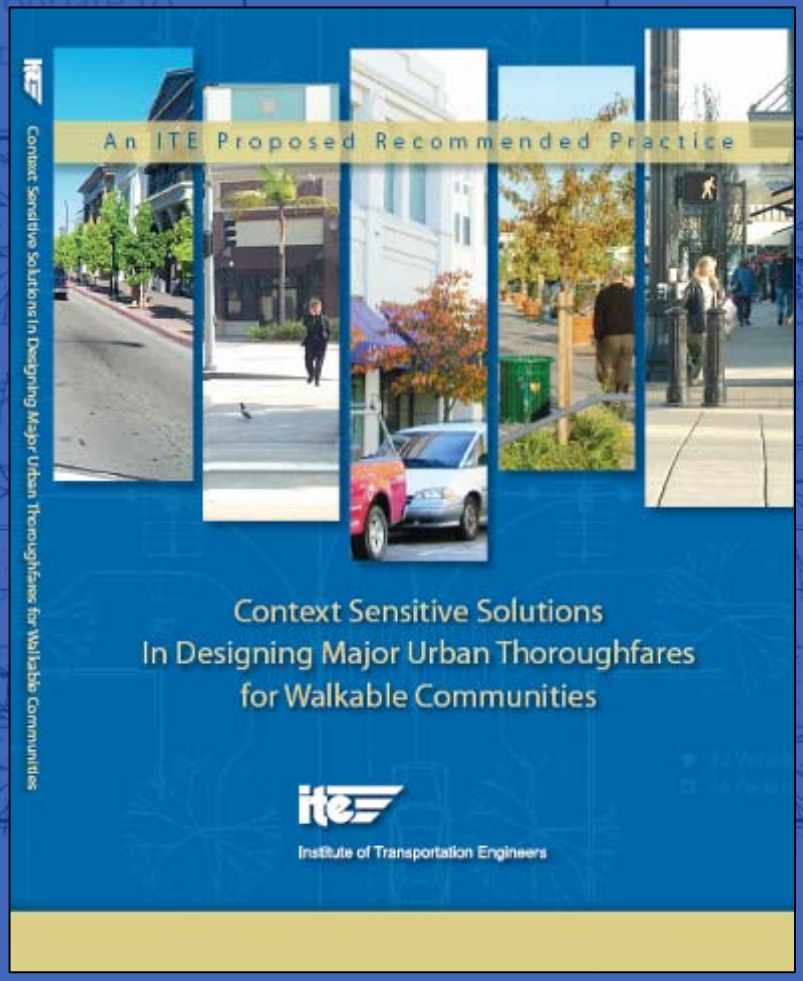
Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

An ITE Proposed Recommended Practice

James M. Daisa, P.E.
Kimley-Horn and Associates, Inc.



Communities Want:

- Flexibility
- Compatibility with adjacent land uses
- Balanced land use/transportation functions
- Safe and attractive streets
- Multimodal facilities
- Streets that are quality public space
- Fewer design exceptions

Report Objectives

- Aid context sensitive design
- CSS principles for planning, project development
  - Network
  - Corridor
  - Project
- Create a design framework
- Present criteria and guidance
- Consistent with established guidance

Project Sponsors

- Federal Highway Administration
- Environmental Protection Agency

- A joint effort:
  - Institute of Transportation Engineers
  - Congress for the New Urbanism

Technical and Steering Committees

- Traffic and design engineers
- Transportation planners
- Land use planners
- Architects
- Urban designers
- Landscape architects
- Transit planners
- Organization Reps (APWA, AASHTO)
- Over 60 reviewers and balloters

Focus of the Proposed RP

- Major urban thoroughfares in walkable areas
  - "Major":
    - arterials and collectors
  - "Urban":
    - Walkable suburbs, town and city centers, neighborhoods
    - mix of interactive land uses
    - Viable, attractive choices
      - Walking
      - Biking
      - Transit

Photo: Skidmore, Owings, and Merrill LLP

Tenets of CSS

- Balance
  - Safety
  - Mobility
  - Community objectives
  - Environment
- Multimodal
- Involve public, stakeholders
- Interdisciplinary teams
- Flexibility in design
- Incorporate aesthetics

Source: Minnesota Department of Transportation

What CSS is not:

- Designer knowing best
- Improving travel performance only
- Sacrificing safety or good design
- Just aesthetics
- Putting the needs of any single mode first
- Not a one-shot or add-on
- Going it alone
- “Us against them”

CSS: Bringing Place and Thoroughfare Design Together

Simulation by Steve Price, UrbanAdvantage

E14th Corridor - San Leandro, CA Source: Community, Design + Architecture

CSS: Bringing Place and Thoroughfare Design Together

Simulation by Steve Price, UrbanAdvantage

E14th Corridor - San Leandro, CA Source: Community, Design + Architecture

CSS: Bringing Place and Thoroughfare Design Together

Simulation by Steve Price, UrbanAdvantage

E14th Corridor - San Leandro, CA Source: Community, Design + Architecture

Contents of the Proposed RP

- **Introduction**
  - Overview
- **Planning**
  - Network and corridor planning
  - Design framework
- **Design**
  - Principles, criteria, guidelines
    - Roadside
    - Traveled way
    - Intersections
  - Design in constrained rights-of-way
  - Flexibility
  - Examples

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

Overview

The CSS publication was developed to provide planners and designers with guidance and information for using flexibility in existing American Association of State Highway and Transportation Officials (AASHTO) policy and information for context sensitive solutions (CSS) in design of major urban thoroughfares (arterials and collectors). The report was a joint effort between the Institute of Transportation Engineers and the Congress for the New Urbanism, sponsored by the Federal Highway Administration and the Environmental Protection Agency.

The publication describes:
- The importance of integrating the principles of CSS in urban roadway improvement projects,
- How CSS principles can be used in the transportation planning and project development processes, and
- Specific guidance on thoroughfare cross-section and intersection design.

The publication, published as an ITE Proposed Recommended Practice to supplement existing AASHTO policies and information, provides the user community an opportunity to use the new guidance and information, then to provide suggestions for improvements to be incorporated into the final ITE recommended practice.

Figure 1 An urban avenue in Denver, CO.

Figure 2 The roadside supports many urban activities.

Fact Sheet 1 - Overview

Fact Sheet 2 - A Framework for CSS in Urban Thoroughfare Design

"Fact Sheet" Series

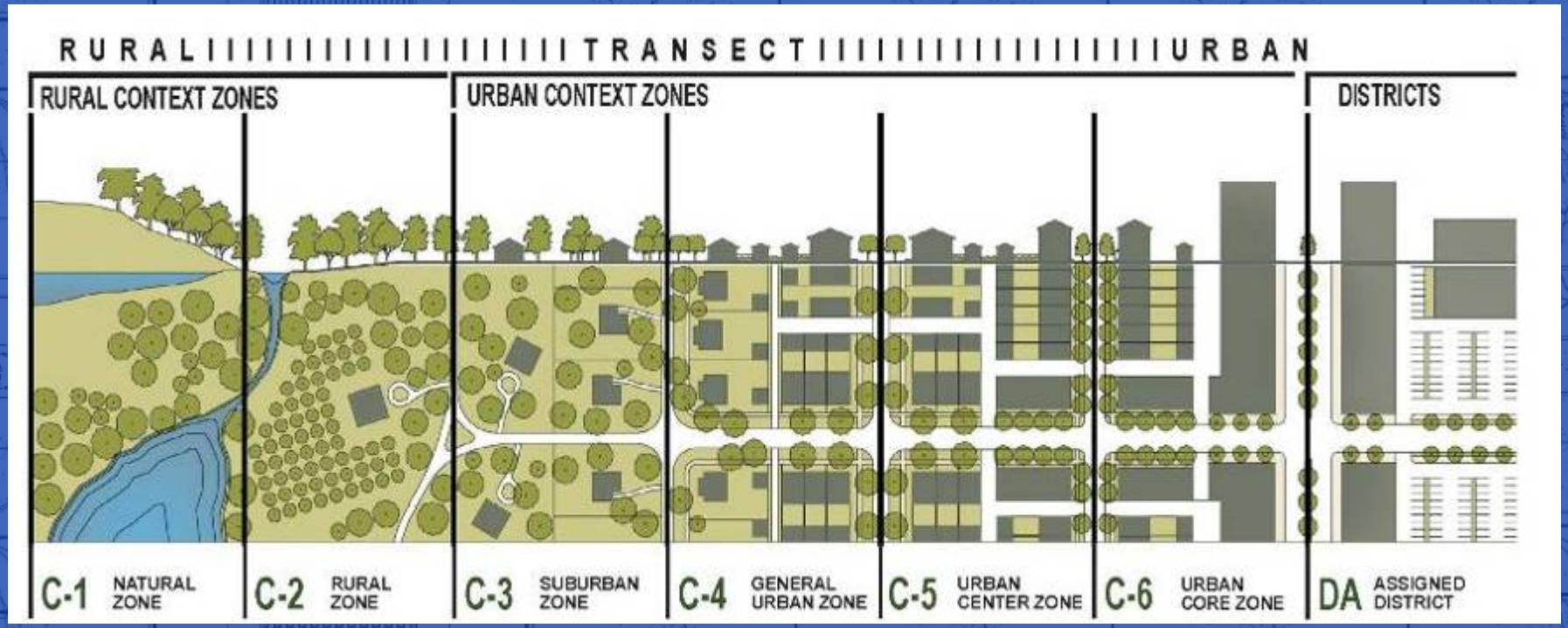
CSS Design Framework

- Context zones:
  - Suburbs - downtowns
- Street classification:
  - Functional class
    - Arterial
    - Collector
  - Thoroughfare type
    - Boulevard
    - Avenue
    - Street
- Compatibility

Placemaking

- Community-based approach to the development and revitalization of cities and neighborhoods
- Placemaking:
  - Unique places with lasting value
  - Compact, mixed-use
  - Pedestrian and transit oriented
  - Strong civic character
  - Contributes to economic development

