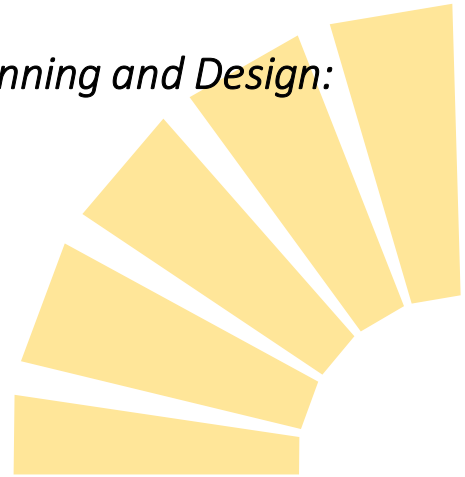


Cal-Poly ITE Student Leadership Summit

February 3, 2024

*“People-oriented Transportation Planning and Design:
Oh yes we can!”*



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Agenda

- **Overview**
- Adapting to trends in transportation
- How we got here matters
- What are tools I can use?
- Example
- Discussion



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Overview

- Our profession continues to positively evolve with an increasing awareness of issues and needs associated with transportation projects
- Yet institutional and professional inertia remains and must be overcome to provide contextually appropriate solutions
- Legacy initiatives and documents and philosophies supporting flexible, multimodal planning and design and remain relevant
- Performance-based tools can integrate transportation equity, culture, public health, and community needs into planning and design decision making



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It is an exciting time to be in the transportation profession....

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Adapting to trends in transportation

- Increasing demand for people-oriented planning and design
- Recognizing opportunities to address past impacts and damages
- Passion for environmental stewardship
- Integrating equity and public health factors



We just need to consider intended project outcomes...
Whom are we trying to serve? What are we trying to achieve?

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Measuring success beyond motor vehicles

- Multi-modalism
- Valuing communities, history, and heritage
- Focus on safety performance and quality of service
- Emphasizing needs for vulnerable users and populations



Source: NCHRP Research Report 1043 Exhibit 3.3



Source: FHWA Integrating the Safe System Approach with the Highway Safety Improvement Program: An Informational Report



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Valuing Communities, History, and Heritage

- Recognizing historically disadvantaged users and communities
- Creating opportunities for restorative justice and investment
- Addressing disparities across racial and ethnic groups, geographic location, and socioeconomic status
- Providing equitable access to community environments that support health



Black Community Cut Off by 'Road to Nowhere' Is Seeking to Reconnect
© Daniel Locada for The Wall Street Journal



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Passion for Environmental Stewardship

- Right-sizing roadways to meet user needs and land use context
- Considering Green House Gas and other air quality issues
- Supporting VMT reduction goals
- Integrating visual and aesthetic details in the built environment
- Balancing transportation needs with historic and cultural preservation



NW Naito Parkway, Portland Oregon



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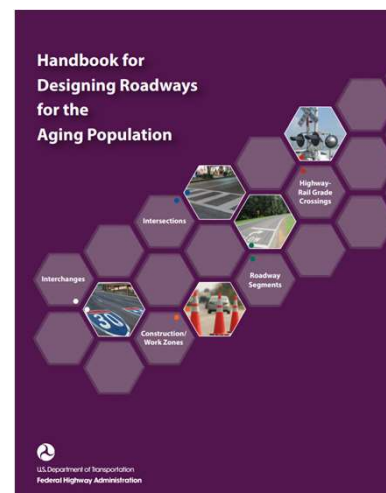
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Integrating Equity and Public Health Factors

- Inclusiveness—having users feel welcome in public spaces
 - Making streets accessible and comfortable to people of all cultures, ages, and abilities
- Supporting community equal opportunity to safely access the goods and services they need to live healthy lives
- Considering the fairness in distributing the benefits and burdens of transportation systems



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Multimodal and contextual design isn't new!

Good Roads Movement: 1870s and the 1920s

- Founded by bicyclists who wanted functional routes.
- Supported by the United States Post Office and farmer organizations.
- The movement lobbied for improved roadbuilding and education that promoted consistently usable travel ways.



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Multimodal and contextual design isn't new!

Context sensitive design dates to the 1920s and 1930s.

