# ACTIVE TRANSPORTATION PERFORMANCE MEASURES

JUNE 2017

AGENDA ITEM NO. V.A.

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APPLICATIONS

RESOURCES

RTP GOALS

- ENVIRONMENT
- CONNECTIVITY
- SAFETY
- OPERATIONS
- QUALITY OF LIFE
- PRESERVATION

# APPLICATIONS

**WHY TRACK PERFORMANCE?**

## PRIORITIZATION

**Multi-criteria comparison of projects**

## EVALUATION

**Compare alternatives and scenarios**

## BENCHMARKS

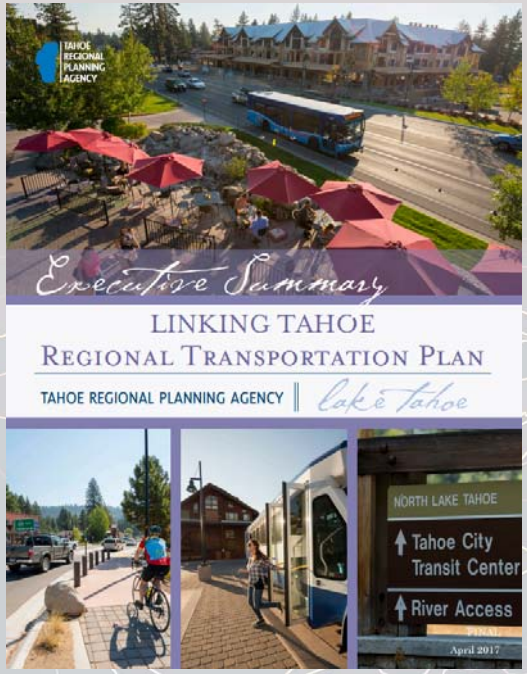
**Compare existing conditions to historic conditions**

## STANDARDS

**Accountability to set goals**

# RESOURCES

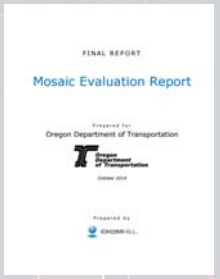
## EXISTING




Regional Transportation Plan

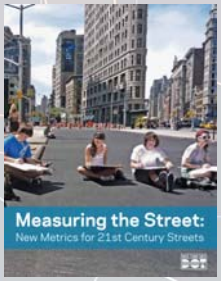
## POTENTIAL

Every Bicyclist Counts




ODOT Mosaic

FHWA Guidebook




NY DOT Metrics

RTP GOAL 1

# MEASURE: **ENVIRONMENT**

## EXISTING

- DAILY VMT EXCLUDING THROUGH TRIPS
  *TRAVEL DEMAND MODEL*
- GHG EMISSIONS/ CAPITA
  *TRAVEL DEMAND MODEL*
- VEHICLE TRIPS REDUCED BY PROJECT
  *EIP PROJECT TRACKER*
- AIR POLLUTANTS AVOIDED BY PROJECT
  *EIP PROJECT TRACKER*

## POTENTIAL

- STREET TREES/ TREE CANOPY COVERAGE
  *REMOTE SENSING OR COMMERICAL STREET INVENTORY*
- PHYSICAL ACTIVITY
  *SURVEY DATA OR SPECIFIC INDICES*

RTP GOAL 1

# MEASURE: **ENVIRONMENT**

**SPOTLIGHT**
## PHYSICAL ACTIVITY

**Sources** for physical activity data:
- Behavioral Risk Factor Surveillance System
- National Health and Nutrition Survey
- National Health Interview Survey
- California Health Interview Survey

**Measures:**
- Percent of population that is physically active (exercises at least 150 minutes per week)
- Percent of population that walks at least 150 minutes per week

