Measuring, Understanding and Realizing Sustainability, Livability & Social Equity

Informing Policy and Design Decisions
Knowledge is Power!!

Bruce Appleyard, PhD, AICP
Human Dynamics in a Mobile Age (HDMA) Lightning Talk
San Diego State University
San Diego, CA
November 27, 2013
Big Problem: The T LU Imbalance

“Tribal”

Local: City/County

Neighborhood

Site

Local Governments

Banks/ Financial Institutions

Developers

Realtors

Customers and/or NIMBYs

FED & STATE DOTs

Regional MPOs COGs

Land Use

Horizontal/Fragmented

Transportation

Vertical/Consolidated

Vicious Cycle

Sprawl/ Jobs-Housing Imbalance

Roads/Car Dependence

Congestion Pollution

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Congestion Pollution

Bruce Appleyard, 2007
A transportation & land use imbalance leads to auto-dependent sprawl and congestion.
...and to a sub-optimal realization of benefits from transit investments
Future Work:
Housing Energy Consumption by Location

- Concord Cooling energy (kWh/sq. ft.)
- Concord Heating Energy (kWh/sq. ft.)
- Berkeley Cooling Energy (kWh/sq. ft.)
- Berkeley Heating Energy (kWh/sq. ft.)
Fundraiser $$$

- Central role in winning research grants grossing over $2,000,000
- TCRP H-45: Measures, Methods and Strategies for Transit Corridor Livability ($350,000)
  - TCRP H-36 Reinventing the Interstate: A 'New Paradigm' for Multimodal Transportation Facilities ($400,000)
- CalTrans Smart Mobility Framework Implementation Project ($250,000)
- HUD/EPA Integrating Social Equity into Local and Regional Decision-making ($400,000)
- TCRP H-46 Quantifying Transit’s Impact on GHG Emissions and Energy Use: The Land Use Component ($350,000)
- Human Dynamics in a Mobile Age

Bruce Appleyard, PhD, AICP
Dissertation Presentation Overview

• Background

• **Measure**: New Methods Development

• **Understand**: Analysis

• **Realize**: Policy & Design Guidance

DISSEPTION: New Methods to Measure Urban Environments for Consumer Behavior Research

Bruce Appleyard, PhD
RESEARCH OVERVIEW
Estimated paths for thousands of travel survey respondents... Using new, **linear** spatial unit of analysis (Individual Access Corridor) + Finer **resolution** BE data (parcel, point, network) = Paradigm shift for Travel Behavior Research
METHODS to MEASURE: Urban Design (Perceptual Qualities)
Average Parcel Size
METHODS to MEASURE: TRANSPORT ACCESS

Route Directness
Straight-Line to Network Distance Ratio
METHODS to MEASURE: Activity

Land Use Activity: Issues Dealing with Detailed Land Use Categories

Complex land use datasets require balancing manageability and meaning (M&M).
- Simplifying land use categories for model manageability while
- Maintaining land use class integrity so results can meaningfully inform policy
Dissertation Presentation Overview

- **Background**
- **Measure**: New Methods Development
- **Understand**: Analysis
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Bruce Appleyard, PhD
**Understand:** Analysis

Modeling Methods:
Predictive Multinomial (MNL) Model of Transit Access Mode Choice

\[
P(CAR_n) = \frac{e^{V_{CAR_n}}}{e^{V_{WALK_n}} + e^{V_{BIKE_n}} + e^{V_{BUS_n}} + e^{V_{CAR_n}} + e^{V_{CARDON_n}}}
\]

Probability of a person choosing to drive to access rapid transit
## Analysis: Results