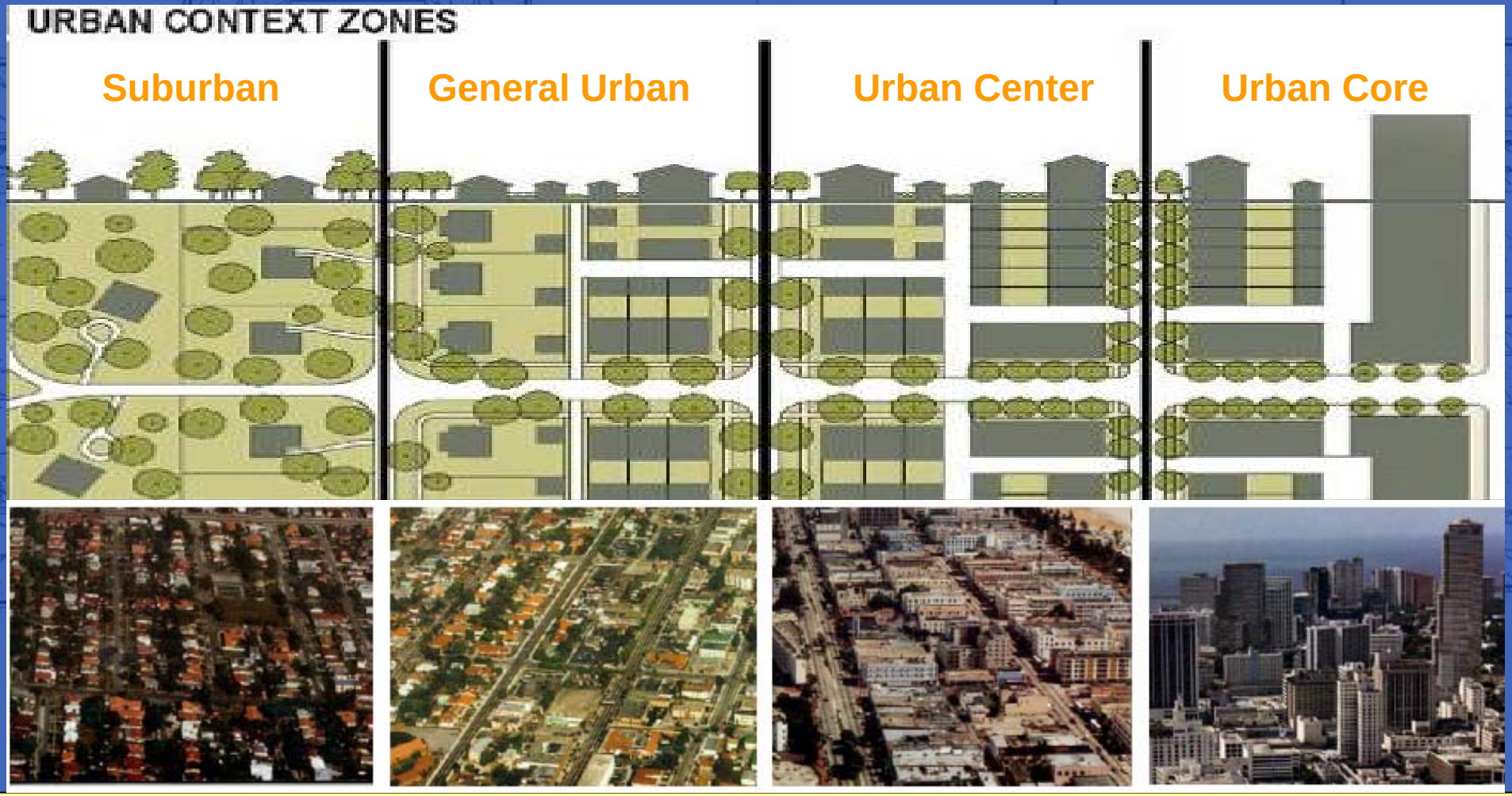
Context Zones – An Organizing System for Thoroughfare Design



Source: Duany Plater-Zyberk and Company

Context Zones – An Organizing System for Thoroughfare Design

Source: Duany Plater-Zyberk and Company



CSS vs. Conventional Thoroughfare Design Approach

Conventional	CSS Approach
Context: Urban Rural	Context: Suburban General urban Urban center Urban core
Design criteria primarily based on: Functional class Design speed Forecast travel demand Level of service	Design criteria primarily based on: Community objectives Functional class Thoroughfare type Adjacent land use

Features That Create Context

- **Land use**
  - Defines urban activity
  - Major factor in design criteria
- **Site design**
  - Arrangement of buildings, circulation, parking and landscape
  - Vehicle or pedestrian-orientation
- **Building design**
  - Height, massing shape context
  - Create enclosure/pedestrian interest

Land Use

- Major factor in thoroughfare design
- Influences:
  - Travel demand
  - Activity in roadside
  - Width of roadside
  - On-street parking
  - Target speed
  - Freight and transit

Site Design

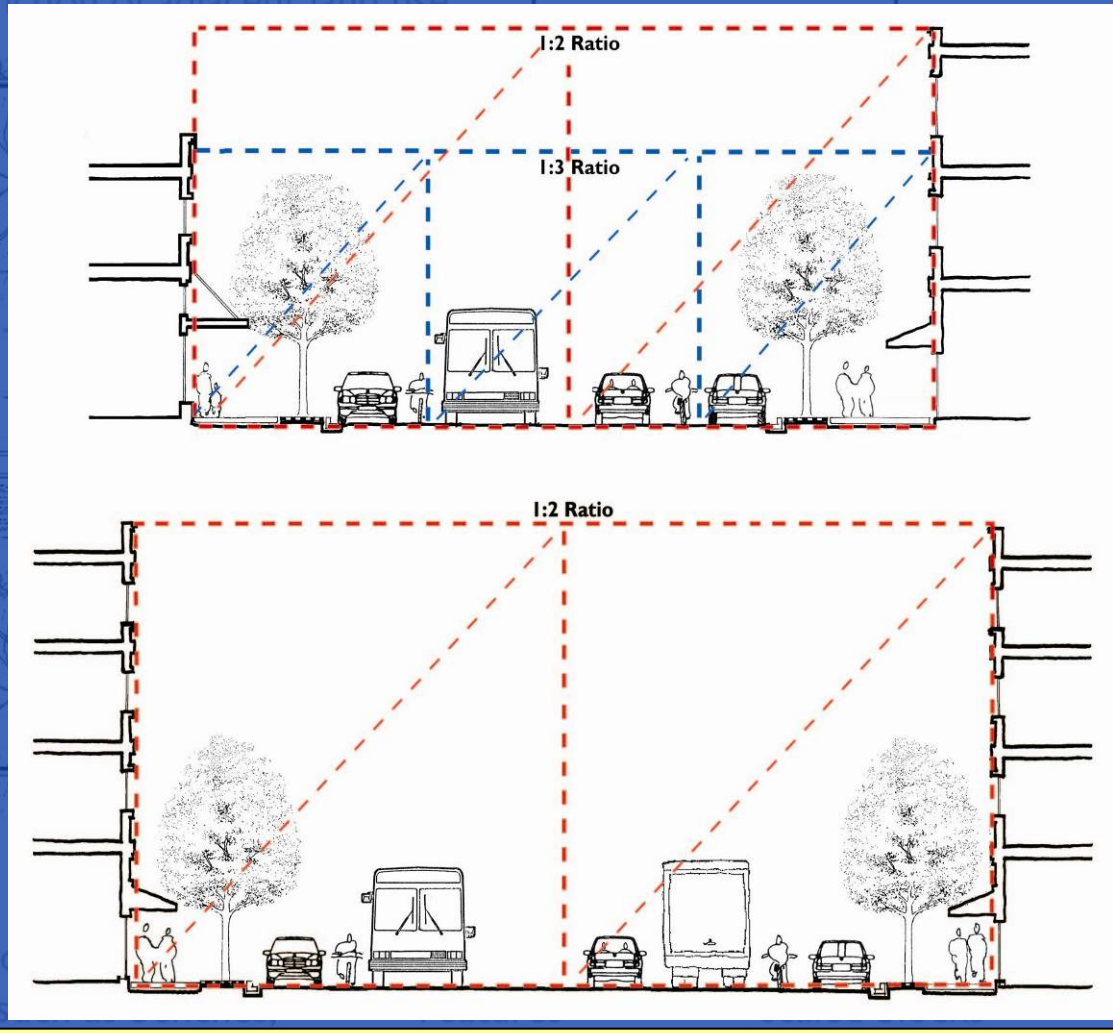
	Auto Oriented	Pedestrian Oriented
Building Orientation and Setback	**– Set well back into private property** **– Oriented to parking or landscape**	**– Oriented to, and adjacent to street** **–Direct pedestrian entrance on street** **– Integrated with street using stoops, arcades, cafes**
Parking Type and Orientation	**– Surface lot between buildings and street**	**– Under or behind building access by alleys** **–Structured** **–On-street**
Block Length	**- Large blocks, often with no public throughway** **- Superblocks**	**- Short blocks** **- High connected network**

Building Design

- Significant contributor to context defined by:
  - Height and thoroughfare enclosure
  - Massing
  - Scale and variety
  - Entries and windows
  - Placement on site
  - Architectural style