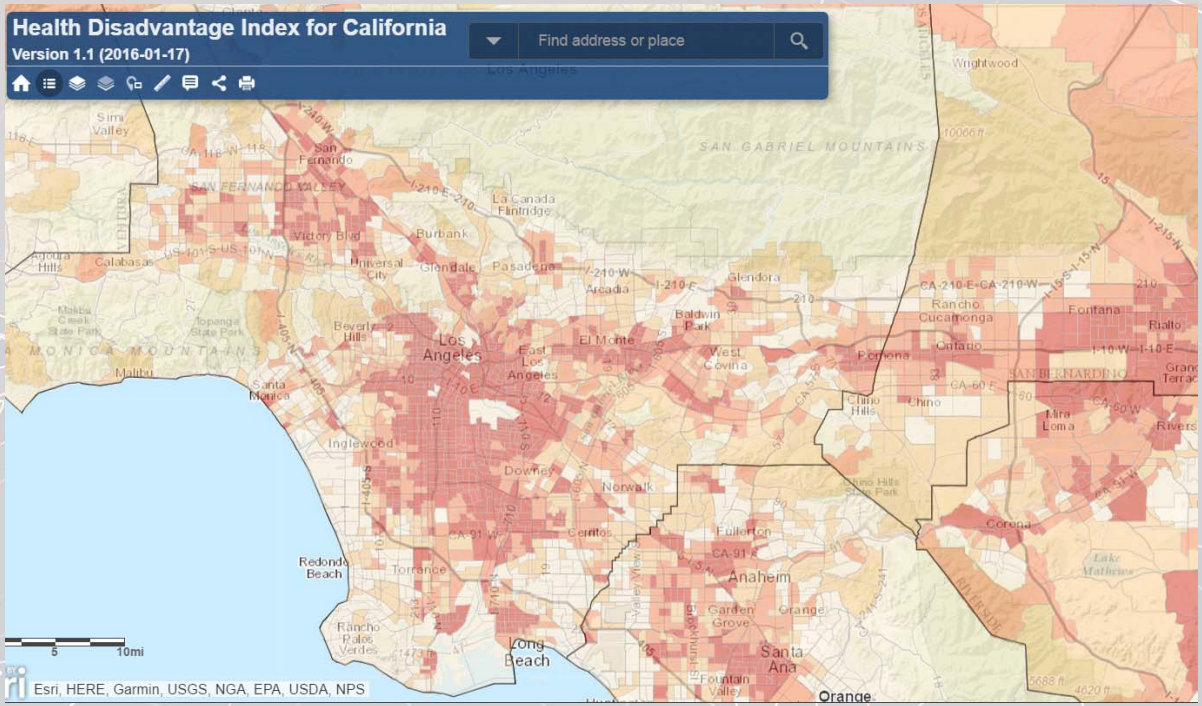
RTP GOAL 1

# MEASURE: **ENVIRONMENT**

**SPOTLIGHT**
PHYSICAL ACTIVITY

Public Health Alliance of Southern California's **Health Disadvantage Index** combines:

- Educational opportunity
- Economic resources
- Social resources
- Health outcomes
- Environmental hazards
- Tree canopy
- Park and grocery access



RTP GOAL 2

# MEASURE: **CONNECTIVITY**

## EXISTING

- **BIKE/PED MODE SHARE**
  *TRPA TRAVEL MODE SURVEY*
- **MILES OF BIKE/PED FACILITIES BUILT**
  *EIP PROJECT TRACKER*
- **BIKE/PED VOLUMES**
  *BICYCLE & PEDESTRIAN MONITORING PROTOCOL*
- **% REC. AREAS W/ BIKE/PED ACCESS**
  *GIS*
- **IMPROVES CONNECTIVITY W/IN MODE**
  *EIP PROJECT TRACKER*

## POTENTIAL

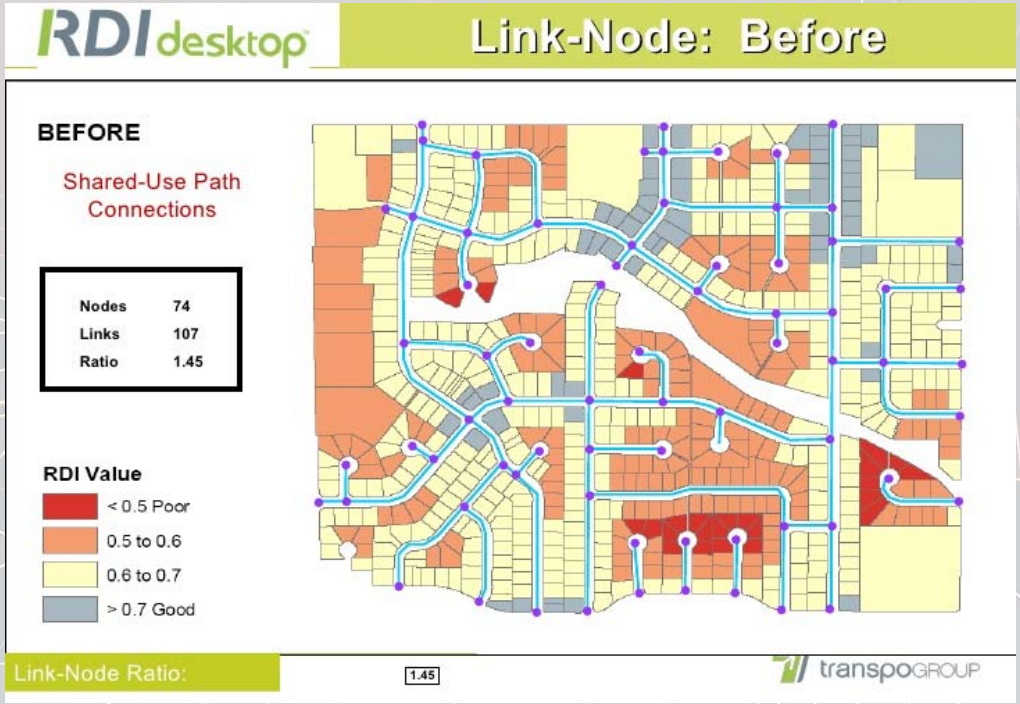
- **CONNECTIVITY INDICES**
  *CONNECTED NODE RATIO, LINK-TO-NODE RATIO*
- **CROSSING OPPORTUNITIES**
  *DISTANCE B/T INTERSECTIONS & MIDBLOCK CROSSINGS*
- **NETWORK DENSITY**
  *INTERSECTIONS, DESTINATIONS, & POLYGONS*
- **ROUTE DIRECTNESS**
  *AVOIDANCE OF OUT-OF-DIRECTION TRAVEL B/T O-Ds*
- **NETWORK COMPLETENESS**
  *% OF NETWORK THAT IS USABLE BY BIKES/PEDS*

# MEASURE: **CONNECTIVITY**

**SPOTLIGHT**
CONNECTIVITY INDICES

**Connected Node Ratio:**
Number of 3- or 4-way intersections divided by the number of 3- or 4-way intersections plus culs-de-sacs or dead ends