| UE Component                          | Variables                                                                 | BIKE Parameter | Robust P-value | BUS Parameter | Robust P-value | CAR Parameter | Robust P-value | CARDO Parameter | Robust P-value | WALK Parameter | Robust P-value |
|---------------------------------------|---------------------------------------------------------------------------|----------------|----------------|---------------|----------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|
| **Constant**                          |                                                                           | 3.00           | 0.00**         | -6.32         | 0.00**         | Base          | 0.845          | 0.18**         | 6.93           | 0.00**         |
| **ACCESS**                            | Transport Access/ Destination Characteristics                              |                |                |               |                |               |                |                |                |                |                |
| 1 = Parking Fees at Station           |                                                                           |                |                | -0.507        | 0.00**         | -0.260        | 0.14**         |                |                |                |                |
| 1 = Parking Fills AM Commute          |                                                                           |                |                | 0.812         | 0.00**         | -0.200        | 0.46           |                |                |                |                |
| # Bike Parking Spaces                 |                                                                           | 0.00474        | 0.00**         |                |                |                |                |                |                |                |                |
| # Parking Spaces at and ½ mile around Station |                                           |                |                | 0.000862      | 0.00**         | 0.000466      | 0.00**         |                |                |                |                |
| Est. Travel Time of Bus Trip (min.)   |                                                                           | -0.00109       | 0.96           |                |                |                |                |                |                |                |                |
| Network Distance (miles)              |                                                                           | -1.06          | 0.00**         |                |                |                |                |                | -0.0879        | 0.09**         | -4.01          | 0.00**         |
| Trans. Acc. (Design)                  | Straight-Line-to-Network-Distance Ratio (closer to 1 = more direct)       | 0.443          | 0.27           | 5.68          | 0.00**         | -0.234        | 0.57           | 3.68           | 0.00**         |
| UD/Perceptual Qs (Density)            | Average Parcel Size (10,000 sq. ft.)                                      | -1.185         | 0.01**         | 0.313         | 0.33           | -0.0218       | 0.32           | -1.109         | 0.00**         |
| Land Use Activity (Diversity)         | Retail/Wholesale                                                          | 0.583          | 0.45           | 6.66          | 0.00**         | 1.42          | 0.06**         | 0.501          | 0.42           |
| 1 = Res/Mixed Use/Small Retail        |                                                                           | 0.627          | 0.00**         | -8.26         | 0.00**         | -0.0982       | 0.62           | 0.483          | 0.00**         |
| Prop. Ed/Relig./Community Inst.       |                                                                           | -0.305         | 0.89           | -2.67         | 0.64           | -3.38         | 0.13**         | -4.47          | 0.01**         |
| Proportion Employment Centers         |                                                                           | -2.10          | 0.21           | -0.609        | 0.86           | -0.389        | 0.74           | 1.23           | 0.37**         |
| LU Activity UD/Perceptual Qs          | Proportion Parking Lot                                                    | -13.7          | 0.00**         | 12.6          | 0.17**         | -2.86         | 0.52           | -9.63          | 0.01**         |
| Proportion ROW                        |                                                                           | 0.726          | 0.20**         | 3.86          | 0.06**         | 0.926         | 0.07**         | -3.42          | 0.00**         |
| Proportion Urban Park                 |                                                                           | 2.72           | 0.32           | 2.63          | 0.63           | 4.04          | 0.02**         | 3.13           | 0.22           |
| ACCESS to Opportunity (Demographics)  | 1 = High Income (Over 75K)                                                | -0.466         | 0.00**         | -0.651        | 0.15**         | -0.0904       | 0.48           | -0.315         | 0.01**         |
| 1 = Low Income (less than 25K)        |                                                                           | 1.30           | 0.00**         | 1.30          | 0.00**         | 0.476         | 0.04**         | 0.832          | 0.00**         |
| 1 = Male                              |                                                                           | 1.39           | 0.00**         | -0.414        | 0.31           | -0.202        | 0.10**         | 0.699          | 0.00**         |
| Number of People in Household         |                                                                           | 0.0115         | 0.40           | 0.0540        | 0.61           | 0.0256        | 0.06**         | 0.0112         | 0.49           |
| 1 = "Car Available for Trip Today"   |                                                                           | -2.23          | 0.00**         | -3.03         | 0.00**         | -1.76         | 0.00**         | -2.35          | 0.00**         |
| 1 = Black or Non-White Hispanic       |                                                                           | -1.28          | 0.00**         | -0.106        | 0.80           | 0.0730        | 0.64           | -0.0390        | 0.81           |

Number of individuals: 5694  † Robust P-Values: ** < 10%; *10% to 20%
Adjusted rho-square: 0.558
Dissertation Presentation Overview

- **Background**
- **Measure**: New Methods Development
- **Understand**: Analysis
- **Realize**: Policy & Design Guidance
  - How Do We Realize Our Best Planning Ideas?
  - How do we overcome the institutional, technical, psychological barriers?

**DISSETATION**: New Methods to Measure Urban Environments for Consumer Behavior Research

Bruce Appleyard, PhD
**Human Scale**
Buildings should match the size, texture and articulation of a person walking (and bicycling). At least at the street wall.

**Enclosure:**
Buildings should be located closer to the street (emanating senses of intimacy and enclosure).

**Transparency**
Buildings should be designed so people can perceive what lies beyond the edge of public space.

**Complexity**
The texture and articulation of buildings and streets should emanate a sense of visual richness.

**Imageability**
Buildings and streets should have distinct characteristics, making them memorable and imageable.

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**REALIZE: Policy & Design Guidance**

**Parcel Size**
Small Retail/Mixed-Use
Parking Lots & Roads
Crime Locations within Transit Buffer Zone
From Academic Research to Policy Application
Human Dynamics in a Mobile Age (HDMA)

**HDMA Center for Spatial Decision Support**

- SB 375, The Sustainable Communities and Climate Protection Act of 2008, effectively mandates public GIS-based scenario planning processes statewide

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**Informing Policy and Design Decisions**

*Knowledge is Power!!*

- Applied, Entrepreneurial, Effective
- Building Partnerships: Public/Private & University Startups
  - SANDAG, Local Governments of San Diego/Tijuana Region
TCRP H-45 Livable Transit Corridors: Methods, Metrics and Strategies

Interim Panel Meeting

Christopher Ferrell, Ph.D.
Bruce Appleyard, Ph.D.
Matthew Taecker, AICP
Project Overview

- The obvious (but important) objectives:
  - Methods
  - Metrics
  - Strategies

- The not-so-obvious objectives:
  - Definitions:
    - Transit Corridor
    - Transit Corridor Livability
  - Livable Transit Corridor Typology
  - Typology/metrics “thresholds”
### Definitions: Partnership’s Livability Principles

<table>
<thead>
<tr>
<th>Partnership for Sustainable Communities' Livability Principles</th>
<th>Proposed Transit Corridor Livability Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide more transportation choices</td>
<td>High-quality transit, walking, and bicycling opportunities</td>
</tr>
<tr>
<td>Promote equitable and affordable housing</td>
<td>Equitable and affordable housing near transit</td>
</tr>
<tr>
<td>Enhance economic competitiveness</td>
<td>Transit-accessible economic opportunities</td>
</tr>
<tr>
<td>Support existing communities</td>
<td>Vibrant and accessible community, cultural, and recreational opportunities</td>
</tr>
<tr>
<td>Coordinate and leverage federal policies and investments</td>
<td>Effective corridor government and social services</td>
</tr>
<tr>
<td>Value communities and neighborhoods</td>
<td>Healthy, safe, walkable transit corridor neighborhoods</td>
</tr>
</tbody>
</table>
Identify the appropriate performance measures, data needs, and analytic approaches for each Livability Principle

From this?