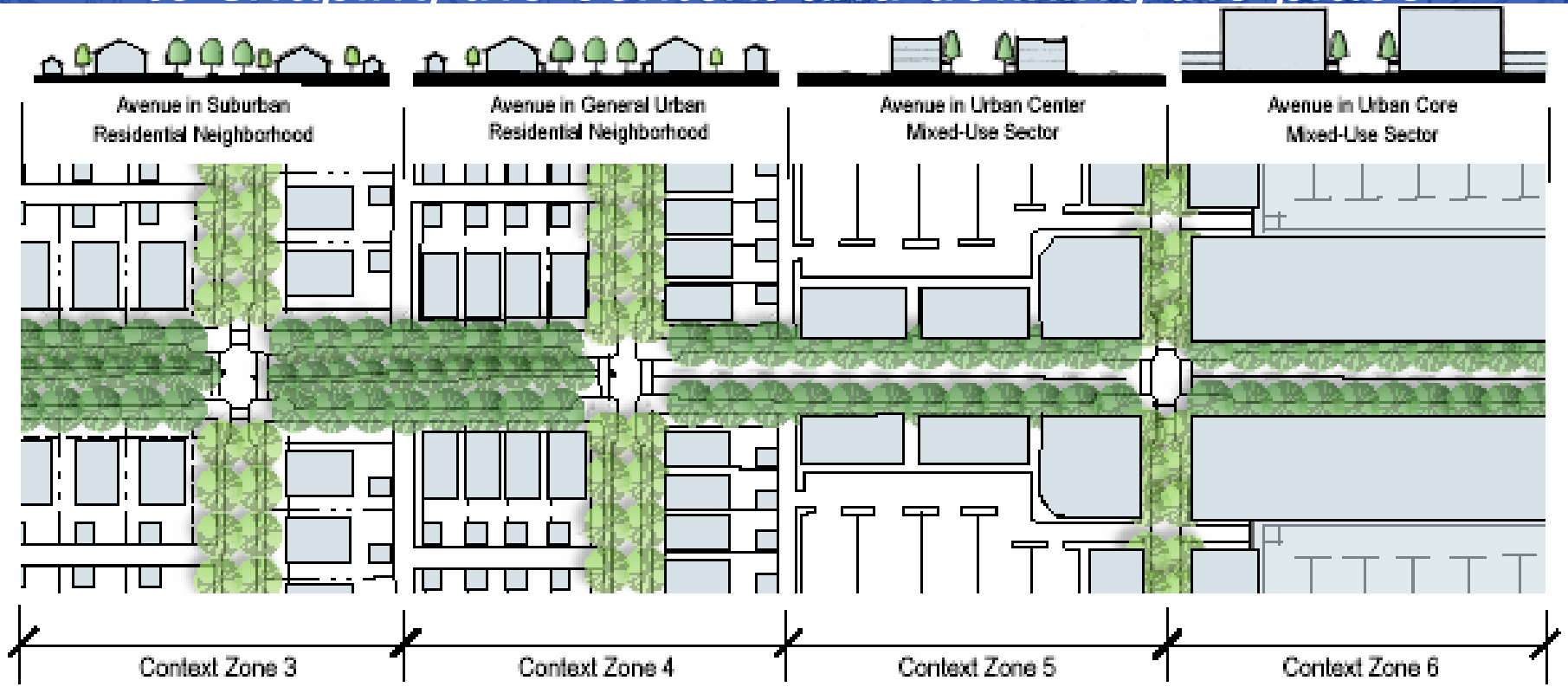
Street Enclosure

- Building height to thoroughfare width ratios:
  - 1:4 suburban
  - 1:2-1:3 urban
- Pedestrians first perceive enclosure at a 1:4 ratio



Thoroughfare Design Changes as Context Changes

The thoroughfare both responds to and contributes to shaping the context and defining the place



Thoroughfare Types

- Three classifications:
  - Boulevard
  - Avenue
  - Street
- Basis for:
  - Physical configuration
  - Design criteria

Boulevard

- Divided arterial (4+ lanes)
- Target speed (35 mph or less)
- Through and local traffic
- Serve longer trips
- Access management
- Major transit corridor
- Primary freight route
- Emergency response route
- Limited curb parking

JADE

Washington
Mutual
DENTAL

Multi-way Boulevard

- Characterized by:
  - Central roadway for through traffic
  - Parallel roadways access abutting property, parking, and pedestrian and bicycle facilities
  - Parallel roadways separated from the through lanes by curbed islands
- Require significant right-of-way
- Special treatment of intersections

NEED TRANSIT INFO?
CALL
511
CHANNING Way

THE ARTS & COMMERCE DISTRICT

Avenue

- Arterial or collector (4 lanes max)
- Target speed (30 to 35 mph)
- Land access
- Primary ped and bike route
- Local transit route
- Freight - local deliveries
- Optional raised landscaped median
- Curb parking

NO
PARKING
BETWEEN
2AM
AND
6AM
HERE TO
CORNER

ZUPANS
ZUPANS
Belmont DAIRY
ZUPANS
Belmont DAIRY

Shortest
Route
to
Bakery
PONTIAC

Washington Mutual
San Pedro
2B
Bus Stop
22
64
68
HY17
DAC
PHUC

Street

- Collector or local
- 2 lanes
- Target speed (25mph)
- Land access primary function
- Designed to:
  - Connect residential neighborhoods
  - Connect neighborhoods with commercial districts
  - Connect local streets to arterials
- May be commercial main street
- Emphasizes curb parking
- Freight restricted to local deliveries

