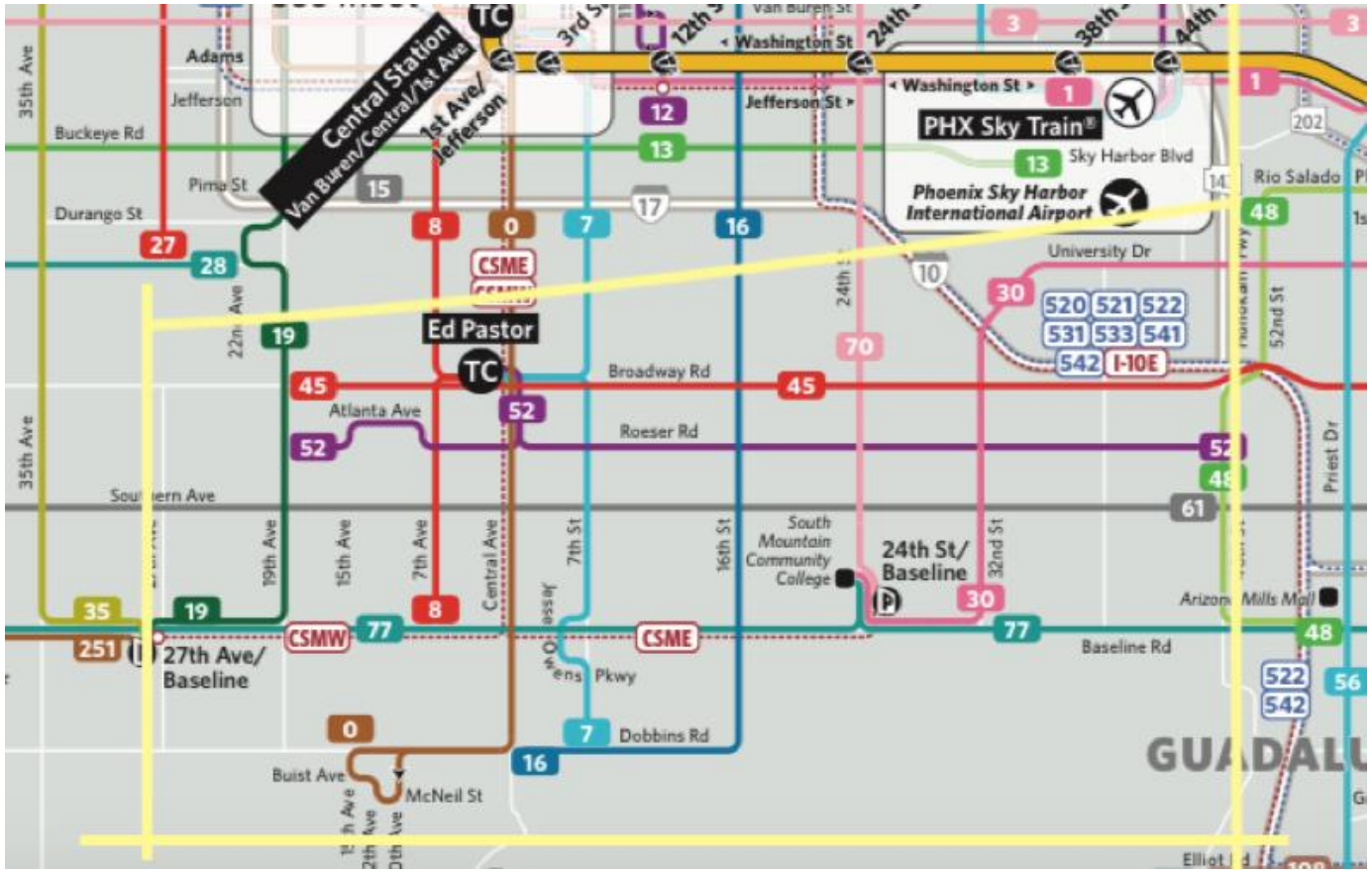
- Greatly reduce GHG emissions per passenger (car vs rail)
- Relieve intersections and bus routes of future peak capacity
- Park & Rides areas allow for parking infrastructure utilization of unused lots in South Mountain
- Solar electricity generation contributes to energy demand of rail
- Property value growth within the Central Ave corridor
- Promotes tourism via interconnected system with the rest of Phoenix rail