- Enhance economic competitiveness
- Coordinate and leverage federal policies and investment
- Provide more transportation choices
- Promote equitable, affordable housing
- Support existing communities
- Value communities and neighborhoods

To this?

Good Governance “Ethic”
Coordinate and leverage federal policies and investment

Diagram:
- Environmental Stewardship
- Social Equity
- Economic Competitiveness

- Transportation Choices
- Regional Accessibility
- Existing Communities
- Equitable, Affordable Housing
Livability

- **People:**
  - Key to understanding livability.
  - Convert *Livability Opportunities* into *Quality of Life Outcomes*.

- **Handbook:** Methods, metrics & strategies focused on enhancing opportunities.
Stewards: Planners, Engineers, Urban Designers

Constituents: Residents, Workers & Visitors

Livability Opportunities in Public Realm (Inputs)

Quality of Life Satisfaction (Outcomes)
Livability

- People:
  - Key to understanding livability.
  - Convert *Livability Opportunities* into *Quality of Life Outcomes*.

- Handbook: Methods, metrics & strategies focused on enhancing opportunities.
Approach Overview: Typology

Partnership for Sustainable Communities' Livability Principles

Livability Opportunities (Inputs)

Transit Corridor Livability Principles
- People
- Place

Theory

Statistical Modeling

Case Studies

Livable Transit Corridor Typology

Two-Pronged Phase I Approach
- Livability Principles → Transit Corridor Context
- Literature Review → Metrics → Modeling
SMART LOCATION DATA

- New York Area
- Study Corridors with Geo-Demographic Data
SMART LOCATION DATA

- San Francisco Bay Area
- Study Corridors with Geo-Demographic Data
Corridor Types

Key Issues:
- Homogeneous corridors are rare.
Smart Mobility Framework Implementation Study

- SB 375, The Sustainable Communities and Climate Protection Act of 2008, effectively mandates public GIS-based scenario planning processes statewide.

Informing Policy and Design Decisions

Knowledge is Power!!
Study Area 1: Existing
Study Area 1: Traditional
Study Area 1: Innovative
## Recommended Performance Measures