- Oregon's Columbia River Highway was sensitive to the dramatic and diverse landscape.
- Montana's Beartooth Highway preserved the scenic characteristics of the spectacular rugged landscapes



American Association of State Highway Officials (1914)

- Advocated for nationwide highway systems,
- Promoted consist design, materials, and methods to provide common roadway configurations, and
- Encouraged uniform application of roadway markings and signage.



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We need to recognize the negative effects of past project decisions to avoid repeating them....



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Watch out for what you wish...

Expanding highways and building interchanges sometimes severely impacted existing communities.

- Bypassing existing developments encouraged building roads in parks and natural areas.
- Intentionally building roadways through low-income communities or communities of color.

Pushback by communities in the 1960s redirected or stopped many urban freeway projects.

This contributed to developing national and state environmental policies and requirements!



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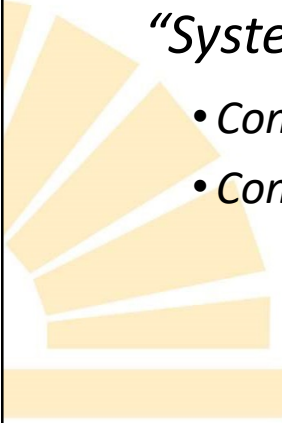
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“Systems planning and Functional Design”

- *Considering the user’s perspective*
- *Considering the “system”*


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Considering the user’s perspective

- *“Context” (past, existing, and future) helps identify user needs*
- *Considering user operational and Quality of Service (QOS) needs guides geometrics and configuration—the “feel” of the facility*
- *Establishing appropriate performance metrics to assess intended quality of service helps inform stakeholders and decision makers*

This includes users are those who will ultimately use the facility and those who are part of the planning and design process...


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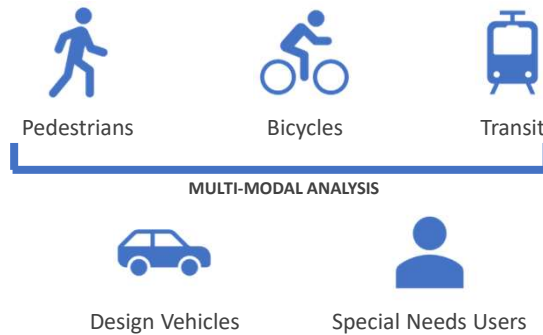
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Considering the user's perspective

The quality of service (QOS) of a facility should be determined by considering various user types



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Considering the user's perspective



Meet user expectations

- Consistency in design
- Consistency in operations
- Consistency with surrounding context



Reduce and simplify user tasks

- Self-describing roadway
- Simplified navigational tasks
- Simplified operational tasks



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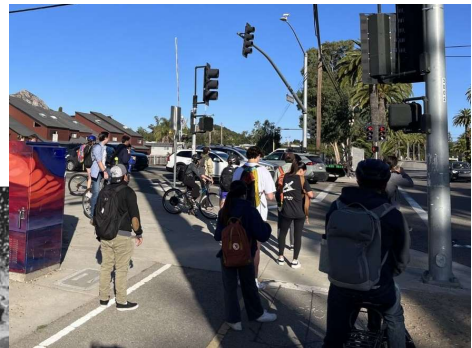
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Considering the user's perspective—Quality of Service



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Considering the user's perspective— If it looks smooth it will operate smooth



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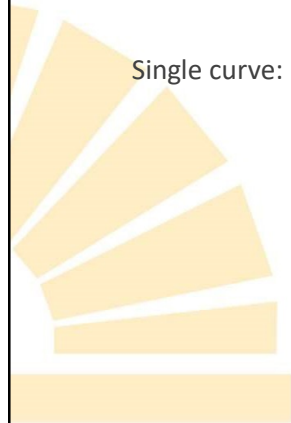
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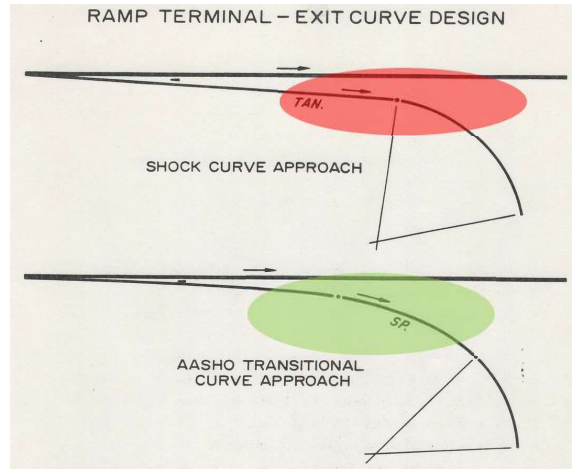
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Considering the user's perspective—
If it looks smooth it will operate smooth