SWAP MEAT

Photographs from Michael King and Reid Ewing

Thoroughfare Examples

- Street in urban center context

Thoroughfare Examples

- Boulevard in general urban context

Thoroughfare Examples

- Boulevard in urban core context

Thoroughfare Examples

- Avenue in suburban context

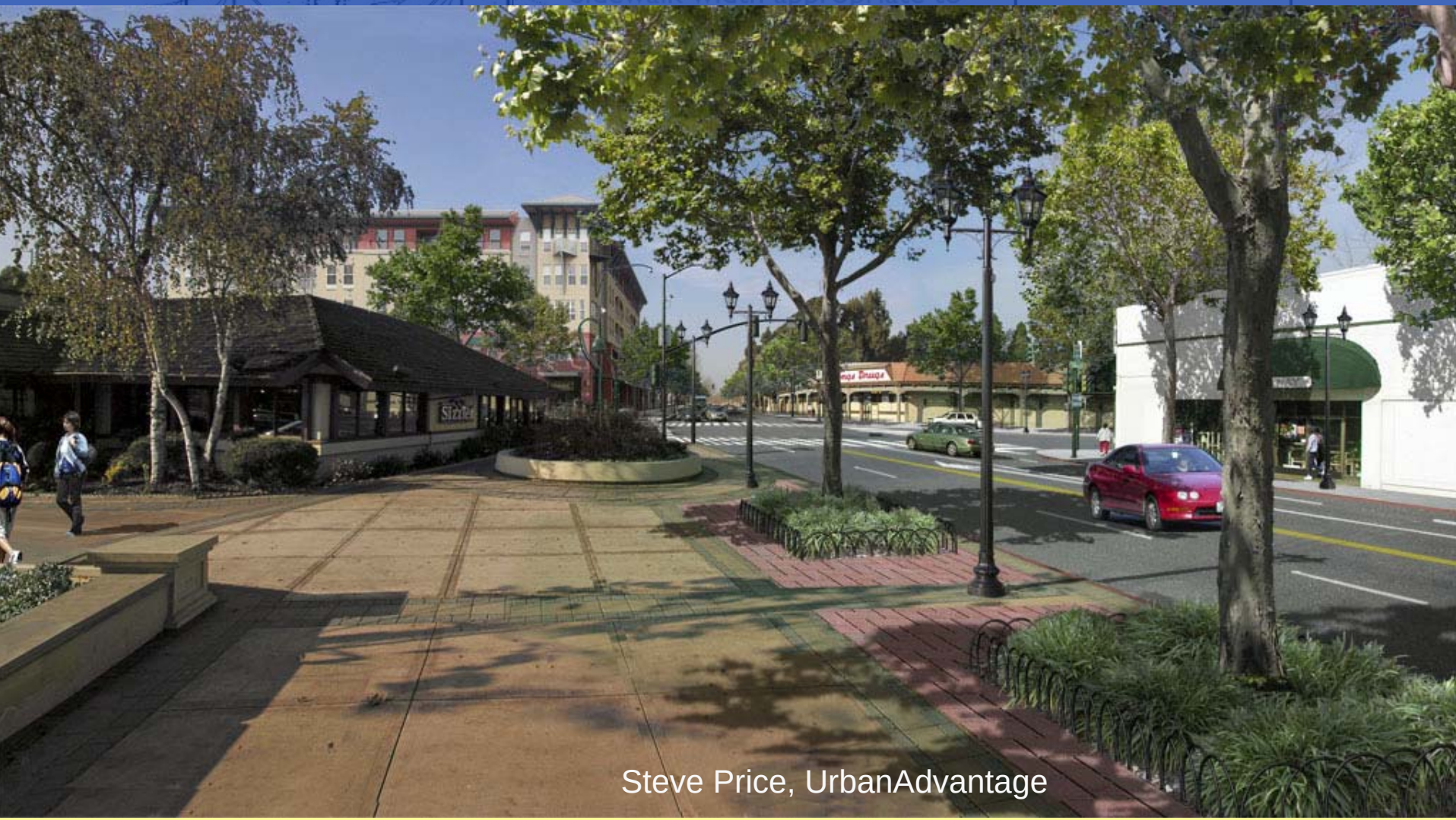
Thoroughfare Examples

- Avenue in urban center context

Change is Gradual

Steve Price, UrbanAdvantage

Change is Gradual



Steve Price, UrbanAdvantage

Change is Gradual

Steve Price, UrbanAdvantage

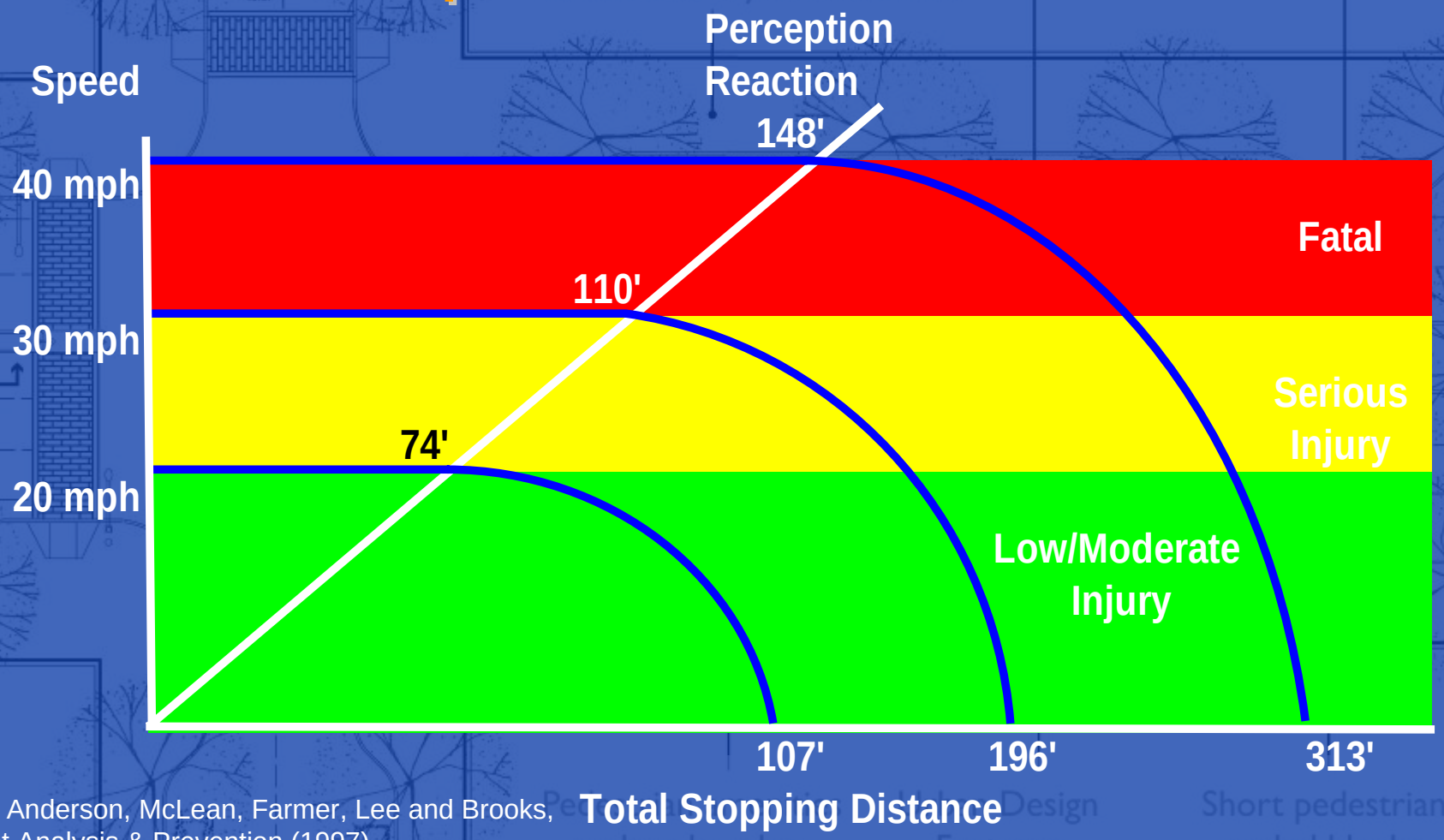
Design Controls in CSS

- Design control – guide selection of design criteria
  - Speed
  - Design vehicle
  - Thoroughfare type, context, land use type
  - Location
  - Sight distance
  - Horizontal / vertical alignment
  - Access management
  - Pedestrians and bicyclists

Speed Definitions

- Target speed
  - Desirable operating speed in specific context
  - Range: 25 to 35 mph
  - Balances
    - Vehicle mobility
    - Safe environment
  - Usually posted speed limit

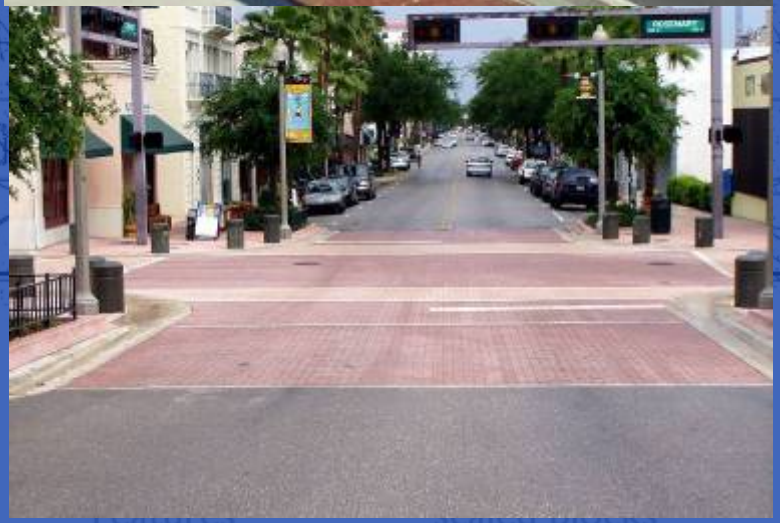
Speed/Accident Severity Relationship



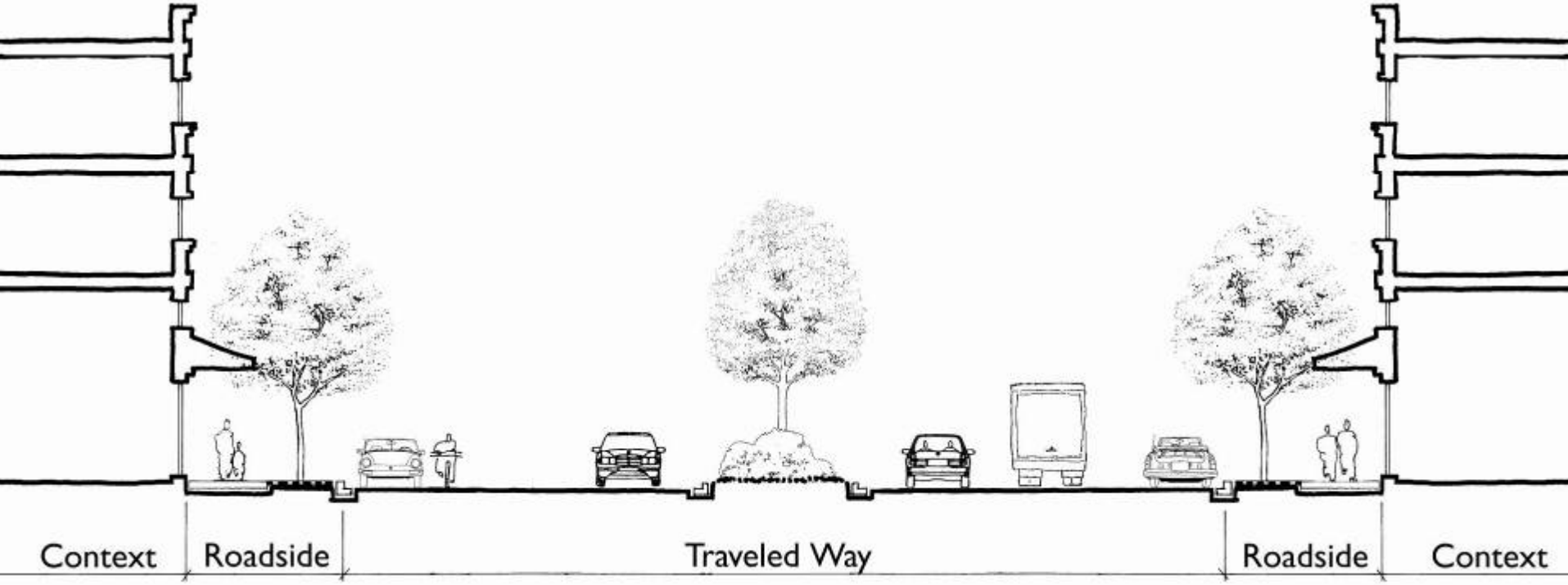
Source: Anderson, McLean, Farmer, Lee and Brooks, Accident Analysis & Prevention (1997)

Design Factors that Influence Target Speed (Urban Areas)

- Lane width
- Minimal offset
- No superelevation
- No shoulders
- On-street parking
- Smaller curb return radii
- Design of right turn lanes
- Spacing of signalized intersections
- Synchronization to desired speed
- Paving materials



Thoroughfare Components



Changing Thoroughfare & Context

Simulation by Steve Price, UrbanAdvantage

Changing Thoroughfare & Context

Simulation by Steve Price, UrbanAdvantage

Changing Thoroughfare & Context

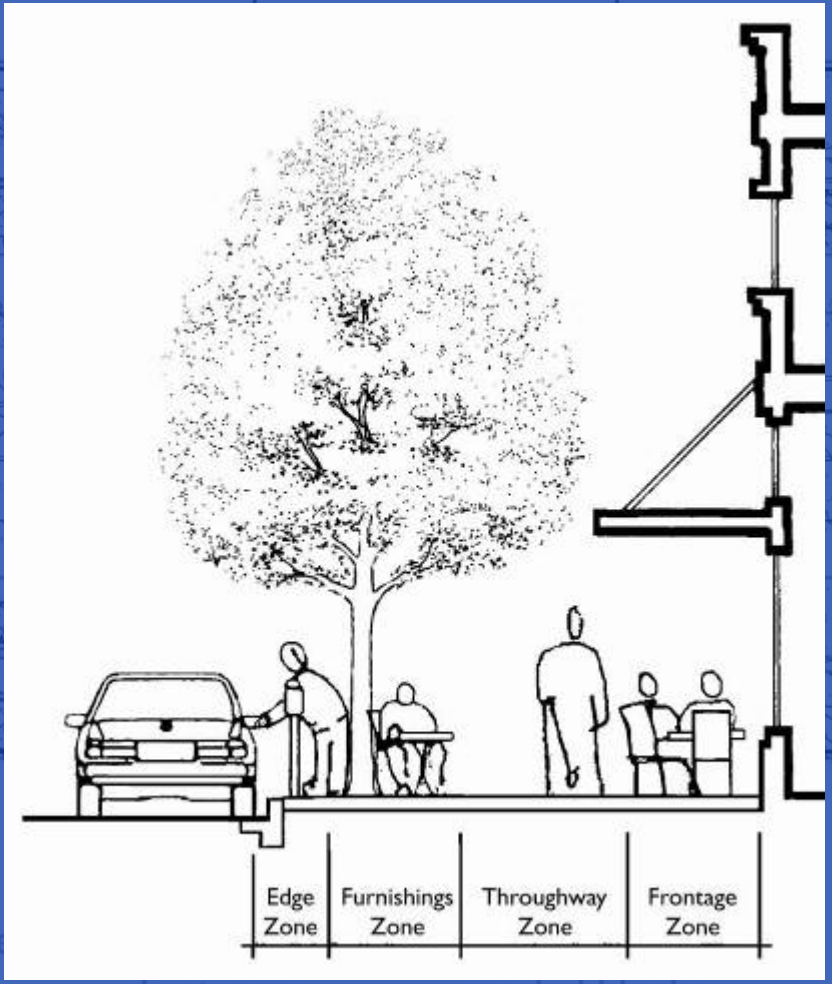
Simulation by Steve Price, UrbanAdvantage

Changing Thoroughfare & Context

Simulation by Steve Price, UrbanAdvantage

Roadside Design

- Roadside zones:
  - Edge Zone
  - Furnishings Zone
  - Throughway Zone (ADA)
  - Frontage Zone
- Function and dimensions vary by context zone and adjacent land use