<table>
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<tr>
<th>Performance Metric</th>
<th>Project/Purpose</th>
<th>Tool/Data</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Average Proximity to Employment (30/45 min Transit)</td>
<td>Location of priority areas (nodes) for local Ped/Bike/NEV/Transit projects &amp; regional connections</td>
<td>Travel Demand Model/ET+ (GIS)</td>
<td>SBCCOG – Should incorporate distance in addition to travel time</td>
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<tr>
<td>Average Proximity to Employment (20/45 min Drive)</td>
<td>Location of priority areas (nodes) for local Ped/Bike/NEV/Transit projects &amp; regional connections</td>
<td>Travel Demand Model/ET+ (GIS)</td>
<td>SBCCOG – Should incorporate distance in addition to travel time</td>
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<tr>
<td>Average Vehicle Occupancy (AVO)</td>
<td>Park-and-ride lots;</td>
<td>Travel/Survey Demand Model</td>
<td></td>
</tr>
<tr>
<td>Modal Travel Time and Cost</td>
<td>Transit, Bike, NEV Projects</td>
<td>Travel Demand Model</td>
<td></td>
</tr>
<tr>
<td>NEV, Bicycle, Walking Facilities</td>
<td>NEV lanes, NEV subsidies; bike lanes; PEV Readiness Plan; bike/ped improvements</td>
<td>ET+ (GIS)/ CSLOS tool</td>
<td></td>
</tr>
<tr>
<td>Percentage of Trips by Transit</td>
<td>Mobility Hub, Neighborhood vanpool, transit improvements</td>
<td>Travel Demand Model/ET+ (7D,TXD, Sketch 7)</td>
<td></td>
</tr>
<tr>
<td>Percentage of Trips by NEV</td>
<td>NEV lanes, NEV Subsidy; PEV Readiness</td>
<td>Research</td>
<td>SBCCOG – Need to include NEV mode</td>
</tr>
<tr>
<td>Percentage of Trips by Bicycling</td>
<td>Bike lanes, safe routes to school</td>
<td>Census/ACS/Research/LA Bike Model</td>
<td></td>
</tr>
<tr>
<td>Percentage of Trips by Walking</td>
<td>Livable Boulevard, safe routes to school</td>
<td>Census/ACS ET+ (7D,TXD, Sketch 7)</td>
<td></td>
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<tr>
<td>Quantities of Criteria Pollutants and GhGs</td>
<td>NEV Infrastructure &amp; Incentives</td>
<td>Travel Demand Model, EMFAC</td>
<td>Caltrans – more correlated to VHT than VMT</td>
</tr>
<tr>
<td>Vehicle Hours of Delay (VHD) or Person Hours of Delay</td>
<td>Intersection Improvements, Railroad Grade Separations, Corridor System Operations/ITS, Hwy on/off-ramps,</td>
<td>CMF Tool, Travel Demand Model, CSLOS tool</td>
<td></td>
</tr>
<tr>
<td>Vehicle Miles Traveled (VMT) or Person Miles Traveled</td>
<td>Transportation/Land Use Alternatives Analysis</td>
<td>Travel Demand Model/ET+ (7D,TXD, Sketch 7)</td>
<td>Caltrans – More useful indicator than VMT</td>
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<td>Vehicle Hours Traveled (VHT)</td>
<td>Transportation/Land Use Alternatives Analysis</td>
<td>Travel Demand Model/ET+</td>
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<tr>
<td>VMT per Capita by Speed Range</td>
<td>Transportation/Land Use Alternatives Analysis</td>
<td>Travel Demand Model</td>
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<tr>
<td>Number of Crashes</td>
<td>Transportation/Land Use Alternatives Analysis</td>
<td>SWITRS, Travel Demand Model, ET+</td>
<td>Metro – Safety is an important goal to measure</td>
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<tr>
<td>Number of Vulnerable User Crashes</td>
<td>Transportation/Land Use Alternatives Analysis</td>
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SBCCOG, ET+, GIS, CSLOS, SWITRS, CMF, EMFAC, Metro.
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<th>Performance Metric</th>
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<th>Tool/Data</th>
<th>Comments</th>
<th>Future Effort/Action (High, Medium, Low)</th>
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<tr>
<td>Travel Time by Mode</td>
<td>Transit, Bike, NEV Projects</td>
<td>Travel Demand Model, ET+</td>
<td>SBCCOG – Better indicator of system impacts than percentage of trips</td>
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<tr>
<td>Travel Distance by Mode</td>
<td>Transit, Bike, NEV Projects</td>
<td>Travel Demand Model, ET+</td>
<td>SBCCOG – Better indicator of system impacts than percentage of trips</td>
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<tr>
<td>DDI: “Destination Distance Index.”</td>
<td>NEV lanes, NEV Subsidy; PEV Readiness</td>
<td>Travel Demand Model, ET+</td>
<td>SBCCOG – This is similar to the CPI which is based on the price of a standard bundle of goods. A decreasing DDI indicates that a neighborhood is becoming more compact.</td>
<td></td>
</tr>
<tr>
<td>Average Trip Distance</td>
<td>- Priority Development Area ID</td>
<td>Travel Demand Model, ET+</td>
<td>SBCCOG / Metro – More sensitive to land use redistribution</td>
<td></td>
</tr>
<tr>
<td>Resource Impacts (largely result from the variation in land-use scenarios.)</td>
<td>- Priority Development Area ID</td>
<td>ET+ GIS</td>
<td>Metro – Indicators of fuel, land, water, etc. usage</td>
<td></td>
</tr>
<tr>
<td>Travel costs</td>
<td>- Priority Development Area ID</td>
<td>Travel Demand Model, ET+/GIS</td>
<td>Metro – Metro’s prosperity priority</td>
<td></td>
</tr>
<tr>
<td>Multi-Modal Travel Reliability</td>
<td>- Priority Development Area ID</td>
<td>Travel Demand Model, ET+</td>
<td>SBCCOG – Time variability disappears when distances become short.</td>
<td></td>
</tr>
<tr>
<td>Equitable Distribution of Impacts: Proportion of Disadvantaged Persons Impacted</td>
<td>All Projects Important for Cap &amp; Trade</td>
<td>Travel Demand Model, ET+/GIS</td>
<td>Metro – Important for Cap &amp; Trade Need to overlay census socio-demographic data</td>
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<tr>
<td>Equitable Access and Mobility: Travel Time and Cost for Disadvantaged Persons to Total Population</td>
<td>All Projects Important for Cap &amp; Trade</td>
<td>Travel Demand Model, ET+/GIS</td>
<td>SBCCOG – Important for Cap &amp; Trade Need to overlay census socio-demographic data</td>
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<tr>
<td>PEV registrations by vehicle type</td>
<td>Monitor fleet conversion from ICE to PEV</td>
<td>Polk data to track PEV registrations</td>
<td>SBCCOG – Use Polk data to track PEV registrations</td>
<td></td>
</tr>
<tr>
<td>“Transit Service Index” (TSI)</td>
<td>Compare transit inputs to service capacity and frequency</td>
<td>Travel Demand Model, ET+/GIS, Metro Operations</td>
<td>SBCCOG – allow cities and sub-regions to compare the transit inputs in the form of service capacity and frequency</td>
<td></td>
</tr>
<tr>
<td>Energy Consumption by Mode</td>
<td>- Priority Development Area ID</td>
<td>Travel Demand Model, ET+/GIS, Mode-Energy table</td>
<td>SBCCOG – VT and VMT in a ZEV is not a problem for air quality, GHG emissions or gasoline consumption</td>
<td></td>
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</table>

“What?” refers to the Meaning/Associations and Context of the performance measures.