BUS TRANSIT INFRASTRUCTURE

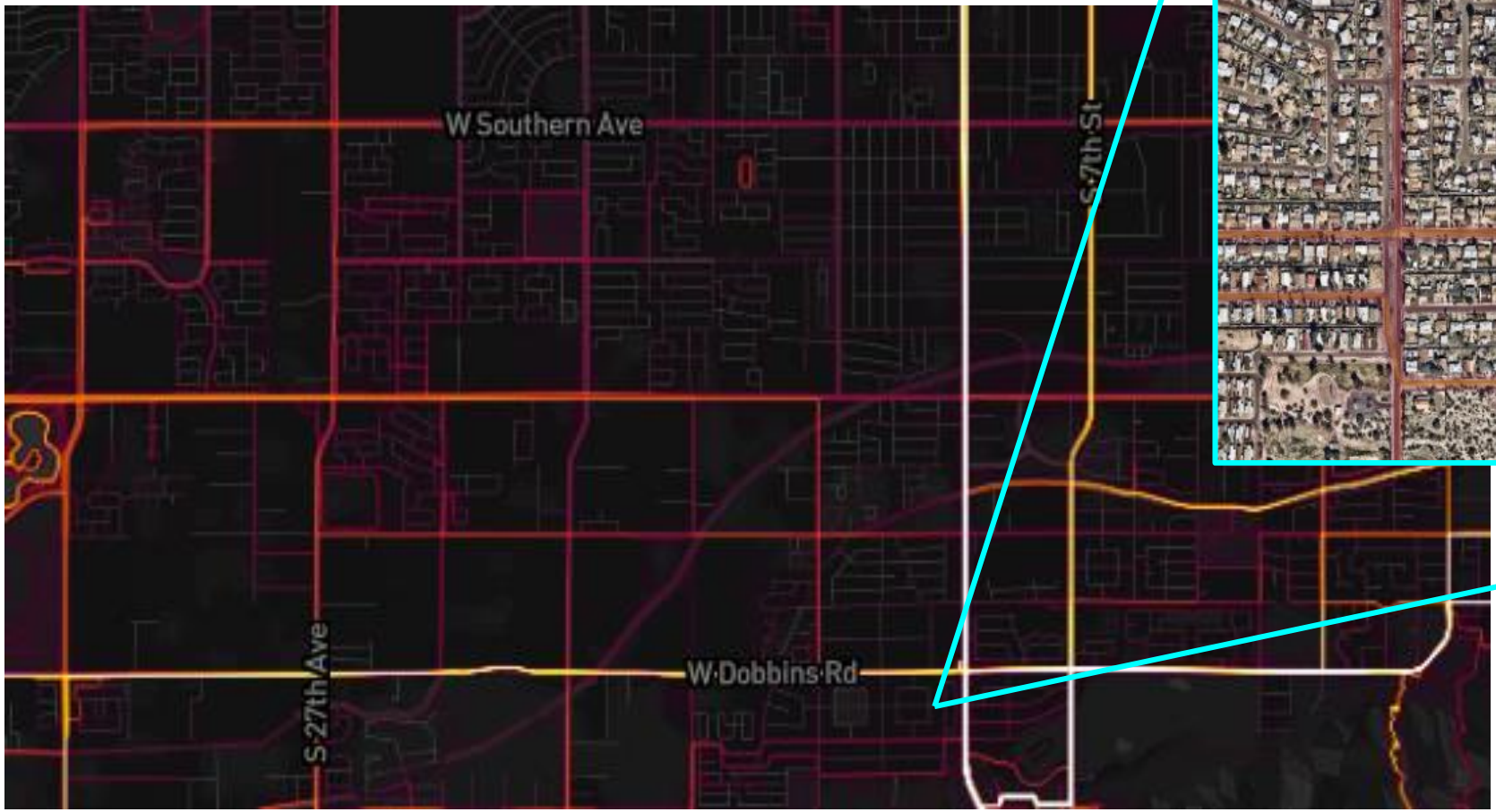
Existing Transit Lines

- Low accessibility with minimal access along Dobbins east of 7th Ave
- High accessibility with multiple lines along Central and Baseline



Pedestrian & Bicyclist Activity (strava.com/heatmap)

- Brighter = More Activity



Census Data Along Dobbins (statisticalatlas.com)