Single curve:



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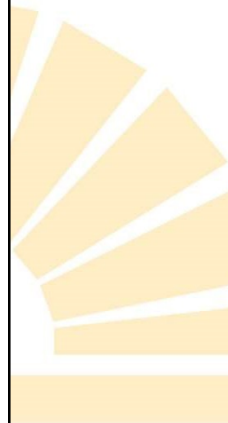


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Considering the user's perspective—
If it looks smooth it will operate smooth



Pedestrian/cycle paths



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There's some really good stuff out there!



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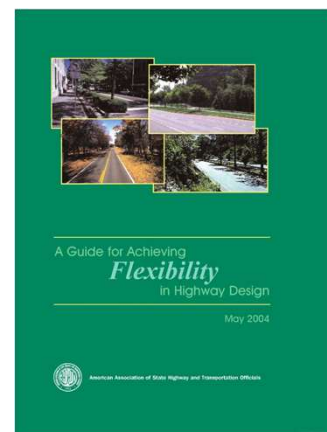
The principles in these documents remain valid!

Thinking Beyond the Pavement Workshop (1998)

- Established seven transportation **design** qualities and seven **process** characteristics that characterize project transportation project excellence

AASHTO A Guide for Achieving Flexibility in Highway Design (2004)

- Encourages highway designers to **expand their consideration** in applying the Green Book criteria
- Notes processes and including public involvement and **creative thinking** to achieve designs



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Just meeting a published design value does not define “success”


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Performance-based approaches support adaptability

Performance-based decision making

- Focusing on outcomes versus prescriptive directives
 - Fire-design: How long to burn-through versus thickness or material
 - Aeronautical: How many cycles until failure
 - Concrete and Steel: Load based dimensions
- Requires understanding intended outcomes
 - Performance
 - Design year or service life
 - User dimensions and characteristics


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We must define: “intended project outcomes”:

- *Whom are we trying to serve?*
- *What are we trying to achieve?*



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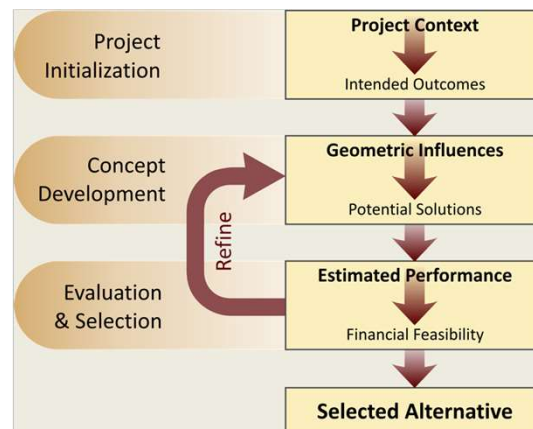
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Evolving Planning and Design Practices

NCHRP Report 785 *Performance-Based Analysis of Geometric Design of Highways and Streets*

- Presents a framework for incorporating performance-based analysis into project development
- Supports flexible designs that are consistent with the Practical Solutions and CSS philosophies
- Uses an iterative approach to refine and optimize solutions



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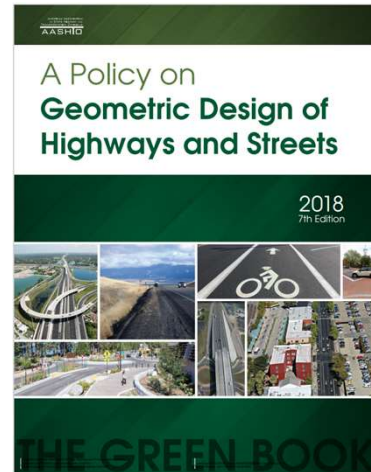
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Evolving Planning and Design Practices

Chapter 1: *New Framework for Geometric Design* noted meeting nominal design values:

"...may have led to overdesign, constructing projects that were more costly than they needed to be or were inappropriate for the roadway context..."