**Link-to-Node Ratio:**
Number of roadway links divided by the number of nodes in the network in a given area



RTP GOAL 2

# MEASURE: **CONNECTIVITY**

**SPOTLIGHT**
CONNECTIVITY INDICES

**Indianapolis MPO's**
**Bicycle Connectivity Measures:**

- **Coverage:** Houses with access to dedicated bikeway w/in 1 mile
- **Connections:** Miles of existing bikeways a new bikeway would connect to
- **Transit:** Number of transit stops w/in 0.25 miles of a bikeway
- **Barriers:** Bikeway crosses primary arterial or water body

RTP GOAL 3

# MEASURE: **SAFETY**

## EXISTING

- **BIKE/PED FATALITIES & SERIOUS INJURIES**
  *SWITRS/ NDOT*
- **PROJECT ADDRESSES MODAL CONFLICT**
  *EIP PROJECT TRACKER*
- **PROJECT ADDRESSES SECURITY ISSUE**
  *EIP PROJECT TRACKER*

## POTENTIAL

- **SYSTEMIC SAFETY/ NEAR MISSES**
  *VIDEO ANALYTICS & NATIONAL DATABASE*
- **BIKE/PED COLLISION RATES**
  *COLLISIONS/ 10K BIKE/PED COMMUTERS (FARS)*
- **AMBULANCE/ HOSPITAL DATA**
  *SUPPLEMENT REPORTED COLLISIONS*