**Meaning/Associations**
- What do the measures tell us?
- What are the *associations* measures have to policy, as well as to each other,
  - can be established from empirical research, theory, and/or practice
- For example, research tells us that accessibility/centrality is often associated with lower VMT, vehicle use
  - *Associations* can also refer how measures interact and are related to each with each other. For example, lower VMT leads to lower emissions and lower and Housing + Transportation costs.

**Context:**
- What is the environment in which these measures are being applied? What are the characteristics of the built form, transport facilities, scale (e.g., Street design, light rail facility, freeway, socio-demographics, etc.)

**Combining Associations and Context**
- For example, in an area with High Job Centrality, we should expect lower VMT. If not, than something is missing. In the case of the SBCC subregion, perhaps facilities for non-auto and/or NEV travel.

Why?

Essentially refers to the purpose of the measure. Once the meaning of the measures and the context within which they are being applied is established, attention should turn to the purpose for which the measures are used.

PURPOSE: *What is the measure going to be used for?*

- There are at least four purposes:
  - Benchmarking/Assessment (Diagnosis);
  - Policy Decision-making (Prognosis);
  - Forecasting.
  - Monitoring;

A measure can be used for all of these different purposes, at different times, and for various processes.

Who?

Refers to the agencies and stakeholders who will use these data and the decision processes in which the measures are applied.

Transportation Agencies are concerned with access along various modes and at the local and regional scale.

Municipal Governments set land use and standards for private authority over local streets and infrastructure. Municipal policies also relate to land use and other dimensions of liveability.

State Agencies have responsibility for complementary policies pertaining to transportation, housing, the environment, economic development, and social services.

Private Developers and business interests deliver most non-government investments, including most forms of development within regulatory limits and procedures.

Advocacy Groups represent an array of concerns that may focus on a locale (for example, community groups) or a specific interest (such as affordable housing or bicycling).

Community Members who live or work in the areas are central stakeholders, regardless of whether they are represented by an organization.
SMF/CSPP Measure Framework to Guide Land Use & Transportation Decisions

**Decision Process Prognosis**

- **Transportation**
  - Subregional: Ped/Bike/NEV/Transit Connections to C & D Nodes

**Key Inputs Diagnosis**

- **Centrality (Job Access)**
  - **Population Density (CSPP) (SMF: Community Design)**
- **B: High Job Access Low Population**
  - Land use: Zone & Build More Housing
- **A: Low Job Access High Population**
  - Land Use Zone and Attract More Jobs

**Outcomes/Benefits/ Monitoring**

- Consistency with SCAG Sustainable Communities Strategy
- Acres of Land Consumed
- VMT Reduction Due to Land Use Strategy
- Percentage of Trips by Cycling, Walking, NEV, Transit
- VMT per Capita by Speed Range Relative to State and Regional Goals
- Quantities of Criterion Pollutants and GHG's
- Modal Travel Time and Cost between Representative Locations
- Average Vehicle Occupancy
In considering working with separate land use categories, it makes sense to simplify the group from 72, to a more manageable amount of land use categories. This research employed a heuristic process to group various land use classes on several key dimensions as follows:

- Experiential Aggregation
- Purpose
- Proximity
- Institutional Influence

Compare:
- Coffee Shop
- Bar
- Golf Course

Compare:
- Bar
- Golf Course

Job Access Via Transit (Jobs within 30 Minutes)

Illustration of how Livability Metrics are used to Guide Strategies:

Emerging Corridors => Transitioning Corridor Case Example

Facilitate Collaboration

MPO

Production of Metric | Use of Metric | Action upon Metric | Outcome
--- | --- | --- | ---
Job Access Via Transit (Jobs within 30 Minutes) | Transit Planner | High Job Access? | Yes
- More transit

Land Use Planner | High Job Access | Yes
- Zone For More Housing

Local Traffic Engineer/Planner | Low Job Access | No
- Zone For More Jobs

High Job Access? | Yes
- Ped/Bike/Transit Facilities

Sufficient Affordable Housing? | Yes
- Achieve High Job Access Along Corridor
Essential Measures for Land Use/Transportation Strategy Decisions

Region Access

Responsibility to Act upon Measures

Walkability

Transportation Infrastructure & Incentives

Fed/State/Regional Incentives For Development

Local Perspective

Local Governments

• Target growth into PDAS
• Zoning FBC
• Zone for greater share of Affordable Housing

Banks/Financial Institutions

Developers

Realtors

Customers

LEMs

FED & Caltrans

PMs:

Jobs/Housing Balance

Incentives:

Target ped/bike/transit infrastructure $ into PDAs

Who Acquires/Calculates Regional Accessibility Responsibility to Act upon Measures?

Regional Perspective

Regional Location of Jobs/housing

Density

Diversity

Design

Transit Oriented Development

Accessible Affordable Housing (near transit)

Housing Affordability

Housing & Transportation Index

Occ. Matched Jobs Within 30’ of Transit & 20’ Auto of Low-income Housing

Regional Accessibility Jobs Within 30’ of Transit & 20’ Auto

Demand:

Local Accessibility

Network Walkscore

Transit Score

Supply:

Intersection Density

Transit LOS

Transit Access

Flexible, Inclusive Zoning

Developer Incentives

• Transit trips per capita
• Workers commuting by transit, bicycle, or foot
• Vehicle miles traveled per capita

Number of Affordable homes and rental units
Near employment centers and/or well-served by transit

Affordable Housing Incentives
Big Solution: Transport/Land Use Coordination For Realizing Sustainability Livability and Equity “Beyond Tribes”
Metro Countywide Sustainability Planning Policy

PUBLIC REVIEW DRAFT

July 11, 2012

Figure 2.1 Principles and Priorities

Connect People and Places
- Access. Better integrate land-use and transportation planning to reduce trip lengths and increase travel choices.
- Prosperity. Reduce transportation costs for residents and provide the mobility necessary to increase economic competitiveness.
- Green Modes. Promote clean mobility options to reduce criteria pollutants, greenhouse gas emissions, and dependence on foreign oil.