- Introduces "Context Classification"
- Introduced "project types"
 - New construction
 - Reconstruction
 - Projects on existing roads



Greenbook, 7th Edition (2018)



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Context classification and designing in context

NCHRP Report 1022

Context Classification: A Guide

- Five-context system meeting most agency needs
 - Rural
 - Rural Town
 - Suburban
 - Urban
 - Urban Core

WOD 320: *Aligning Geometric Design with Roadway Context*

- Transportation Expectations for each Context Classification
 - Users/Vehicles
 - Movement
 - Permeability
 - Network
 - Speed



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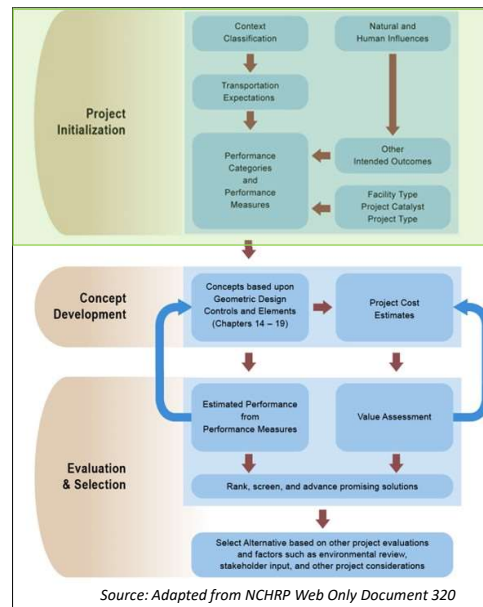
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Designing in Context

NCHRP WOD 320: *Aligning Geometric Design with Roadway Context*



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"Transportation Expectations"

Users/Vehicles

- What is the anticipated range of users/vehicles within the context?

Movement

- What is the ease of movement for each mode?

Permeability

- How extensive are other elements of the transportation network and adjacent land use by mode?

Network

- Are alternative routes available for each mode within the transportation system?

Speed

- What is the anticipated vehicular speed of the roadway?



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Let's look at the performance model for designing in context....



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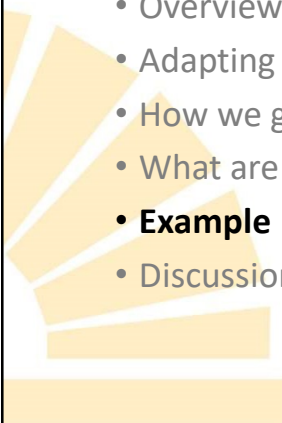


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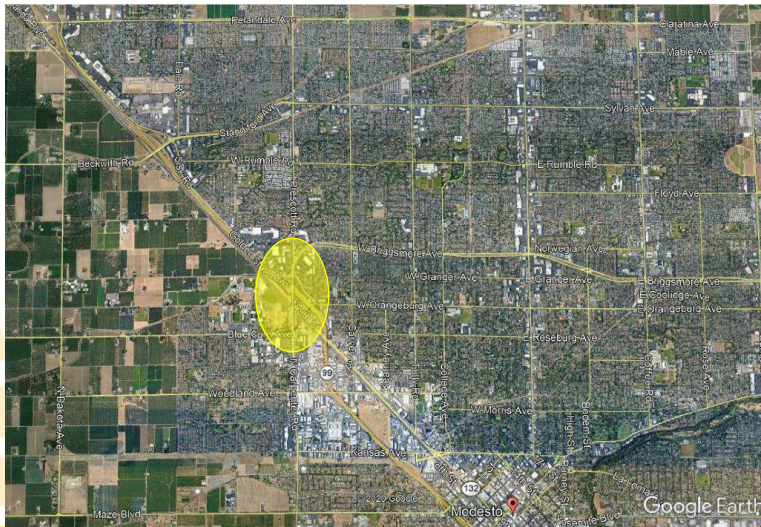