RTP GOAL 3

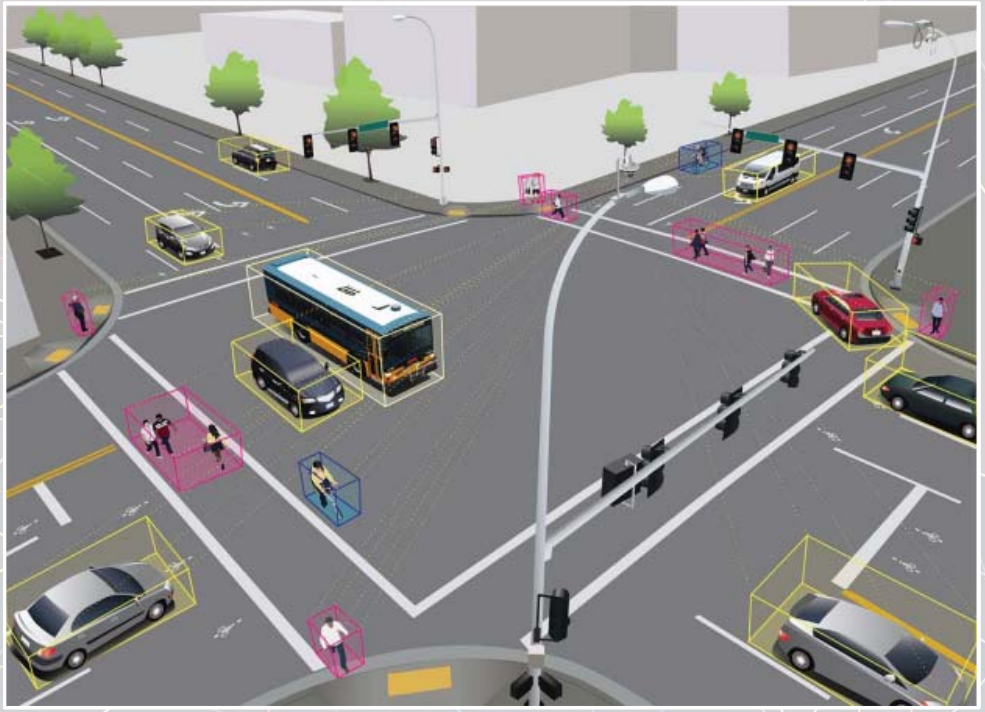
# MEASURE: **SAFETY**

**SPOTLIGHT**
## SYSTEMIC SAFETY

**Automated safety analyses** being developed by:

- Microsoft and partnering agencies
- Miovision
- Brisk Synergies

Detect **near-misses,** non-crash events, and traffic violations



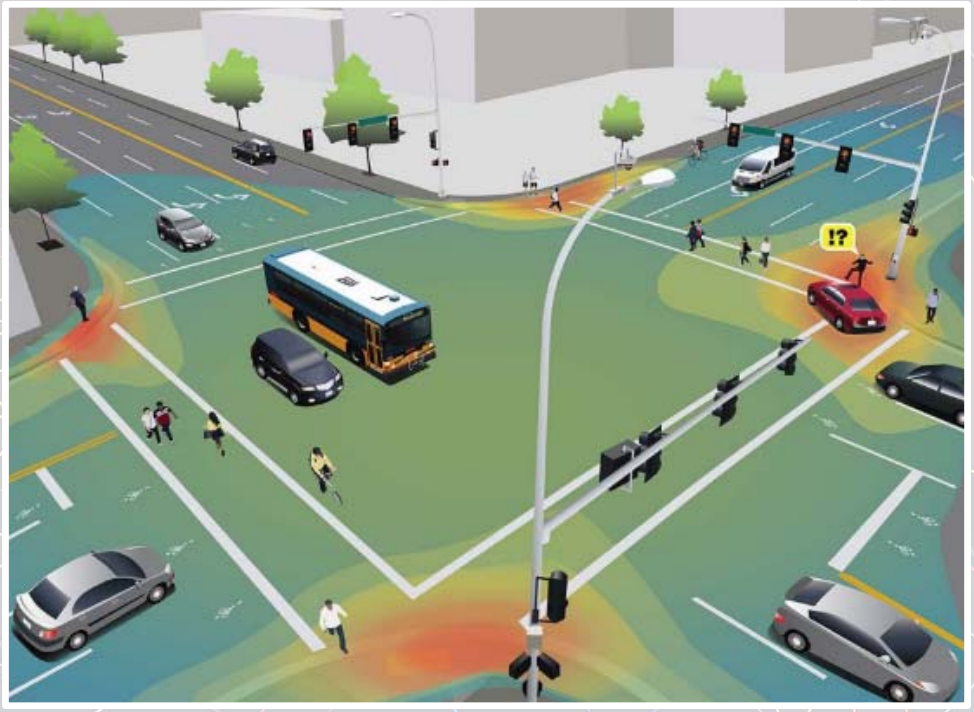
RTP GOAL 3

# MEASURE: **SAFETY**

**SPOTLIGHT**
## SYSTEMIC SAFETY

Taking **machine learning** approach to continuous traffic monitoring **video** data

Allows agencies to move **beyond just reacting** to reported collisions



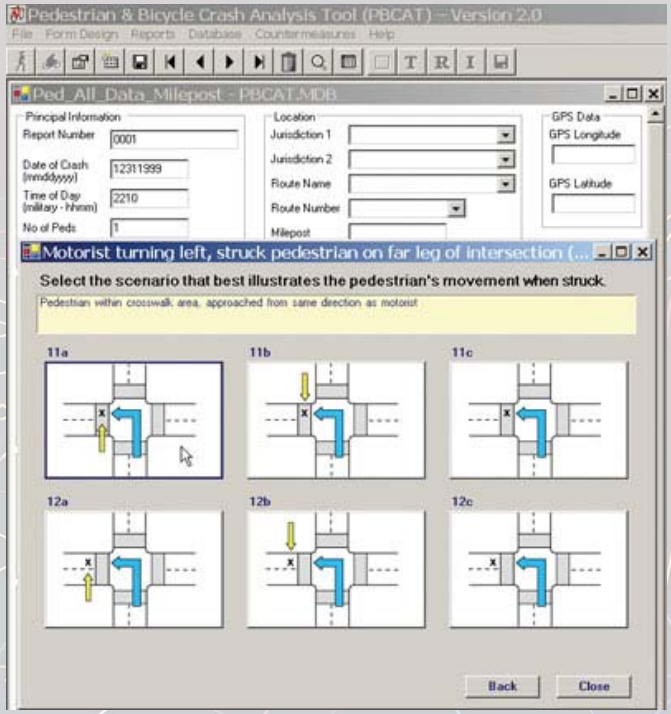
RTP GOAL 3

# MEASURE: **SAFETY**

**SPOTLIGHT**
## SYSTEMIC SAFETY

NCDOT, Metroplan Orlando, and other agencies contribute to and use the Pedestrian and Bicycle Information Center's **national database of bicyclist- and pedestrian-involved collisions**

This database helps an agency develop benchmarks and to identify **effective countermeasures** using PBCAT Version 2.0