Create Community Value
- Healthy Neighborhoods. Improve public health through traffic safety, reduced exposure to pollutants, and design for walking and biking.
- Community Development. Design and build transportation facilities that promote infill development, build community identity, and support social and economic activity.
- Urban Greening. Enhance and restore natural systems to mitigate the impacts of transportation projects on communities and wildlife.

Conserve Resources
- Context Sensitive. Build upon the unique strengths of Los Angeles County’s communities through strategies that match local and regional context and support investment in existing communities.
- System Productivity. Increase the efficiency and ensure the long-term viability of the multimodal transportation system.
- Environmental Stewardship. Plan and support transportation improvements that minimize material and resource use through conservation, re-use, re-cycling, and re-purposing.
SMF/CSPP Measures to Guide Land Use & Transportation Decisions

Decisions

Key Inputs

Centrality (Job Access)

Population Density (SMF: Community Design)

A: Low Job Access High Population

B: High Job Access Low Population

Transportation
Subregional: Ped/Bike/NEV/Transit Connections to C & D Nodes

Land use: Zone & Build More Housing

Land Use: Zone and Attract More Jobs

C & D High Job Access High Population

Transportation
Local AND Subregional Priority for Ped/Bike/NEV/Transit

Outcomes/Benefits/ Monitoring

Consistency with SCAG Sustainable Communities Strategy
Acres of Land Consumed
VMT Reduction Due to Land Use Strategy
Percentage of Trips by Cycling, Walking, NEV, Transit
VMT per Capita by Speed Range Relative to State and Regional Goals
Quantities of Criterion Pollutants and GHG’s
Modal Travel Time and Cost between Representative Locations
Average Vehicle Occupancy

Key Inputs

Average Proximity to Employment (30 min Transit)
Average Proximity to Employment (20 min Drive)
NEV, Bicycle, Walking Facilities

Outcomes/Benefits/ Monitoring

Consistency with SCAG Sustainable Communities Strategy
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Toward a Livability Ethic to Guide Planning and Design Decisions

- “pursuit of happiness”

- Livability could be:
  - A collection of People and Place Opportunities for individuals to pursue a satisfying quality of life...

- But there should be an ethic.

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- Opportunity Indicators
- Vulnerability Indicators
- Socio-Demographic Indicators
Big Solution: Multiple Perspectives For Realizing Livability and Equity “Beyond Tribes”
### Major Themes

- **Walkability (bikability)**
- **Transit Access**

### Easy to Gather, Useful measures

<table>
<thead>
<tr>
<th>Demand</th>
<th>Local Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network walkscore</td>
<td>Network transit score</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supply</th>
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<tbody>
<tr>
<td>Intersection Density</td>
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<td>Transit LOS</td>
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### Regional Location of Jobs/housing (Lower VMT, etc.)

- **Regional Accessibility Jobs Within 30’ of Transit & 20’ Auto**

### Accessible, Affordable Housing (near transit)

- **Number of Affordable homes and rental units Near employment centers and/or well-served by transit**

### Housing Affordability

- **Housing & Transportation Cost Index (CNT/CTOD/RA)**

### Economic Competence (Operation and reliability)

- “Person Mobility Index”, VHT/per cap, TTI
Transportation

Who Acquires/Calculates
Regional Accessibility Measure

Information
- Land use employment data
- Transportation facility and operations

Knowledge: Research Tested
- Regional Accessibility
- Indicator, Performance Measure

Context: Community Target Setting
- Jobs Within 30' of Transit & Auto

Regional Accessibility Measure

Knowledge Transfer

Regional Accessibility

Responsibility to Act upon the PM

Regional Perspective
- Local Government

Transit Oriented Development
- Density
- Diversity
- Design

Land Use

Transportation

Regional Accessibility Measure

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SMF Place Types

1. Urban Centers
2. Close-in Compact Communities
3. Compact Communities
4. Suburbs
5. Rural Towns
6. & 7. Agricultural & Protected Lands

Stronger Community Design

Stronger Regional Accessibility

Goal
Metro Countywide Sustainability Planning Policy
PUBLIC REVIEW DRAFT
July 11, 2012

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Study Area 1: Innovative
Update on Evaluation

Outputs

Dashboard

Scorecard

ET+ Model Data

SCAG RTP/SCS Model

Literature Review / Research
Dashboard

Smart Mobility Framework: Dashboard Results

Existing
- Walk: 13%
- Transit: 23%
- Bicycle: 1%
- Other: 2%
- NEV: 1%

Vehicle Trips: 62%

Traditional
- Walk: 15%
- Transit: 24%
- Bicycle: 2%
- Other: 3%
- NEV: 1%

Vehicle Trips: 58%

Innovative
- Walk: 18%
- Transit: 26%
- Bicycle: 3%
- Other: 5%
- NEV: 2%

Vehicle Trips: 51%

NEV Ownership (percent of population)
- Existing: 10%

NEV Use due to innovative land use and transportation policy (as percent of VMT)
- Existing: 35%