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Systems Planning



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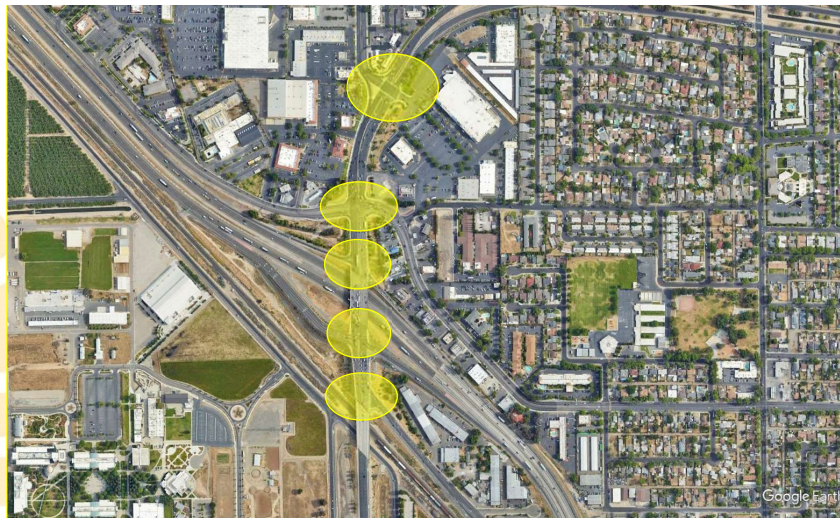
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Systems Planning



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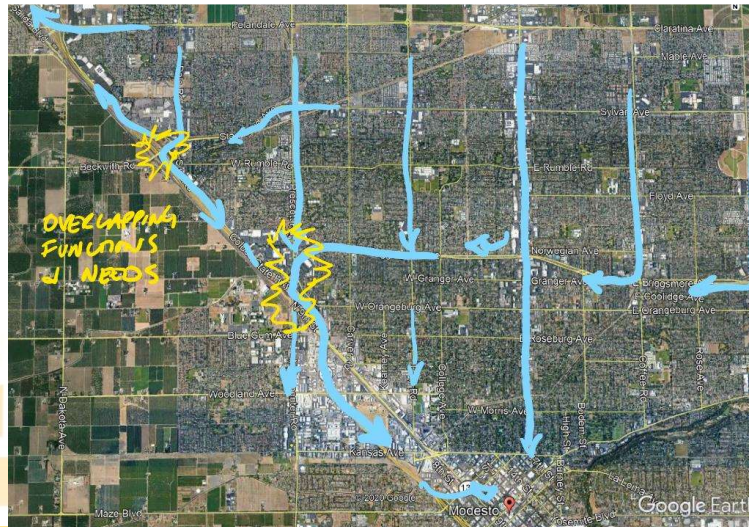
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Systems Planning



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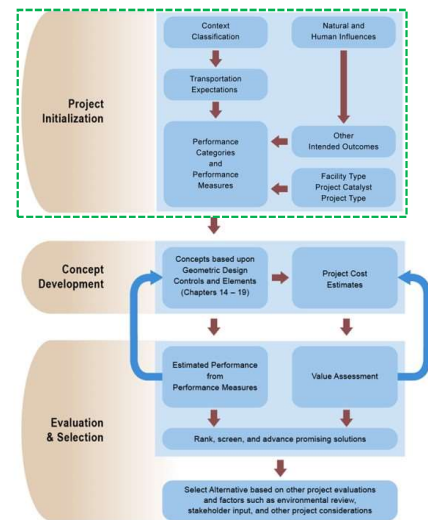
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Applying WOD 320

1. Establish context classification and identify Transportation Expectations at the outset of project work.
2. Define other human and natural influences to establish intended outcomes for roadway elements for each context.
3. Use project-specific information to establish and refine design elements for delivering a comprehensive transportation solution.
4. Apply the performance-based framework.



Evaluations inform environmental reviews, stakeholder engagement, and other activities that lead to the recommended alternative.

Source: Adapted from NCHRP WOD 320



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Integrating Equity and Sustainability

How can equity and sustainability indices guide a project?