Roadside Defined

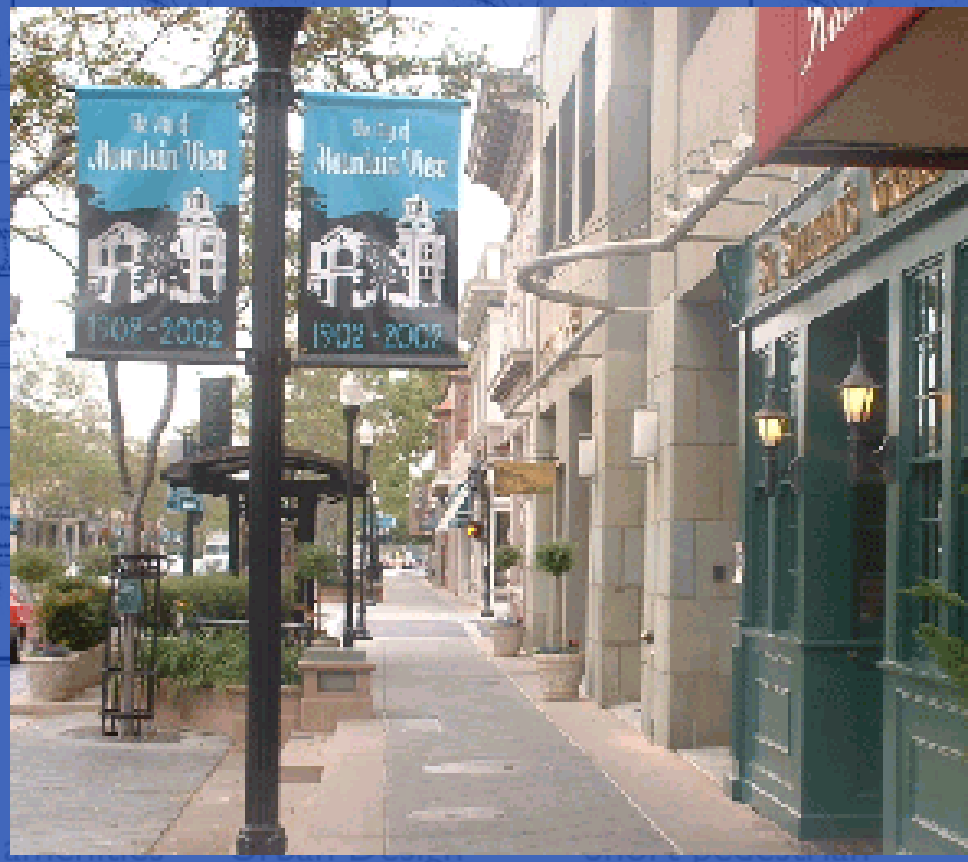
- From property line to face of curb
- Accommodates street activity
  - Mobility
  - Business
  - Social
- Public space

The Urban Roadside – Uses and Activities

- Movement of pedestrians
- Access to buildings/property
- Utilities/appurtenances
- Transit stops
- Landscaping
- Urban design/public art
- Sidewalk cafes
- Business functions
- Civic spaces (plazas, seating)

Roadside Design

- Roadside zones
- Public places
- Placement of roadside facilities
- Public art
- Sidewalk width and function
- Pedestrian buffers
- Sidewalk/driveway/alley crossings
- Street furniture
- Utilities
- Landscaping/street trees



OPEN

GUINNESS
DRAUGHT

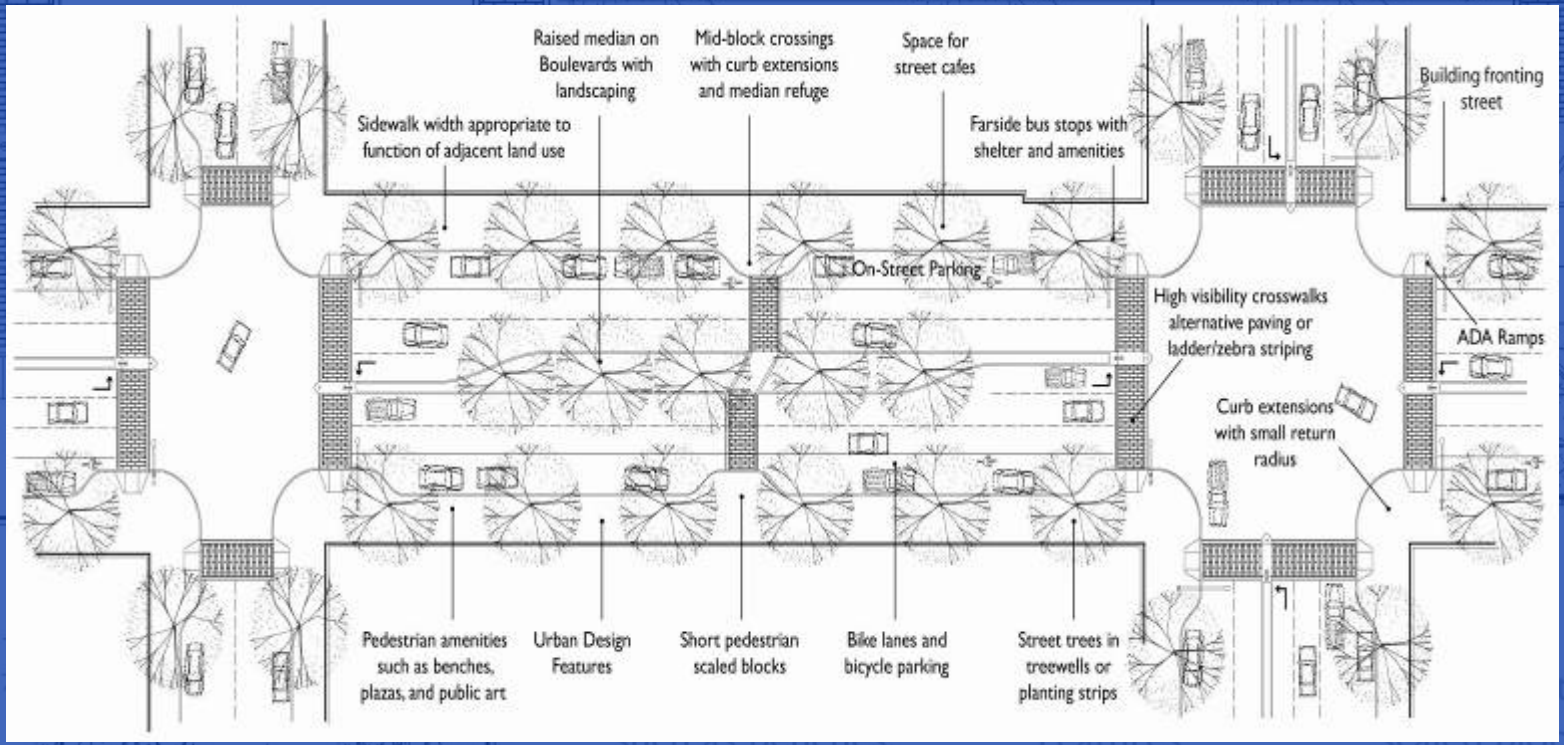
juice
Jamba Juice

Traveled Way Design

- Cross-sections
- Access management
- Transition principles
- Lane width
- Medians
- Bicycle facilities
- On-street parking
- Mid-block crosswalks
- Pedestrian refuge islands
- Mid-block bus stops
- Snow removal
- Transit stops