Bicycle Ridership due to innovative land use and transportation policy (percent reduction of per capita VMT)
- Existing: 35%

Daily VMT
- Existing: 25,867,434.81
- Traditional: 23,905,434.81
- Innovative: 19,300,000.00

Transportation Carbon Emissions (CO2)
- Existing: 12,889,092,992
- Traditional: 11,911,477,681
- Innovative: 9,616,705,227
Smart Mobility Framework: Dashboard Results

**Existing**
- Vehicle Trips: 62%
- NEV: 1%
- Transit: 23%
- Bicycle: 1%
- Other: 2%

**Traditional**
- Vehicle Trips: 58%
- NEV: 1%
- Transit: 24%
- Bicycle: 2%
- Other: 3%

**Innovative**
- Vehicle Trips: 51%
- NEV: 2%
- Transit: 26%
- Bicycle: 3%
- Other: 5%

**NEV Ownership (percent of population)**: 10%
**NEV Use (as percent of VMT)**: 35%
**Bicycle Ridership (percent reduction of per capita VMT)**: 35%

**Daily VMT**: 30,000,000.00

**Transportation Carbon Emissions (CO2)**
Dashboard

- **NEV Ownership (percent of population):** 10%
- **NEV Use (as percent of VMT):** 35%
- **Bicycle Ridership (percent reduction of per capita VMT):** 35%

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<thead>
<tr>
<th>Measure</th>
<th>Existing</th>
<th>Traditional LU</th>
<th>Innovative LU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Proximity to Employment (within 30 min drive)</td>
<td>24.1%</td>
<td>C+</td>
<td>B-</td>
</tr>
<tr>
<td>Average Proximity to Employment (within 45 min transit)</td>
<td>?</td>
<td>C- (xx.yy)</td>
<td>A-</td>
</tr>
<tr>
<td>Average Vehicle Occupancy</td>
<td></td>
<td>D+</td>
<td>B+</td>
</tr>
<tr>
<td>Modal Travel Time and Cost*</td>
<td></td>
<td>D+</td>
<td>B+</td>
</tr>
<tr>
<td>NEV, Bicycle, Walking Facilities</td>
<td></td>
<td>D-</td>
<td>B-</td>
</tr>
<tr>
<td>Percentage of Trips by Transit</td>
<td></td>
<td>C+</td>
<td>B-</td>
</tr>
<tr>
<td>Percentage of Trips by NEV</td>
<td>0</td>
<td>D-</td>
<td>C-</td>
</tr>
<tr>
<td>Percentage of Trips by Bicycling</td>
<td></td>
<td>D+</td>
<td>C-</td>
</tr>
<tr>
<td>Percentage of Trips by Walking</td>
<td></td>
<td>C-</td>
<td>A-</td>
</tr>
<tr>
<td>Quantity of Criteria Pollutants</td>
<td></td>
<td>C-</td>
<td>B-</td>
</tr>
<tr>
<td>Vehicle Hours of Delay</td>
<td></td>
<td>C-</td>
<td>B-</td>
</tr>
<tr>
<td>Vehicle Miles Traveled (VMT)</td>
<td></td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>Vehicle Hours Traveled</td>
<td></td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>VMT per Capita by Speed Range</td>
<td></td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>Number of Crashes</td>
<td></td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>Number of Vulnerable User Crashes</td>
<td></td>
<td>C</td>
<td>B-</td>
</tr>
</tbody>
</table>

Grades are based on improvement over existing conditions.
# Study Area 2: Score Card

<table>
<thead>
<tr>
<th>Measure</th>
<th>Existing</th>
<th>Traditional LU</th>
<th>Innovative LU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Landuse: B-</td>
<td>Transportation: C</td>
<td></td>
</tr>
<tr>
<td>Average Proximity to Employment</td>
<td>19.6%</td>
<td>C-</td>
<td>A-</td>
</tr>
<tr>
<td>(within 30 min drive)</td>
<td></td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>Average Proximity to Employment</td>
<td>1.4%</td>
<td>C- (xx.yy)</td>
<td>B-</td>
</tr>
<tr>
<td>(within 45 min transit)</td>
<td></td>
<td>B</td>
<td>A-</td>
</tr>
<tr>
<td>Average Vehicle Occupancy</td>
<td>?</td>
<td>D+</td>
<td>B+</td>
</tr>
<tr>
<td>Modal Travel Time and Cost</td>
<td>Model</td>
<td>D+</td>
<td>B+</td>
</tr>
<tr>
<td>NEV, Bicycle, Walking Facilities</td>
<td>Low/Med</td>
<td>C</td>
<td>B+</td>
</tr>
<tr>
<td>Percentage of Trips by Transit</td>
<td>model</td>
<td>C+</td>
<td>A+</td>
</tr>
<tr>
<td>Percentage of Trips by NEV</td>
<td>0</td>
<td>F</td>
<td>D</td>
</tr>
<tr>
<td>Percentage of Trips by Bicycling</td>
<td>model</td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>Percentage of Trips by Walking</td>
<td>model</td>
<td>C-</td>
<td>A-</td>
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<td>VMT per Capita by Speed Range</td>
<td>model</td>
<td>C</td>
<td>A-</td>
</tr>
<tr>
<td>Number of Crashes</td>
<td>429</td>
<td>C</td>
<td>B-</td>
</tr>
<tr>
<td>Number of Vulnerable User Crashes</td>
<td>50</td>
<td>C</td>
<td>B+</td>
</tr>
</tbody>
</table>

**Average:**
- C
- B-
- B-
- A-
Toward a Livability Ethic to Guide Planning Decisions: Lessons Learned:

1. **People Adapt to Poor Conditions**
   - The poor, the disenfranchised, the disconnected.