Food stamps

- 7th St to 7th Ave: 27.2%
- 7th Ave to 27th Ave: 14.7%

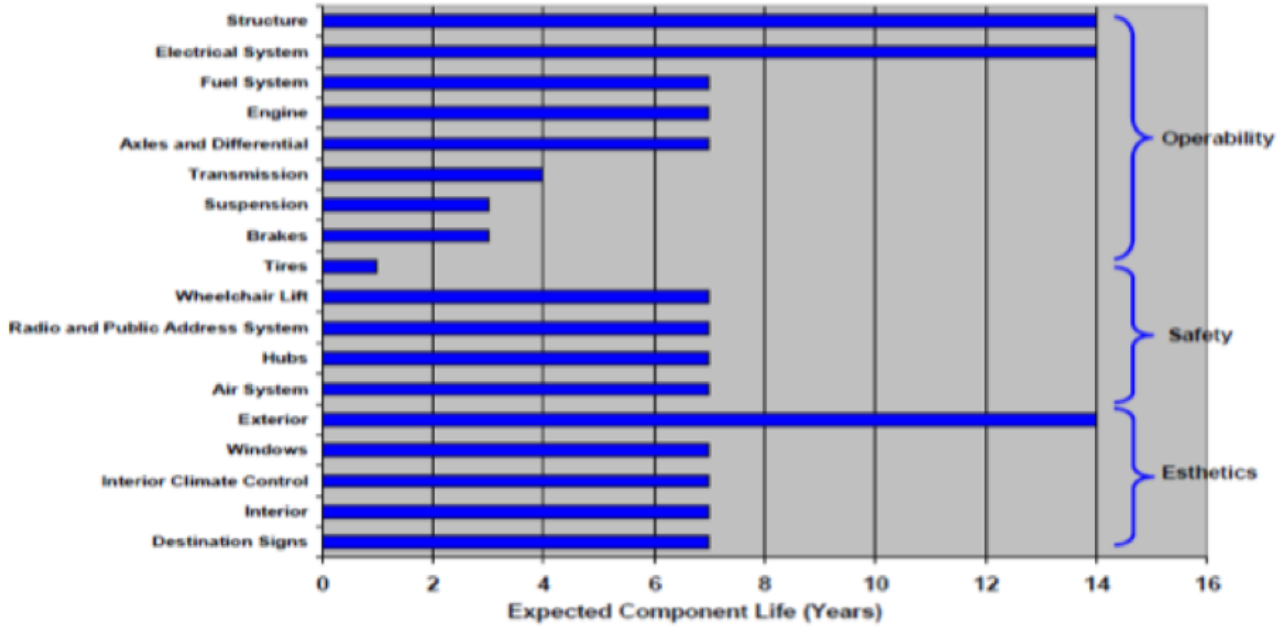
Annual Household Income (20% Percentile)

- 7th St to 7th Ave: $12,432
- 7th Ave to 19th Ave: $19,600
- 19th Ave to 27th Ave: $15,660

2050 Transportation Plan (Future)

Implementation: Sustainable Infrastructure

Proposition: Replace Aging Bus Transit with Electric Alternatives



(Source: Useful Life of Transit Buses and Vans, Report No. FTA VA-26-7229-07.1, April 2007. Figure 6-1, page 70.)

Why Electric?

- Valley Metro Bus Fleet 70% CNG/LNG
- 2016 California Foothills Transit Study Per Mile Total Maintenance Cost
  - 0.28 $/Mile CNG
  - 0.22 $/Mile Electric
- Equivalent Lifelong Cost to Standard Transit
- Little to No Impact on Public Health