RTP GOAL 4

# MEASURE: **OPERATIONS**

## EXISTING

**PROJECT IMPROVES LOS/ EFFICIENCY**
*EIP PROJECT TRACKER*

**EDUCATION/ INTREPRETIVE PROGRAMS**
*EIP PROJECT TRACKER*

## POTENTIAL

**NETWORK QUALITY**
*LEVEL OF TRAFFIC STRESS*

**NETWORK QUALITY**
*MULTI-MODAL LEVEL OF SERVICE*

**DELAY**
*TIME FOR BIKE/PED TO TRAVEL THROUGH INTERSECTION*

**DEDICATED BIKE/PED STAFF AND FUNDING**
*RATIO TO TOTAL POPULATION; PERCENT OF TOTAL BUDGET*

**ENCOURAGEMENT**
*ACTIVE ADVISORY COMMITTEE OR NUMBER OF EVENTS*

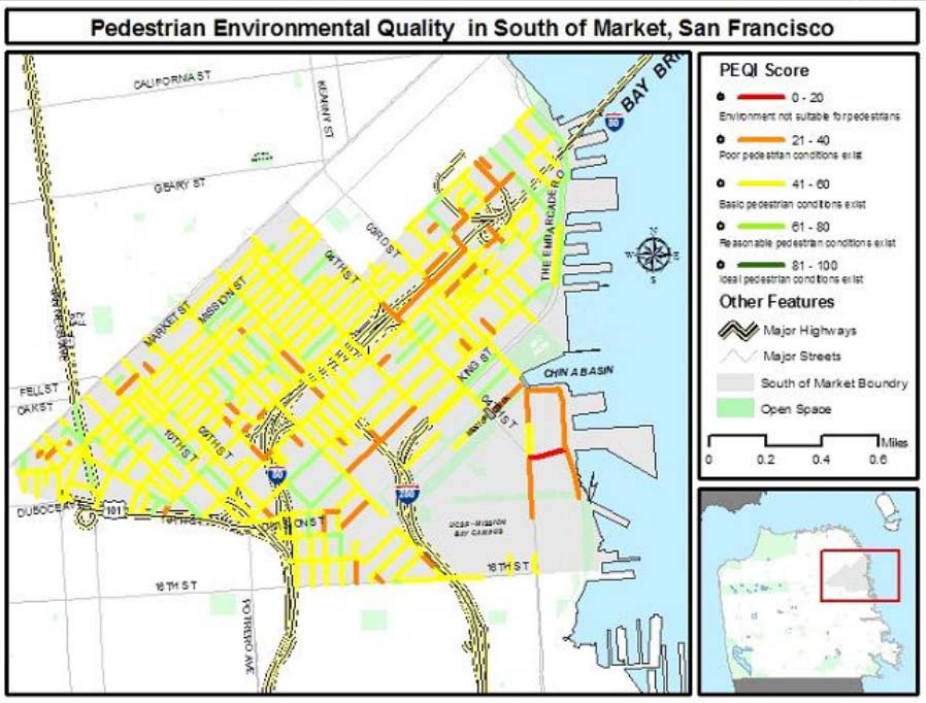
RTP GOAL 4

# MEASURE: **OPERATIONS**

**SPOTLIGHT**
MULTI-MODAL LOS

**PROS:**
- Comparable grade for all modes (A-F)
- Considers interactions between modes
- Consistent, national measure

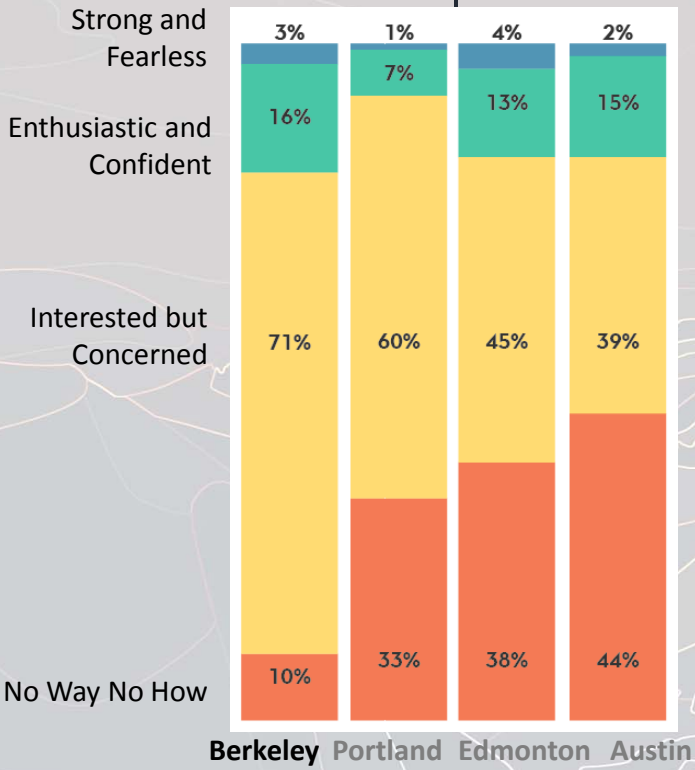
**CONS:**
- Meaning of level not clear across modes
- Models developed for arterials and collectors only
- May not be directly connected to user experience