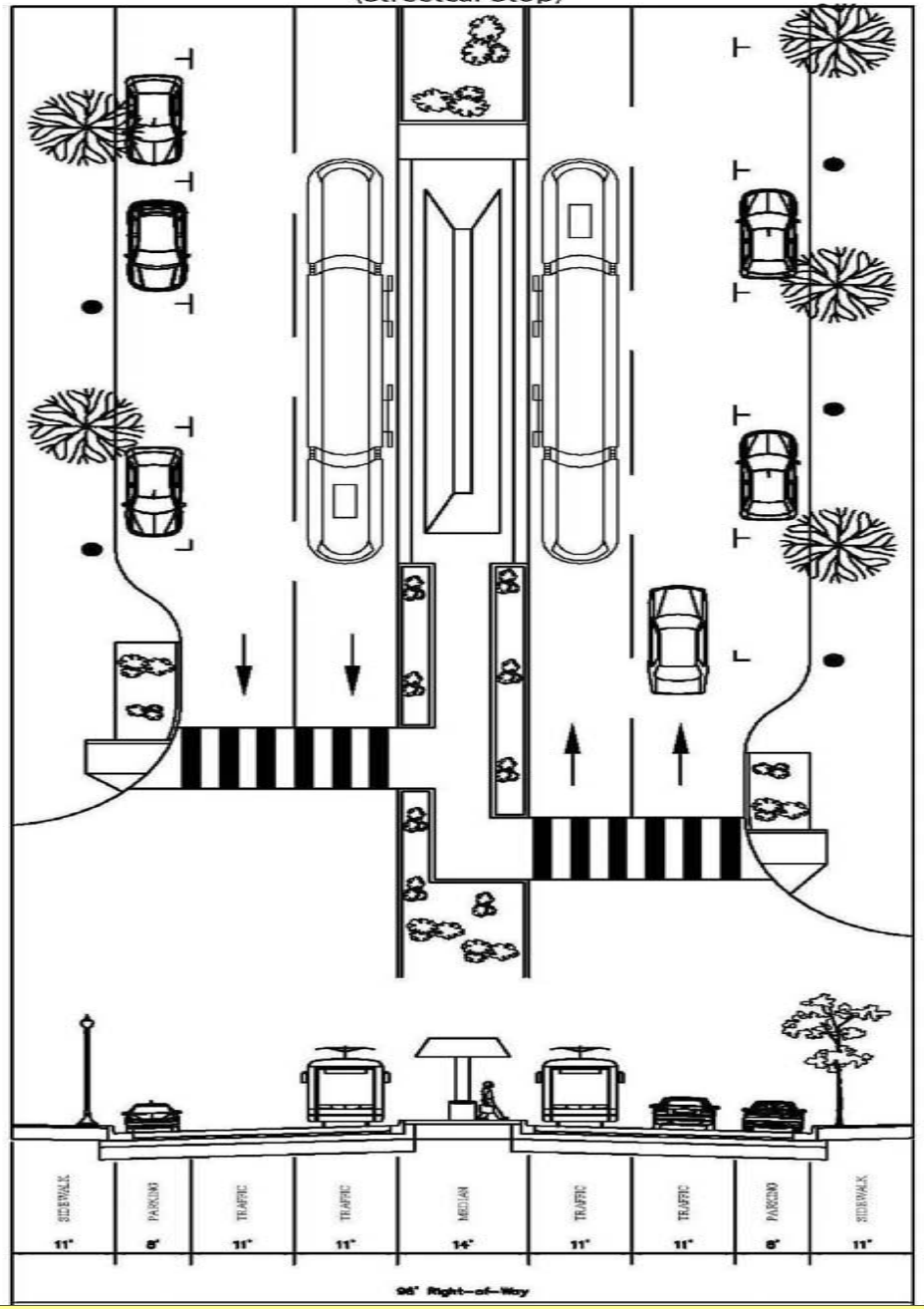
The Urban Traveled Way

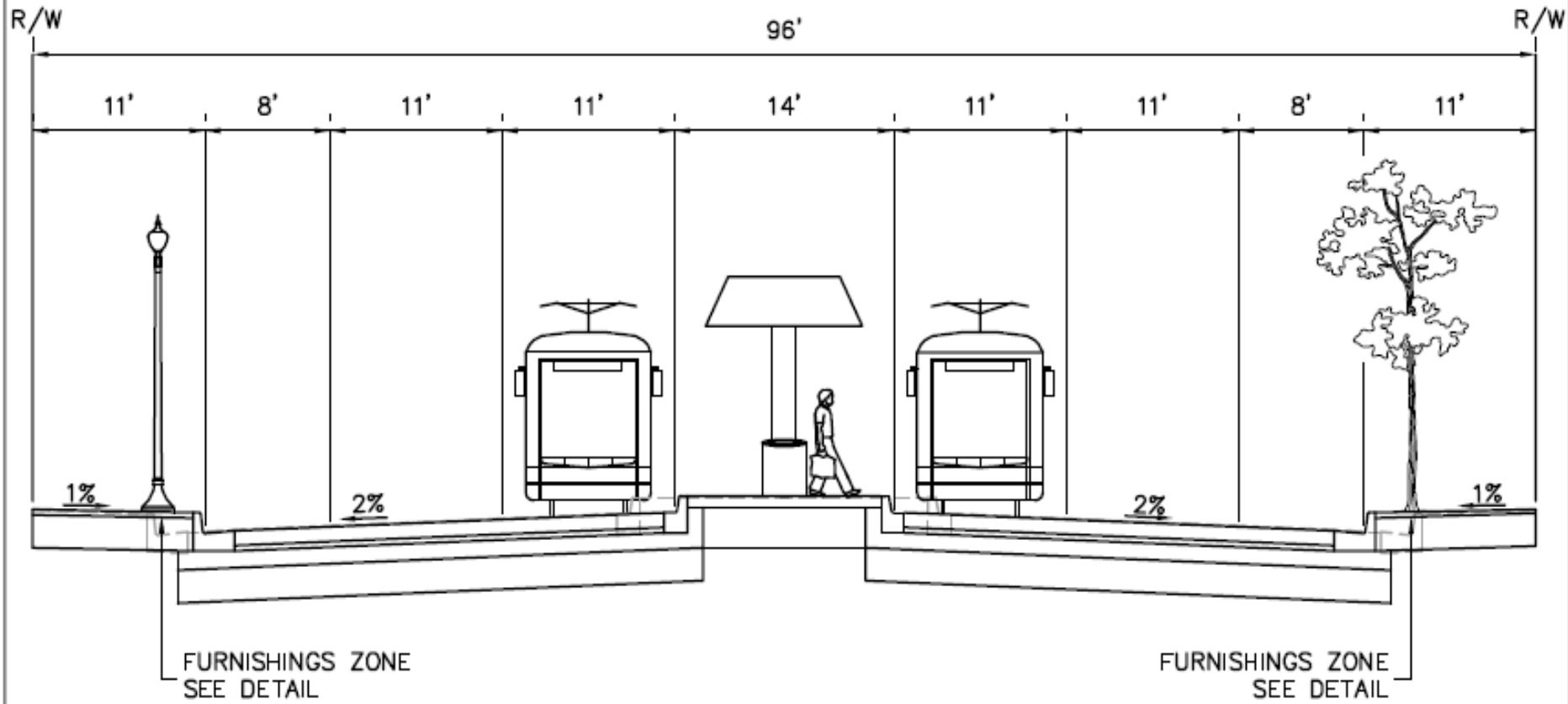
- Central portion of thoroughfare between curbs
- Provides for movement of vehicles
- Interface with roadside via on-street parking



Streetcar Stop

- Fits within existing R/W
- Streetcars operate within inside lanes shared with traffic
- Platforms in median
- Special crossings for pedestrians to access stations





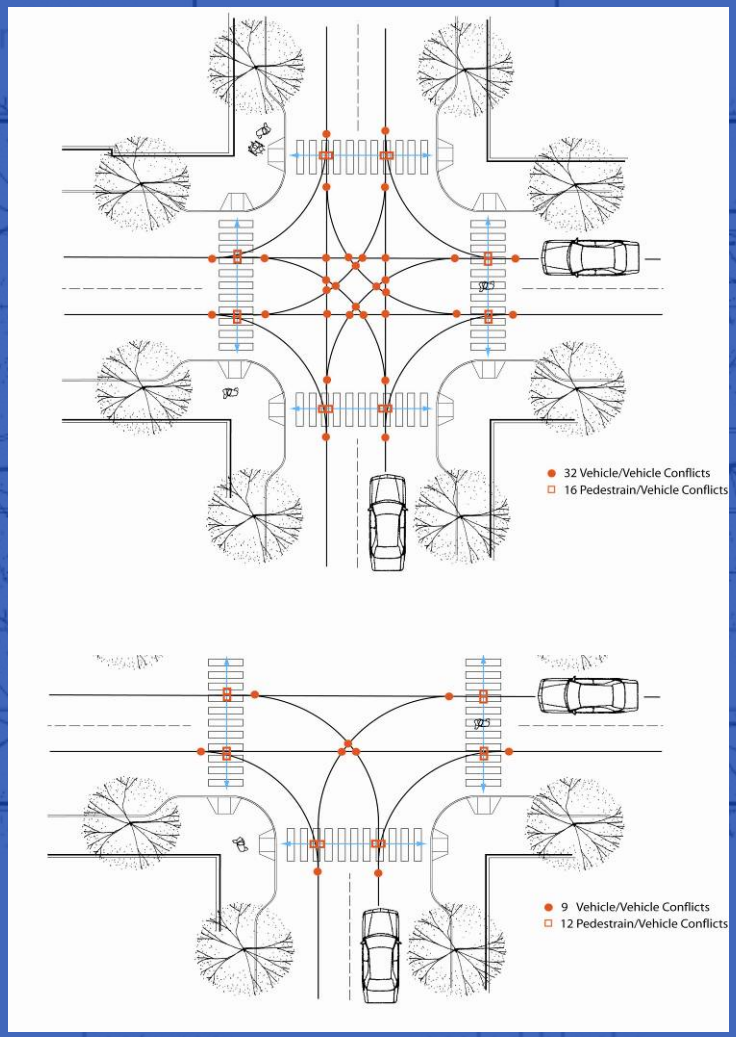
TYPICAL BOULEVARD CROSS SECTION AT STREETCAR STATION

JOY &
PEACE

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

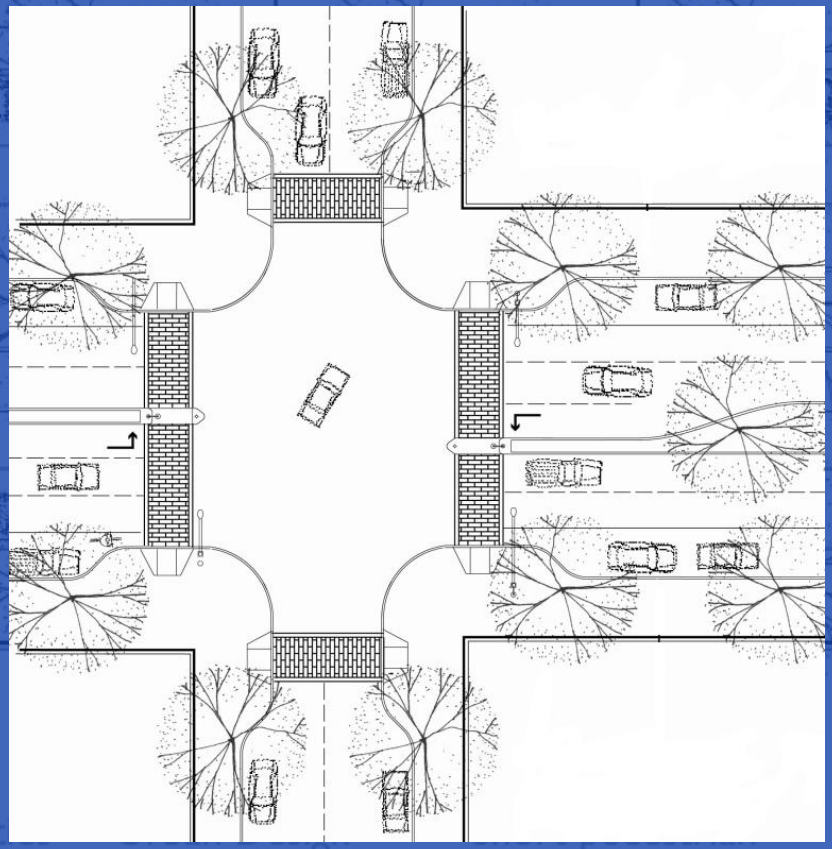
Urban Intersections

- General principles
  - Minimize conflicts between modes
  - Minimize pedestrian exposure
  - Provide crosswalks on all approaches
  - Minimize curb radii consistent with design/control vehicle
  - Ensure good visibility
  - Balance vehicle LOS with pedestrian convenience and safety



Urban Intersections

- Design elements
  - Through and turning lanes
  - Intersection sight distance
  - Medians
  - Curb return radii
  - Design vehicle
  - Channelized right turns
  - Modern roundabouts
  - Crosswalks and refuges
  - Curb extensions
  - Bicycle lane treatment
  - Bus stops
  - Traffic signals