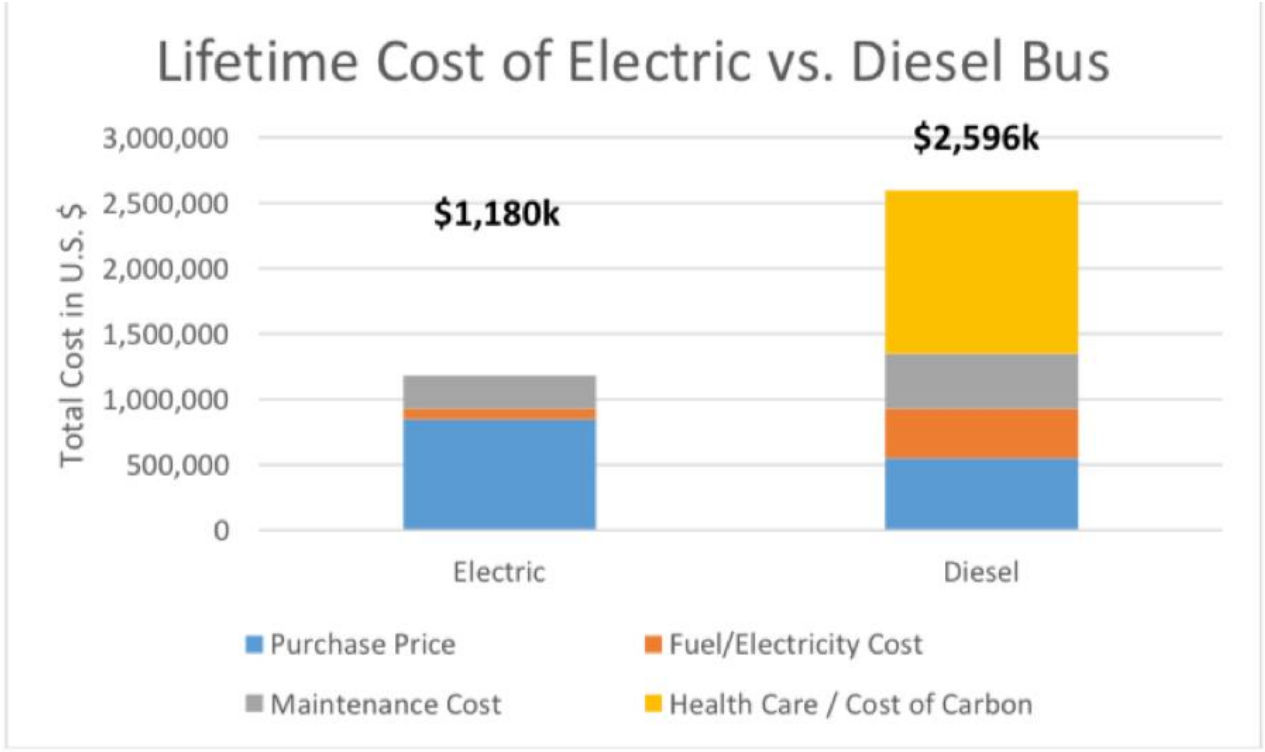


Figure 9: Lifetime Cost of Electric Buses vs. Diesel Buses in U.S. $ Including Cost Savings Associated with Health Benefits

Feasibility

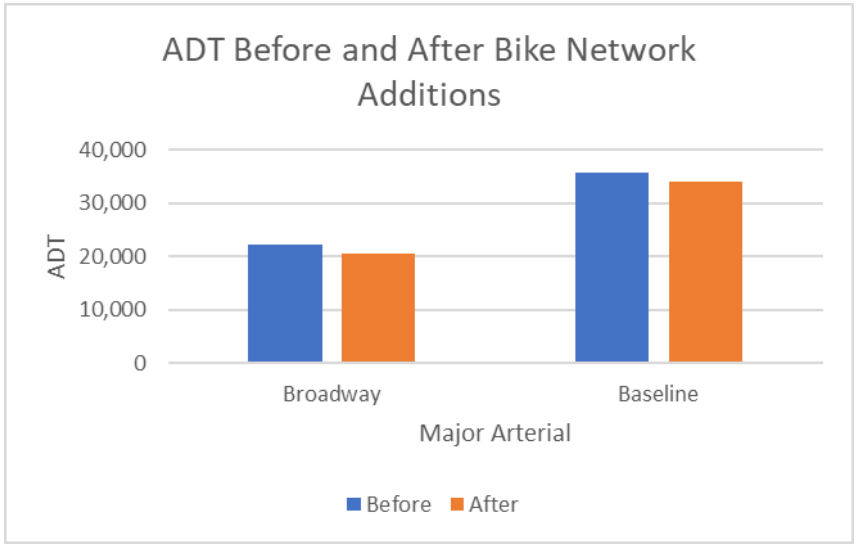
- ~$800,000 per Electric Bus
- ~$50,000 per Charging Station
- Time to Full Charge 1-4 Hours
- Federal Grants Available
  - Transit Investments for Greenhouse Gas & Energy Reduction Grant Program through FTA
  - Clean Fuels Grant Program through US DOT