2. **The Need for Advocacy and Inclusion: Understanding the Adaption and Retreat from Poor Conditions**
A Livability Ethic for Equity:

Consider:

- Livability as the inclusive collective quality of the “human experience” in and around public spaces,
- Giving priority to most vulnerable.
- One’s pursuit of Livability Should Not Unduly Detract from a Region/Community’s Collective Quality of Life
Reaching out to Overcome the De-Humanizing Forces of Auto-Domination
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Bruce Appleyard, AICP
appleyard@berkeley.edu
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1. **People Adapt to Poor Conditions**
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2. **The Need for Advocacy and Inclusion: Understanding the Adaptation and Retreat from Poor Conditions**
- Opportunity Indicators
- Vulnerability Indicators
- Socio-Demographic Indicators
Big Solution:
Multiple Perspectives For Realizing Livability and Equity
“Beyond Tribes”
Identify the appropriate performance measures, data needs, and analytic approaches for each Livability Principle

From this?

• Enhance economic competitiveness
• Coordinate and leverage federal policies and investment
• Provide more transportation choices
• Promote equitable, affordable housing
• Support existing communities
• Value communities and neighborhoods

To this?

Good Governance “Ethic”
Coordinate and leverage federal policies and investment
Major Themes | Easy to Gather, Useful measures
--- | ---
• Walkability (bikability) 
• Transit Access | Demand
Local Accessibility
• Network walkscore
• Network transit score
Supply
• Intersection Density
• Transit LOS

Regional Location of Jobs/housing (Lower VMT, etc.) | Regional Accessibility Jobs Within 30’ of Transit & 20’ Auto

Accessible, Affordable Housing (near transit) | Number of Affordable homes and rental units Near employment centers and/or well-served by transit

Housing Affordability | Housing & Transportation Cost Index (CNT/CTOD/RA)

Economic Competiveness (Operation and reliability) | “Person Mobility Index”, VHT/per cap, TTI
Transportation

Who Acquires/Calculates Regional Accessibility Measure

- Information
  - Land use employment data
  - Transportation facility and operations

Regional Accessibility Performance Measure

Knowledge: Indicators, Performance Measure

Context: Community Target Setting

Regional Accessibility Jobs Within 30’ of Transit & Auto

Knowledge Transfer

Regional Accessibility

Land Use

Responsibility to Act upon the PM

- Regional Perspective
- Local Government

Transit Oriented Development

- Density
- Diversity
- Design

Information

Knowledge Transfer
Essential Measures for Land Use/Transportation Strategy Decisions

Responsibility to Act upon Measures

Fed/State/Regional Incentives For Development

Regional Accessibility
Jobs Within 30’ of Transit & 20’ Auto

Occ. Matched Jobs Within 30’ of Transit & 20’ Auto of Low-income Housing

Housing & Transportation Index

LEMs

Regional Location of Jobs/housing
Density
Diversity
Design

Regional Accessibility
Jobs Within 30’ of Transit & 20’ Auto

Regional Location of Jobs/housing

Transportation Infrastructure & Incentives

Walkability

Transit Access

Flexible, Inclusive Zoning

Local Perspective

Fed/State/Regional Incentives

Local Governments

Policy Solutions In Red

Transport Access

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Housing & Transportation Index

LEMs

Accessible Affordable Housing (near transit)

Housing Affordability

Affordable Housing Incentives

Number of Affordable homes and rental units Near employment centers and/or well-served by transit

Transit trips per capita
Workers commuting by transit, bicycle, or foot
Vehicle miles traveled per capita

Transit Oriented Development

Demand Local Accessibility Network walkscore transit score
Supply Intersection Density Transit LOS

Flexible, Inclusive Zoning

Developer Incentives

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Much great work has been done thus far.

- Achieving livability =
  1. Individual, scale (or as close as possible)
  2. Perceptions (honor qualitative/subjective)
  3. Prioritize actions in face of conflicting objectives
  4. Need to mitigate
  5. Need detailed measures (Individual, scale or as close as possible)
kiss

Twitter  Flickr  Search

Filter...

twitter

Kendra_Lillian
kiss me in the pouring rain

ogsleepyhead
while people be like "kiss me" http://coisRo3yF1UH

ASAPJESSE
@BabyKakes kiss me

jadoremarze
@___Diamondz OK so Trackstar (a) was like I wanna kiss you tam

ash2music
One of the cutest things? When a guy asks for a kiss...
boneyard

@LucCarl Keep on rocking the boneyard my friend Luc. Nobody else did.

@LucCarl Please rock the boneyard tomorrow my brother Luc. I'm listed.