Intersection Design

- Design considerations

Source: City of Palo Alto
CD+A, FPA, and Urban Advantage

El Camino Real @ Los Robles – EXISTING CONDITIONS

Intersection Design

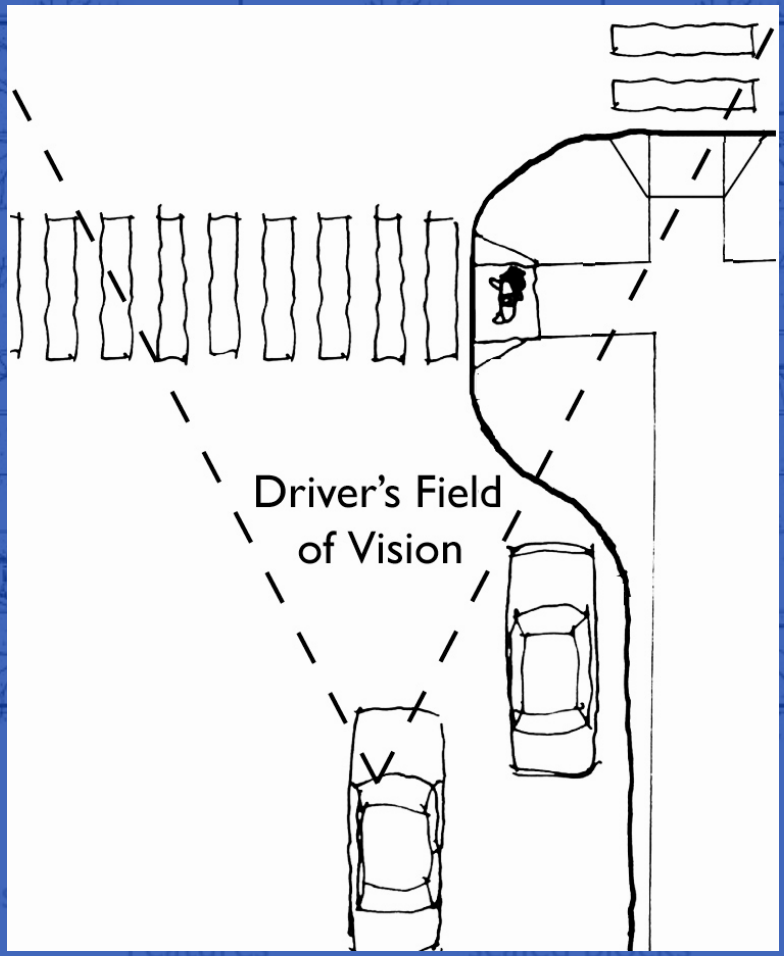
- Creating opportunities to improve context

Source: City of Palo Alto
CD+A, FPA, and Urban Advantage

El Camino Real @ Los Robles – PROPOSED IMPROVEMENTS

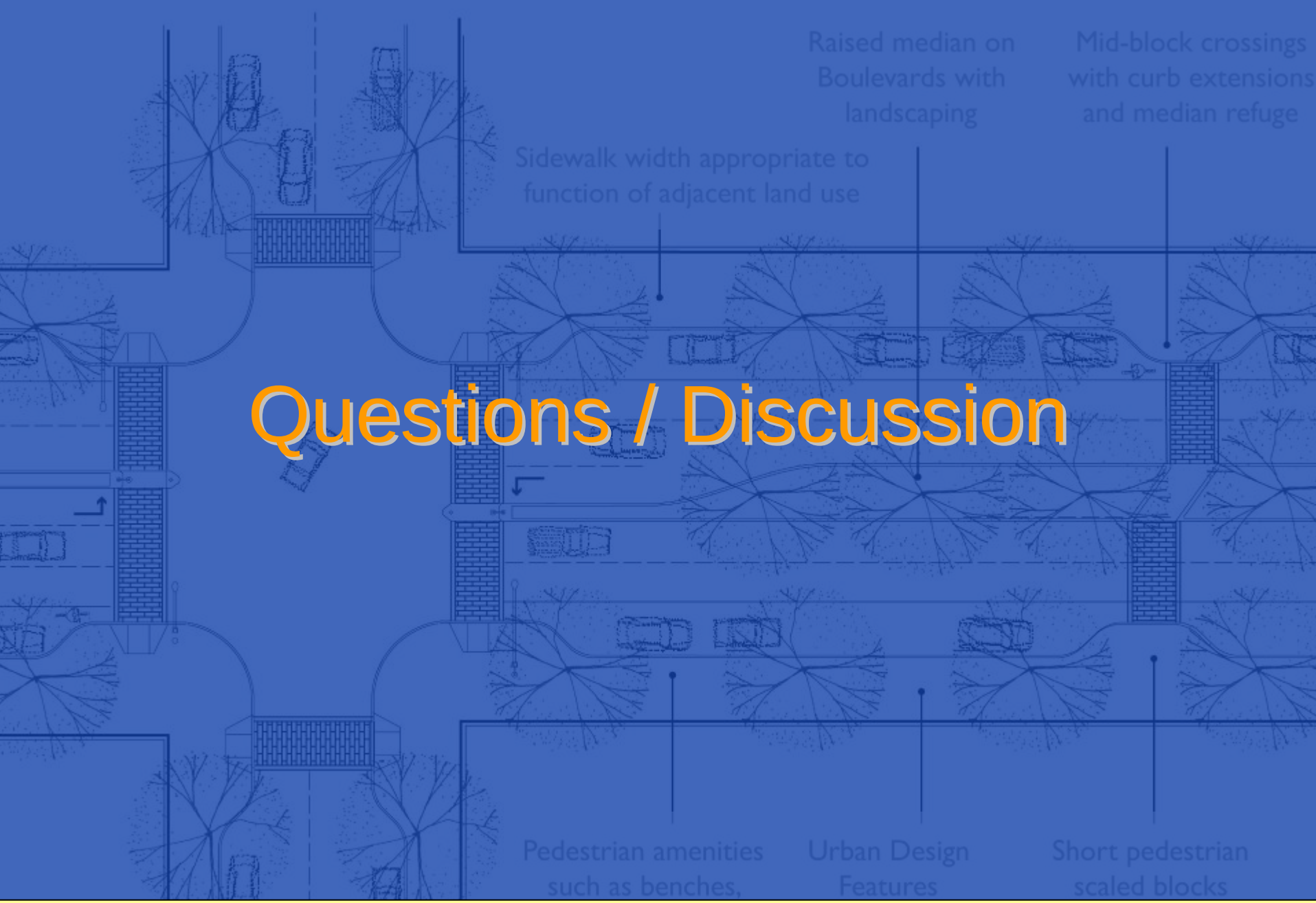
Bulb-Outs

- Improve visibility
- Reduce crossing width
- On streets with parking
- Recommended practice
  - Extend curb line 1 ft. less than parking width
  - Curb return radius for control vehicle
  - Use with bus stops to increase waiting area



WHITE | BLACK

ONE WAY



Questions / Discussion

Areas of Debate, Continuing Discussion

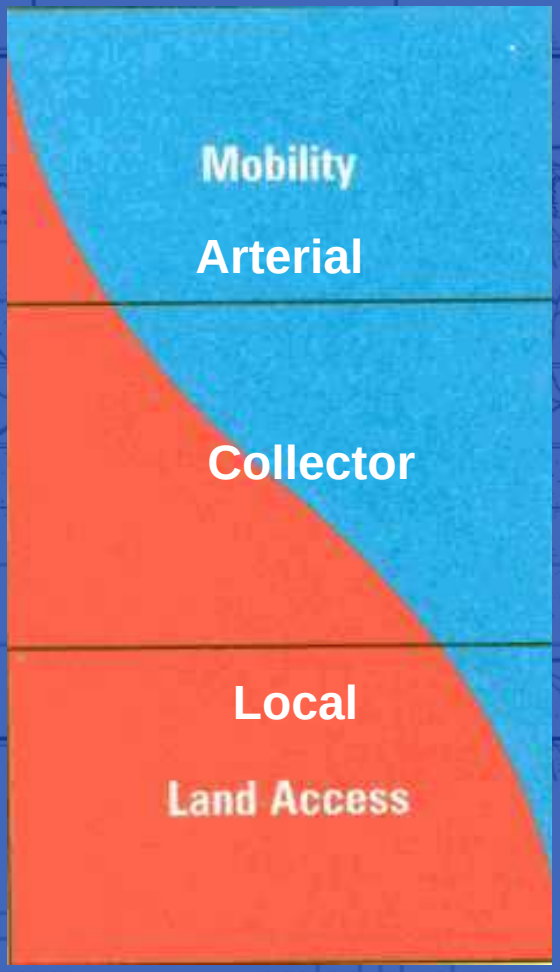
- Design speed vs. target speed
- Appropriate target speeds
- Appropriate lane widths
- Maximum number of moving lanes
- Reduction in design exceptions
- Design vehicle
- Role of level of service
- Clear zones/street trees in urban areas
- Mid-block crosswalks
- Extensive use of bike lanes

Reduce Target Speeds

- Arguments for reduction
  - More walkability
  - Safer; reduced crash severity
  - Recommended range should reach 20 mph (or lower)
- Arguments for no change
  - Target speeds already range to 25 mph
    - Arterials 25-35 mph
    - Collectors 25-30 mph
  - Report does not include slower local streets