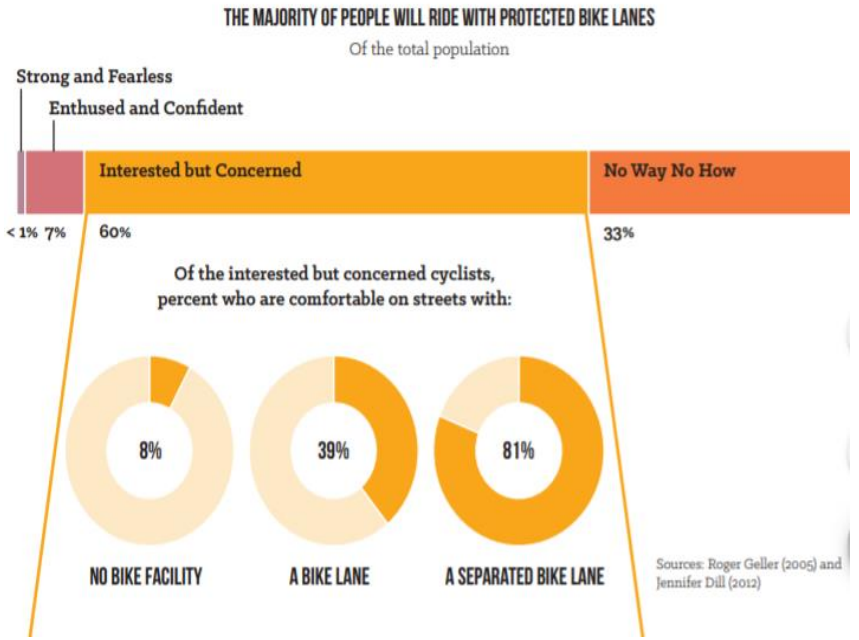
BIKE INFRASTRUCTURE

CURRENT BIKE MAP

OFF-ROAD BIKE INFRASTRUCTURE

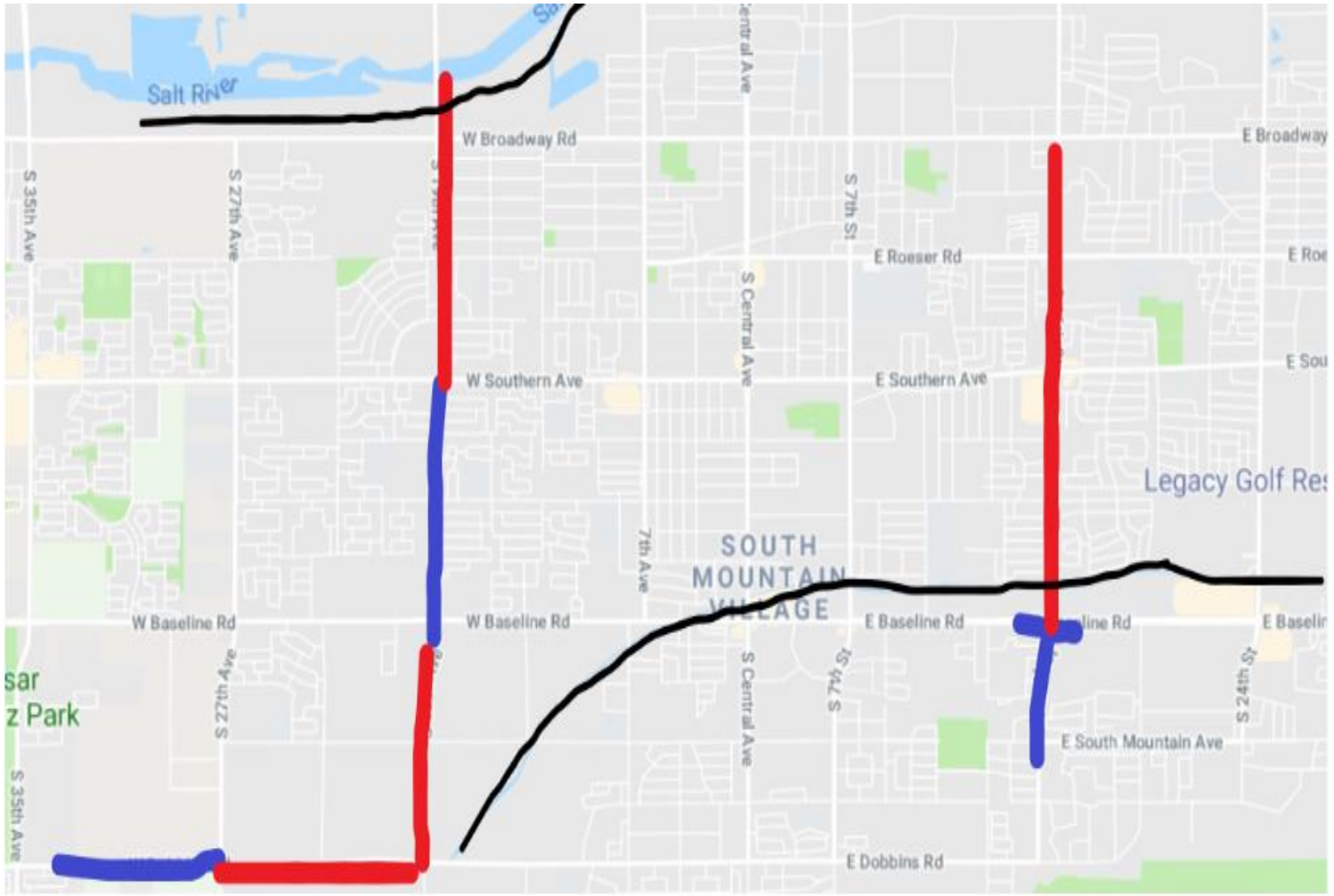
- Separated bike lanes increase ridership anywhere from 21% to 171% according to NACTO.
- 60% of people surveyed are interested in cycling but concerned about safety.
- Adding bike lanes along the Salt River and Western canal would relieve congestion by 1,564 passengers on both Broadway and Baseline