RTP GOAL 4

# MEASURE: **OPERATIONS**

**SPOTLIGHT**
## LEVEL OF TRAFFIC STRESS




**LTS 1**
- Low Stress
- Suitable for all ages and abilities, including children

**LTS 2**
- Low Stress, with attention required
- Indicates traffic stress that most adults will tolerate

**LTS 3**
- More stressful than LTS 2
- Requires attention and suitable for adults with confidence to bicycle

**LTS 4**
- Most stressful
- Suitable only for most traffic tolerant

Types of Cyclists

Interested but Concerned

Enthusiastic and Confident

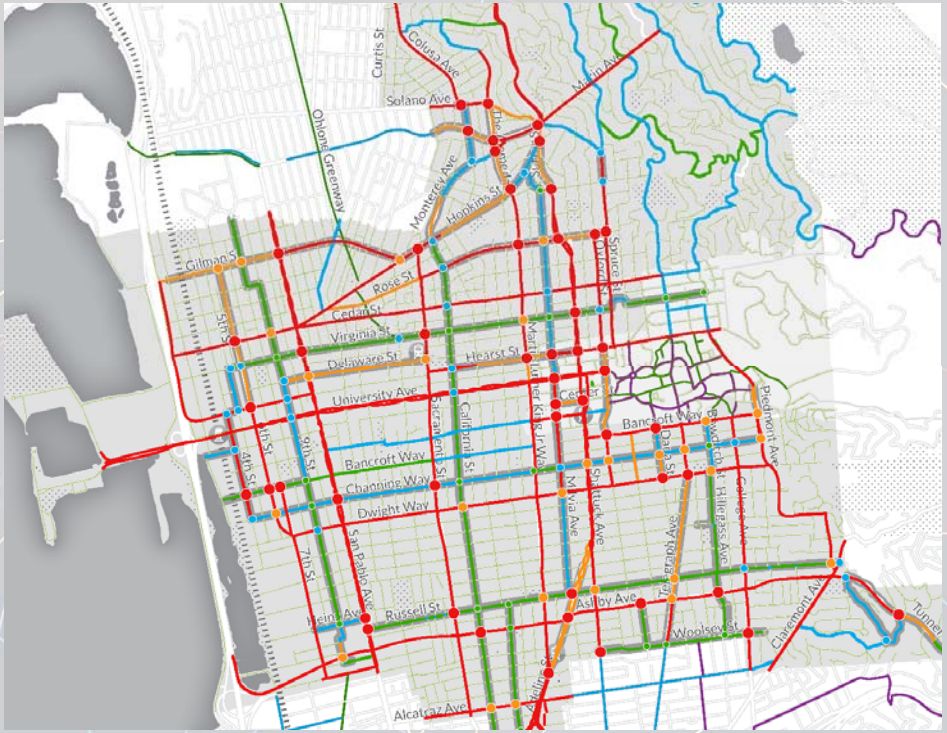
Strong and fearless

RTP GOAL 4

# MEASURE: **OPERATIONS**

**SPOTLIGHT**
## LEVEL OF TRAFFIC STRESS

Level of Traffic Stress analysis applied to the City of Berkeley



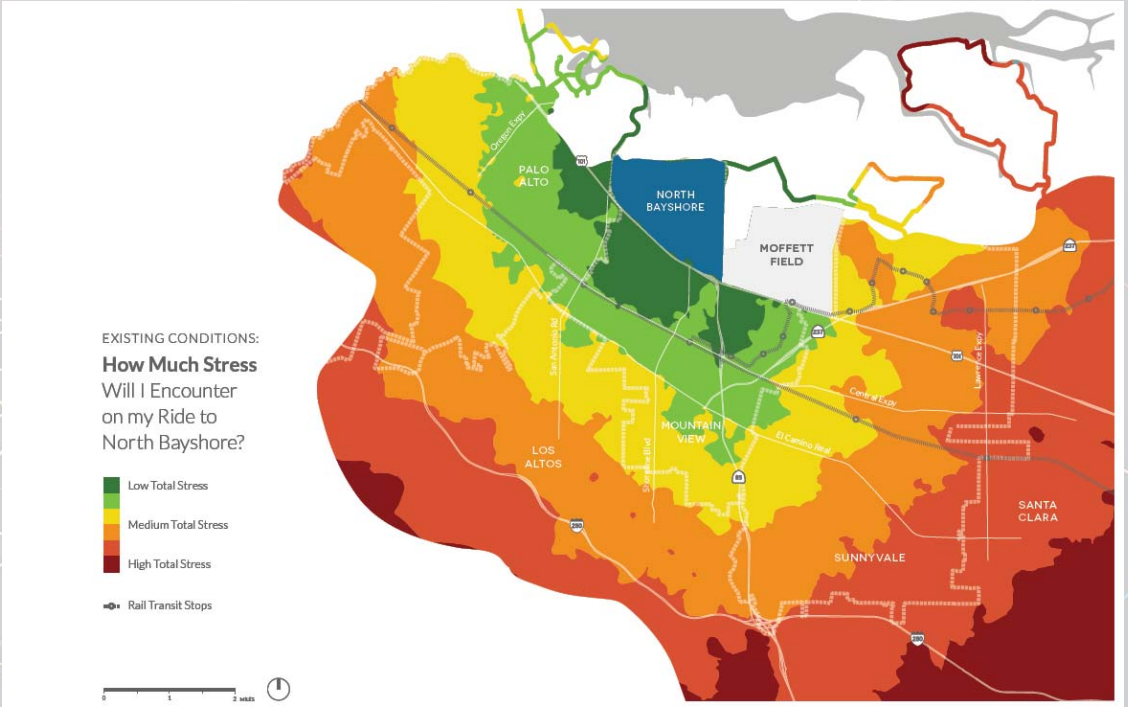
RTP GOAL 4

# MEASURE: **OPERATIONS**

**SPOTLIGHT**
## LEVEL OF TRAFFIC STRESS

More advanced approaches incorporate:

- **Total Stress Analysis:** total accumulated stress of each selected route from all origins to a specific destination
- **Average Stress Analysis:** Normalizes total stress scores by distance traveled over most likely route
- **Incremental Stress Analysis:** Normalizes total stress relative to minimum amount of possible stress
- **Network Connectivity:** Displays the bike network available to a bicyclist based on their tolerance for stressful roadway segments



RTP GOAL 5

# MEASURE: **QUALITY OF LIFE**

## EXISTING

- **TRANSPORTATION AFFORDABILITY INDEX**
  *CENTER FOR NEIGHBORHOOD TECHNOLOGY*
- **CONNECTIVITY TO TOWN CENTER**
  *EIP PROJECT TRACKER*
- **IMPROVES WALK/BIKE/LIVE-ABILITY**
  *EIP PROJECT TRACKER*
- **ACCESS TO REC. AREA/ IS A REC. AMENITY**
  *EIP PROJECT TRACKER*

## POTENTIAL

- **ACCESS TO JOBS**
  *BY MODE AND INDUSTRY*
- **AVERAGE TRAVEL TIME**
  *OR TRAVEL TIME RELIABILITY BY MODE*
- **PEDESTRIAN SPACE**
  *% OF PUBLIC R.O.W. FOR PEDESTRIAN ACTIVITIES*
- **USER PERCEPTIONS**
  *SURVEYS AND OBSERVED BEHAVIOR*
- **ECONOMIC VITALITY**
  *STOREFRONT TRACKING AND RETAIL SALES*