Delete Functional Classifications

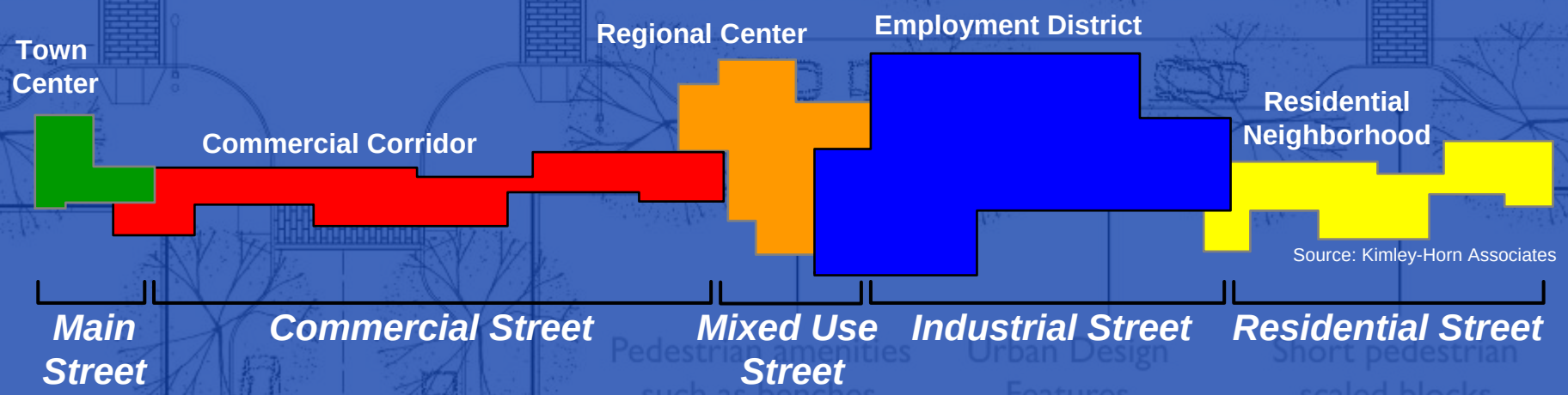
- Arguments against functional classifications:
  - Politically assigned
  - Motivated by funding desires
  - Arbitrary
  - Not reflective of actual function or use
  - Over prioritize mobility role
  - Not properly reflective of urban thoroughfare functions



Expand Thoroughfare Types

Current types
- Boulevard
- Multi-way boulevard
- Avenue
- Street

Additional possibilities
- Define by adjacent land use
  - Main street
  - Commercial street
  - Mixed-use street
  - Residential street
  - Industrial street

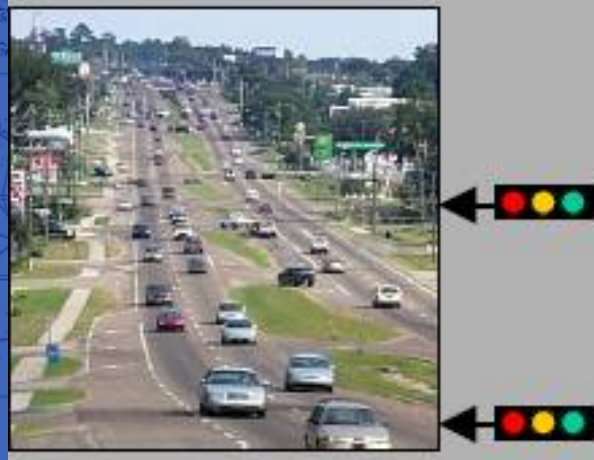


Narrower Traffic Lanes and Increased Range

- Widths vary
  - Most 10-11 feet (11-12 at 35mph+)
  - A few 10-12 feet
- Request for 9 foot widths
- AASHTO
  - Minimum 10 feet for ***major*** thoroughfare
  - Permits 9 feet for turn lane on ***local*** streets

De-emphasize or Emphasize Use of Level Of Service

- Arguments against retention
  - Puts too much emphasis on vehicle movement
  - Does not effectively address Pedestrians, Bicycles, and Transit
  - Over-emphasizes auto mobility function
  - High levels of service not necessarily better for walkable areas
- Arguments for increased emphasis
  - Vehicles provide most of mobility
  - Safety experience tied to LOS
  - Emergency access (area) dependent on LOS



Guidelines for Small Town Main Streets

Provide Mid-Block Signalization Criteria

- Users seek MUTCD warrants or guidelines
- MUTCD signal warrant #4
  - Pedestrian volume warrant
  - Applicable to mid-block
- Add reference to MUTCD warrant #4 in midblock cross-section

More on Multi-way Boulevards

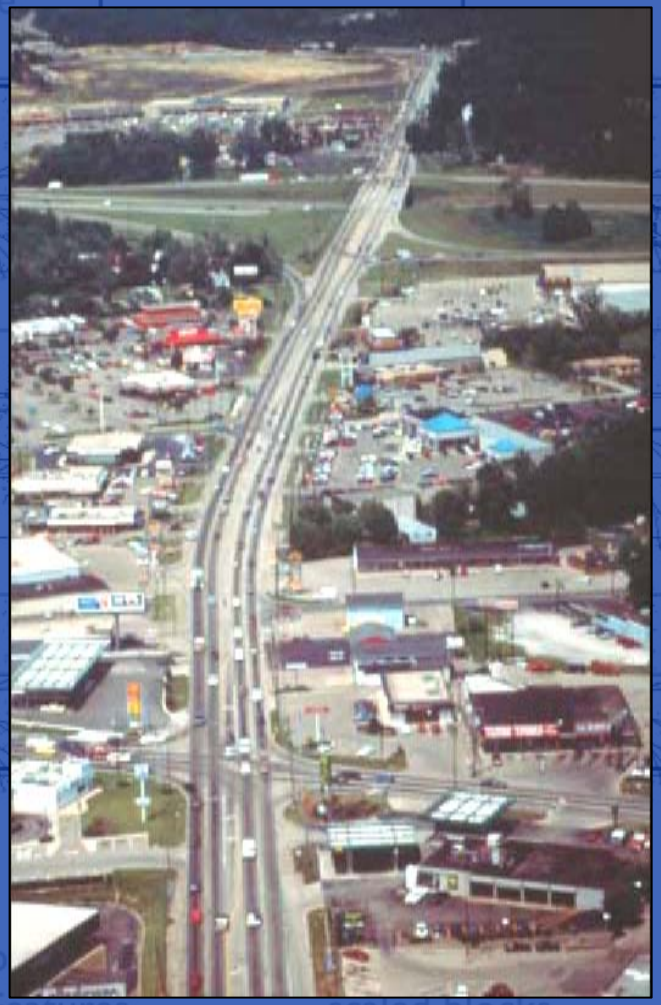
- Requests
  - Make independent thoroughfare type
  - Add more material

Expand Section on How to Locate/Orient Buildings

Source: Steve Price, Urban Advantage

Vehicle Mobility Priority

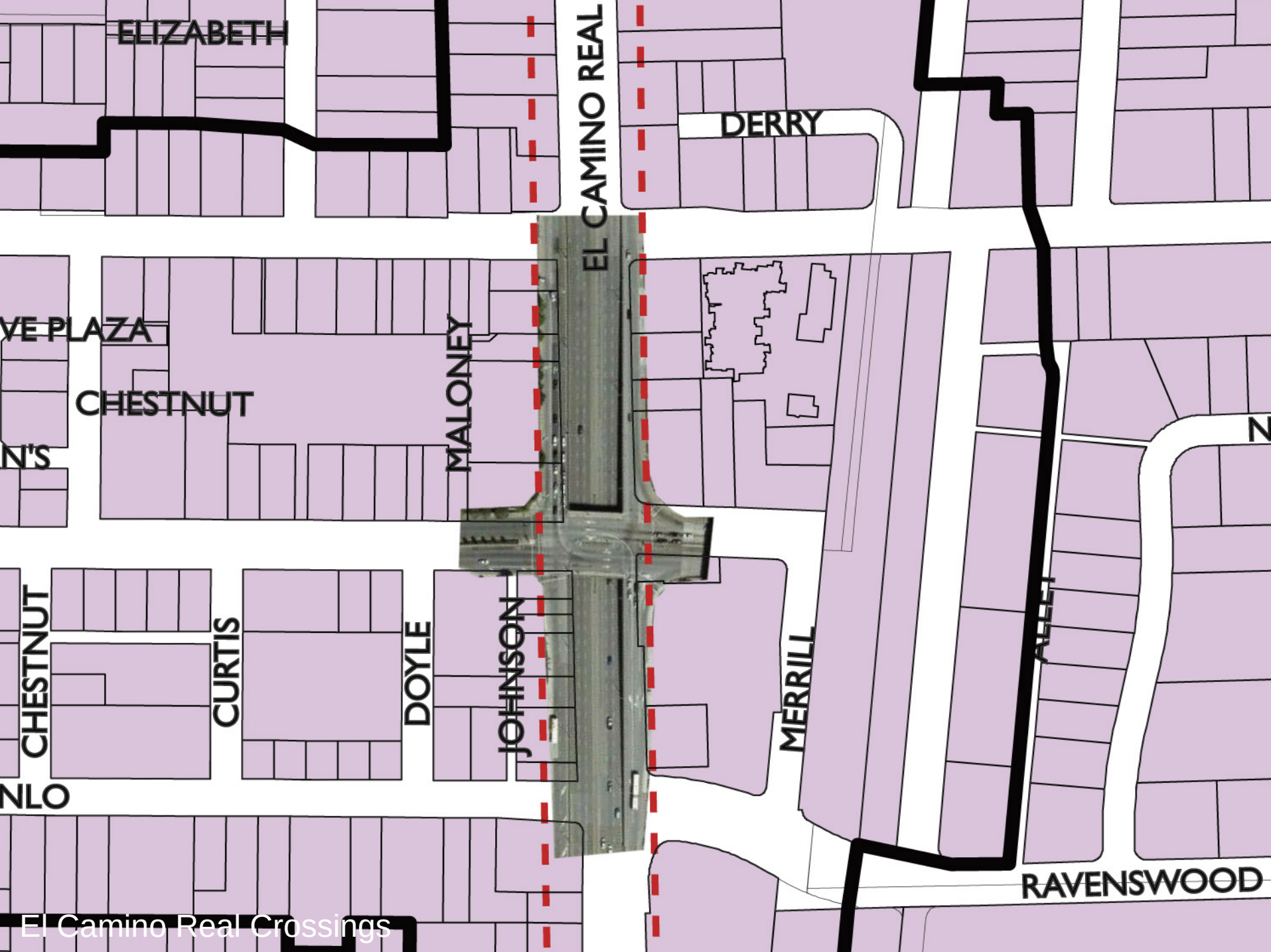
- Chapter 11
- Mobility priority thoroughfares
- Many requests for removal
  - Does not fit context of rest of report
- Some requests for expansion



Other Requested Changes

- More and better examples
  - Photos, illustrations, visualizations
  - Case studies
- Increased flexibility
- More/less bike provisions
- Green streets and storm water management
- More on utility location
- Section on favorable court decisions
- More on ADA policies and requirements
- Broaden section on trade-offs
- Expanded emergency access section

Source: Steve Price, Urban Advantage



El Camino Real Crossings