PROPOSED BIKE ADDITIONS

- Salt River Biking Network
- Western Canal Biking Network
- Bike lane connectivity for Salt River and Western Canal Paths



Existing lanes labeled in blue and proposed additions labeled in red. Black is labeled for the Salt River and Western Canal

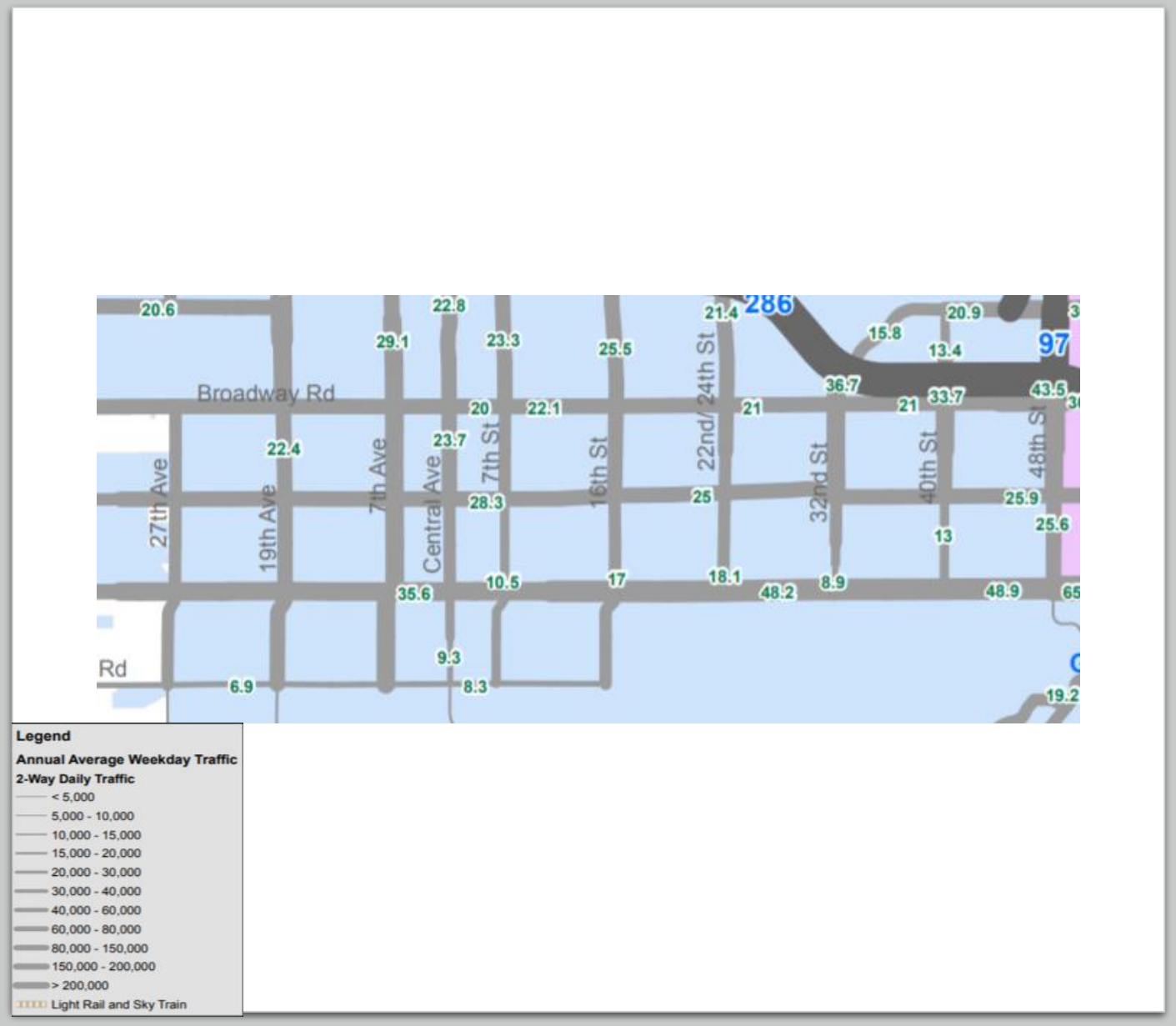
VEHICULAR INFRASTRUCTURE

Overview

- Assess existing conditions of arterial roadways
- Identify roadway deficiencies (Vehicular, Bicycles & Pedestrians)
- Provide proposed improvements
- Between 27th Ave & 48th St, South Mountain & Salt River
  - Roadways Running North-South
    - 27th Ave, 19th Ave, 7th Ave, Central Ave, 7th St, 16th St, 24th St
  - Roadways Running East-West
    - Broadway Rd, Southern Ave, Baseline Rd, Dobbins Rd

Existing Conditions

- Roadway Functional Classifications defined by City of Phoenix
  - Majority of Roadways defined as Arterials
  - 19th Ave, 7th St, & Baseline Rd defined as Major Arterials
- Roadways range from 3 lane to 7 lane sections
- 2015 Annual Average Weekday Traffic Volumes provided by MAG
- Speed & Congestion Data provided by MAG



Planning Level LOS Analysis

- Level of Service (LOS) is a qualitative measurement of a roadways quality of traffic service
- LOS is based on ADT and MCDOT acceptable service volumes based on roadway functional classification
- Based on 2015 MAG volumes all roadways operate at LOS C or better

LOS	Description
A	free flow, with low volumes and high speeds
B	reasonably free flow, speeds beginning to be restricted by traffic conditions
C	stable flow zone, most drivers restricted in freedom to select their own speed