RTP GOAL 5

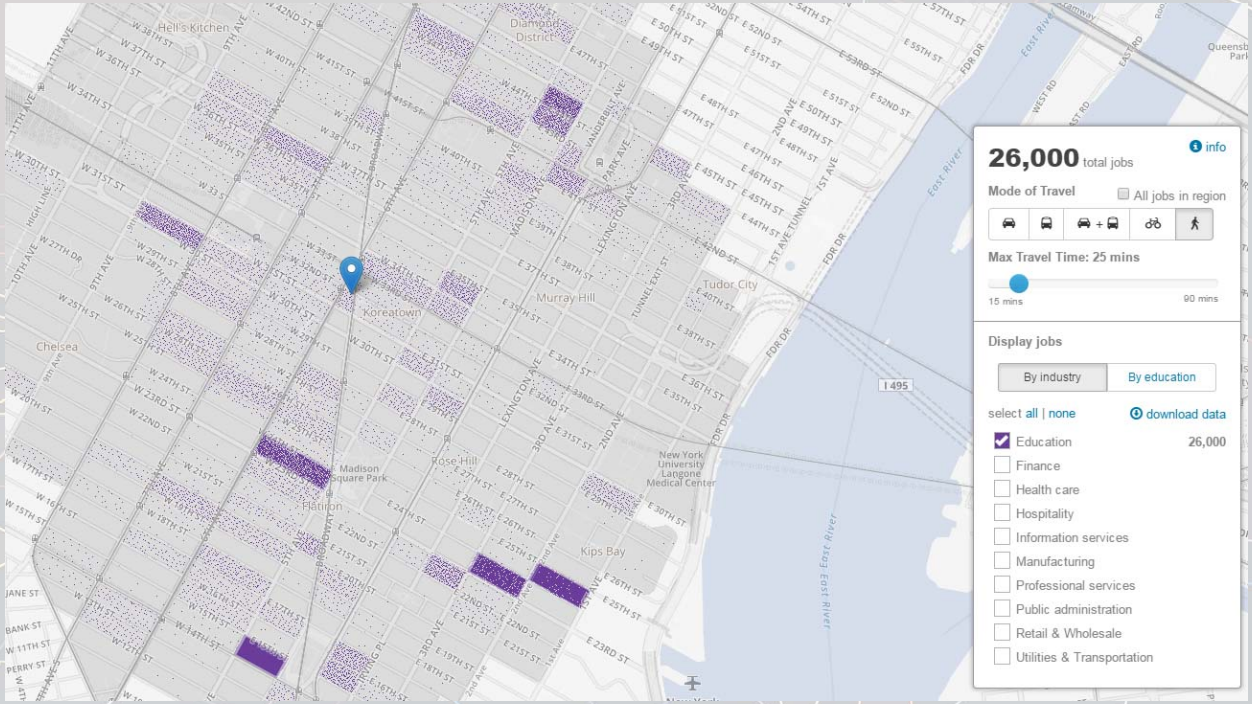
# MEASURE: **QUALITY OF LIFE**

**SPOTLIGHT**
## ACCESS TO JOBS

New York City's Regional Plan Association maps job access by **travel time, mode, and industry**

Based on **LEHD** Origin-Destination Employment Statistics

A simpler approach is the using **American Community Survey** data for commute trips less than 20 minutes



# MEASURE: **QUALITY OF LIFE**

**SPOTLIGHT**
## USER PERCEPTIONS

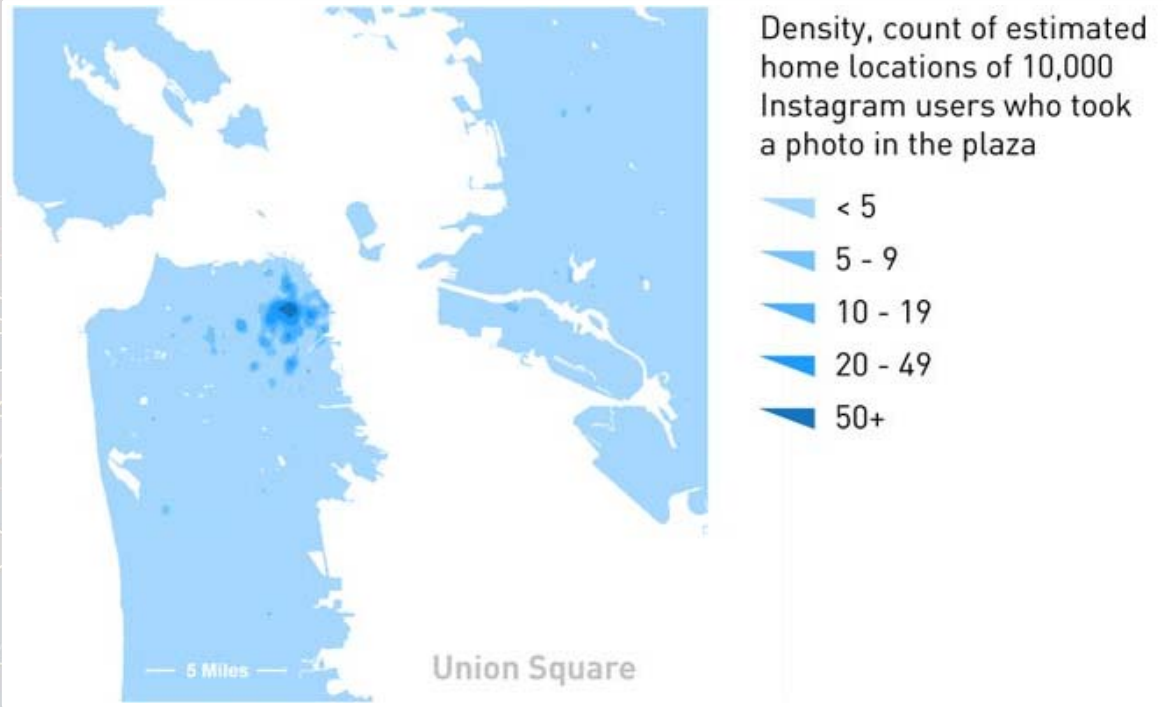
Intercept surveys to assess users **perceptions of safety**