- Identifying transportation solutions that meaningfully improve indices
- Identify performance metrics that highlight the benefits of investments
- Target specific potential funding sources tied to performance metrics



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Equity and Sustainability Indices

Here are just a few

- CalEnviroScreen 4.0
- Healthy Places Index
- SB 535
- Justice 40



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CalEnviroScreen 4.0--Factors

- Exposure:
 - Diesel Particulate Matter,
 - Traffic,
 - Pesticides, and Drinking Water
- Environmental Effects:
 - Groundwater Threats
- Sensitive Populations:
 - Asthma
- Socioeconomic Factors:
 - Education,
 - Poverty,
 - Unemployment, and Housing Burden



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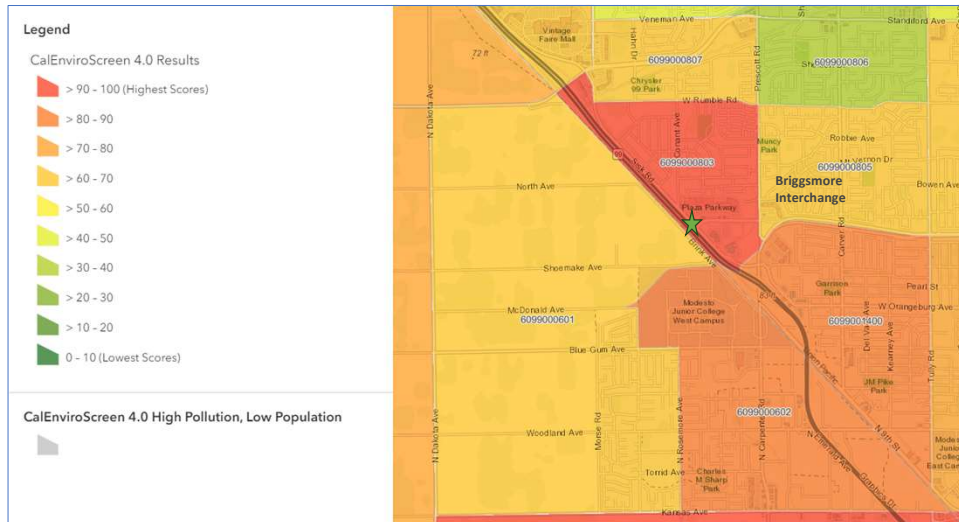


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CalEnviroScreen 4.0:



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Justice 40: Climate and Economic Justice Screening

- Climate Change:
 - Projected Wildfire Risk,
 - Low Income,
 - Projected Flood Risk
- Energy:
 - PM2.5 in the Air, and Low Income
- Health:
 - Low life expectancy, and Low Income
- Legacy Pollution:
 - Proximity to Superfund Sites and Low Income
- Workforce Development:
 - Unemployment, High School Education



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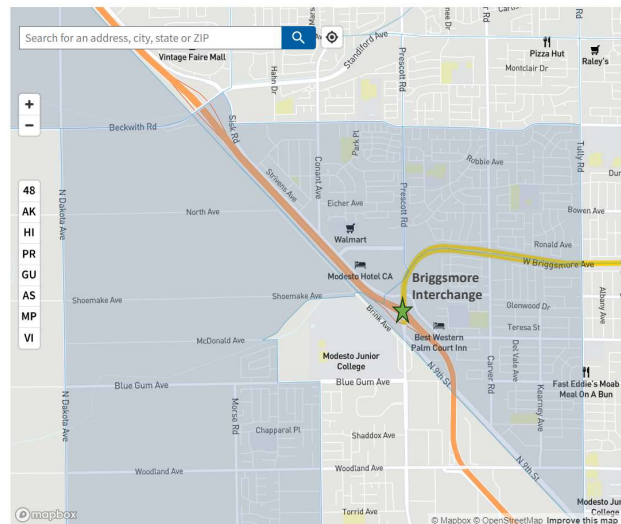
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Justice 40: Climate and Economic Justice Screening

Communities that are disadvantaged live in tracts that are exposed to burdens.

These tracks are highlighted in blue



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Integrating Equity and Sustainability

Interchange solutions:

- Targeted treatments at the interchange to serve promote non-motorized users at a high quality of service
- Other network connections that support users and help address issues identified in the screening activities

Integrate these concepts in early concept development versus trying to add them on at the end!



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What I hope you take away from this!

- There are many existing tools to help planners and engineers carry out a flexible, multimodal, performance-based, and context-sensitive design process.
- New tools supplement historically common performance metrics with contemporary considerations such as multimodal quality of service and safety performance (crash frequency and severity).
- We don't have to wait to integrate contemporary and emerging issues (public health, community and transportation equity, local cultures, and other community values) into our solutions!



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Be the ones to do things differently!

Thank you!

Brian Ray
brianray1962@outlook.com



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