D	approaching unstable flow, drivers have little freedom to maneuver
E	unstable flow, may be short stoppages
F	forced or breakdown flow

- Light Rail extension proposed along Central Ave to Baseline Rd
- Requires transitioning Central Ave from 4/5 lanes to 2 lanes
- Locally Preferred Alternative Report prepare in 2014
  - Decrease in volumes along Central Ave
    - Increase in Transit use
    - Increase in volumes along 7th Ave & 7th St
  - Decrease in LOS along Central Ave, 7th Ave, & 7th St

Light Rail Extension

Addition of Bike Lanes

Bike Lanes proposed

- 19th Ave (Salt River to Dobbins Rd)
  - Currently existing bike lanes in portion of corridor
  - Requires removal of 1 vehicular lane
  - LOS expected to remain at LOS C or better
- 16th St (Broadway Rd to Baseline Rd)
  - Requires removal of 1 vehicular lane
  - LOS expected to remain at LOS C or better
- Dobbins Rd (27th Ave to Western Canal)
  - Roadway widening required, existing pavement in poor condition
  - Widening would not require removal of vehicular lanes
  - LOS expected to remain at LOS C or better

Recommendations & Conclusions

- Installing Bike Lanes
  - 19th Ave (Salt River to Dobbins Rd)
  - 16th St (Broadway Rd to Baseline Rd)
  - Dobbins Rd (27th Ave to Western Canal)
- Roadway configurations that are median separated with breaks for left turns
  - Provides safer feel for bicyclists and pedestrians, encouraging these forms of travel
- Feeling of tighter roadways contribute to reducing vehicular traffic speeds.
  - Trees, Allowing on street parking