Ex. Atlanta Regional Commission annual survey
Ex. NHTSA pedestrian and bicyclist attitude and behavior survey

or

Observed behavior

Ex. Gehl Architect's assessment of Instagram photos in public space



RTP GOAL 6

# MEASURE: **PRESERVATION**

## EXISTING

- % PAVEMENT IN GOOD CONDITION
  *MULTIPLE*
- MILES OF STREET SWEEPING
  *EIP PROJECT TRACKER*

## POTENTIAL

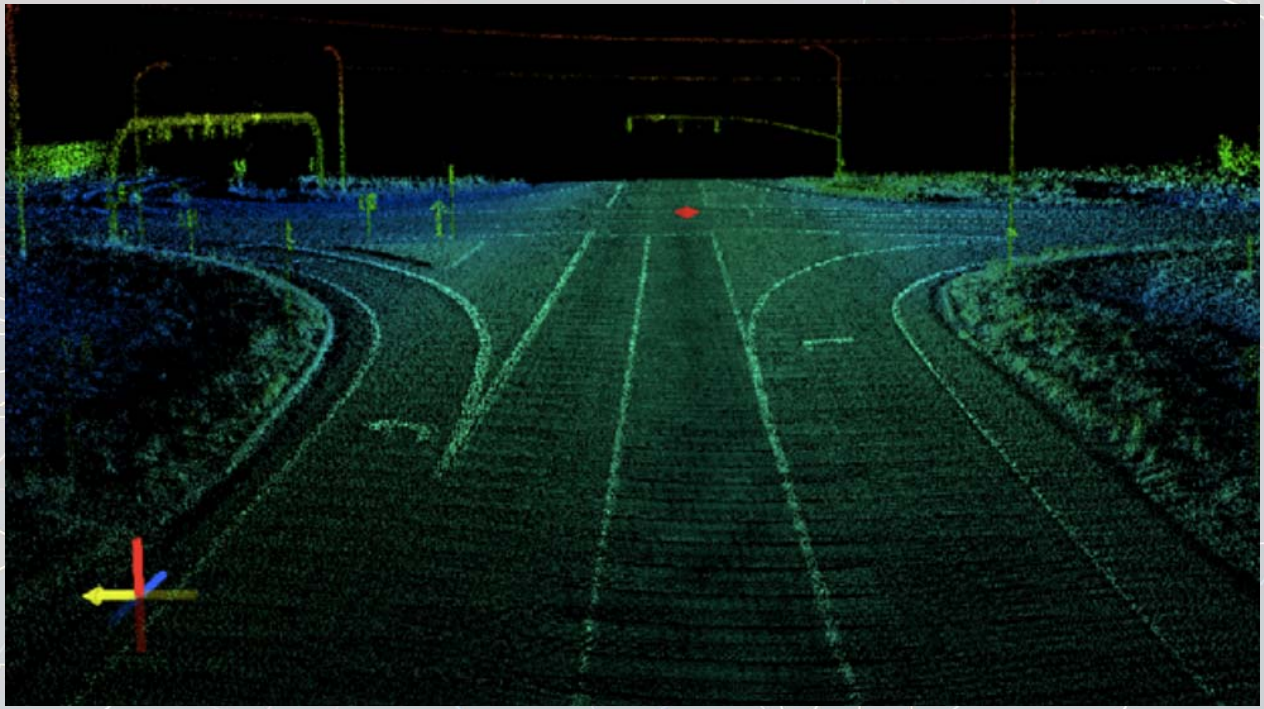
- CONDITION: BIKE/PED PAVEMENT INDEX
  *USING REMOTE SENSING*
- CONDITION: CROWDSOURCE
  *USING CROWDSOURCED NOTIFICATIONS*

RTP GOAL 6

# MEASURE: **PRESERVATION**

**SPOTLIGHT**
REMOTE SURVEYING

Utah DOT's lidar based asset management system allows them to **inventory and assess the condition** of bikeway facilities, pavement markings, and signage



# Thank You!

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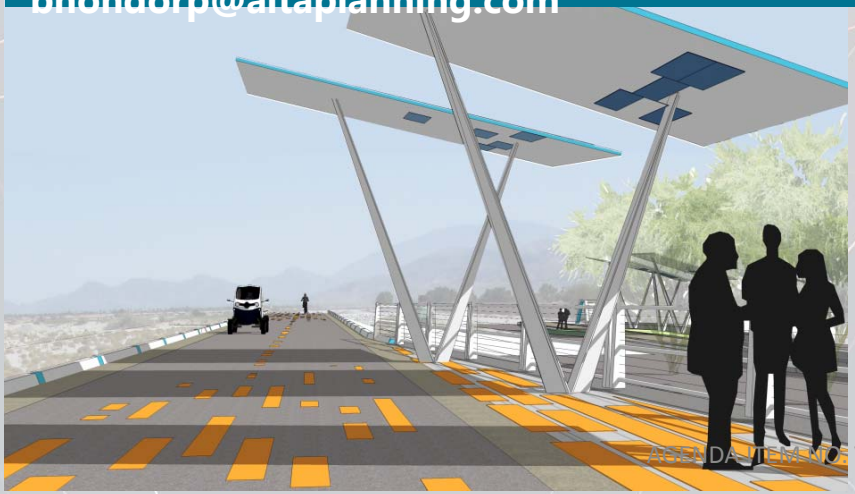
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