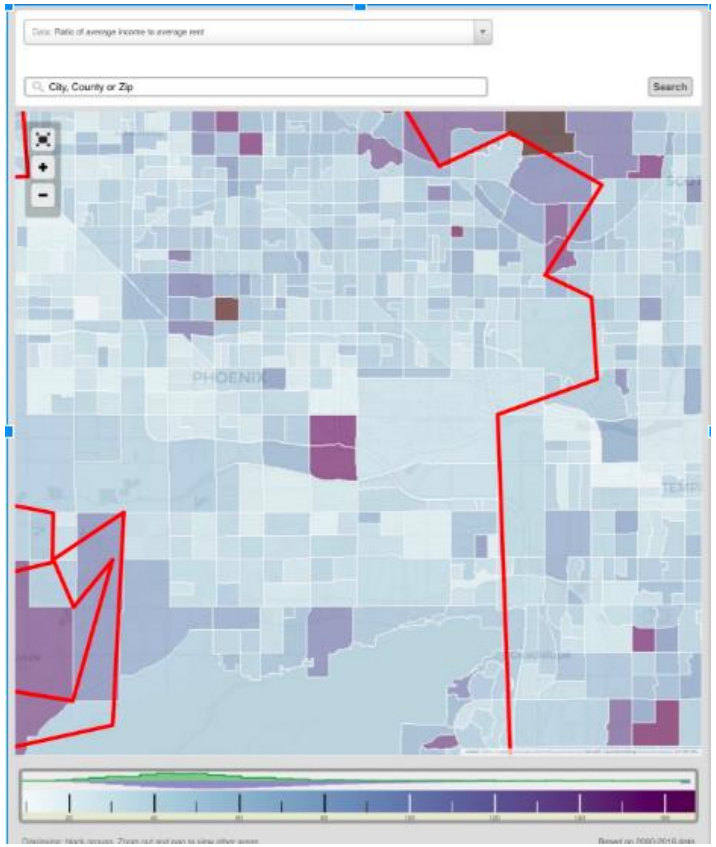
Recommendations & Conclusions Cont.

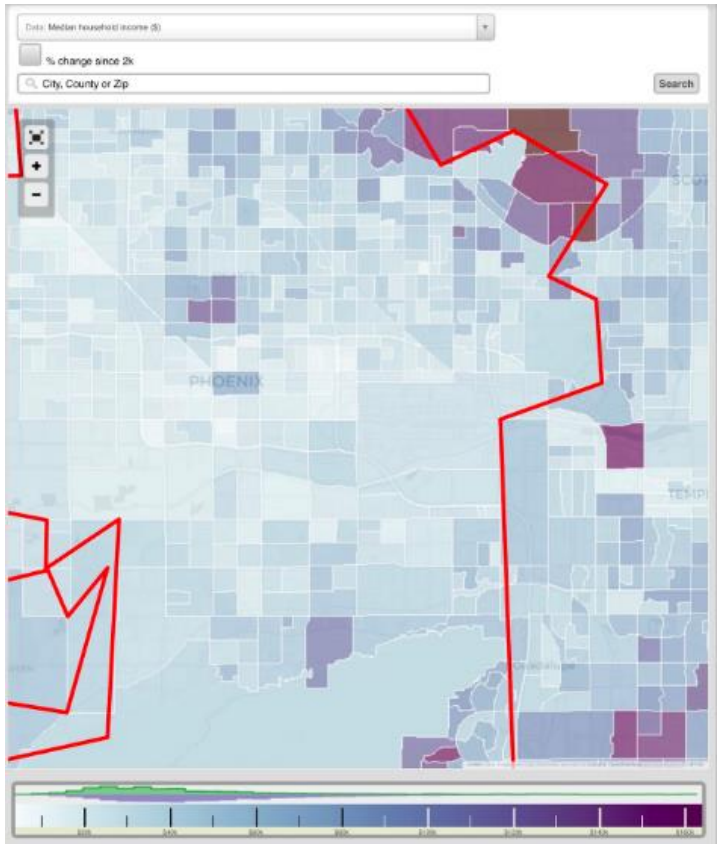
- Additional pavement marking that brings attention to bike lanes
  - Green markings, Bike symbols.
- Limiting driveway access points along roadways also
  - Reduces potential conflict points for bicyclists and pedestrians
- National Association of City Transportation Officials (NACTO) Design Guides
  - Designing streets that promote safe multimodal forms of transportation
    - Street guidelines, Bike lane guidelines, Drainage guidelines

Public Outreach & Stakeholder Involvement

Social Equity and Sustainability

- Diversity of stakeholder meetings?
- Do the stakeholders along the planned light rail extension want it?
- Gentrification?





Low Income & Renting

Recommendations

- Diverse Public Meetings
  - Various times
  - Provide food
- Neighborhood Survey
  - Transparency
- Community Cooperative

QUESTIONS

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